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Implementation and Continuation of Good Agricultural Practices (GAP) among Fruits & Vegetable Farmers in Kegalle District in Sri Lanka

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Abstract: Since 2015, Sri Lanka has implemented the SL-GAP certification for food safety and quality, but progress has been slow, particularly in farmer adaptation and recertification. This research in the Kegalle district aimed to identify factors influencing SL-GAP's success, and assess GAP awareness, satisfaction with extension programs, and challenges faced by SL-GAP-certified farmers. The study sampled 50 GAP-adopted and 50 non-adopted farmers using purposive sampling, collecting data from March to April 2022 via questionnaires and structured interviews. The analysis employed descriptive statistics, the Mann-Whitney U test, and Binary Logistic Regression. Results showed that extension officer contact, farming experience, government funding, GAP training, and internet access significantly influenced SL-GAP adoption. GAP-adopted farmers were fully aware of site management, irrigation, fertilizer application, storage, and pest control, but less aware of quality management, postharvest practices, worker welfare, record keeping, and traceability. Non-adopted farmers had varying awareness across GAP standards. Major constraints for SL-GAP-certified farmers included a lack of premium prices, inadequate marketing channels, high production costs, and fertilizer shortages. GAP adopters expressed higher satisfaction with extension programs, particularly farm visits, field days, and informational materials. The study concluded that more frequent contact and GAP training are essential. It recommended government provision of necessary inputs and tailored funding programs. Enhanced farmer support and training are crucial for the successful implementation of the SL-GAP program in Kegalle.

Keywords: Good Agricultural Practices (GAP); adopted farmers; non-adopted farmers; awareness; satisfaction; constraint

INTRODUCTION

Food safety has gained much importance throughout time as a result of its significance from both a health as well as a trade standpoint. Safe food production is critical for safeguarding customers from the dangers of foodborne illnesses, and it is crucial both in the domestic food industry and for boosting competitiveness in international markets. Hazards can occur at any point along the food chain, beginning with primary production. As a result, it's critical to start thinking about food safety right at the farm level. Using Good Agricultural Practices (GAP) during on-farm production and post-production processes to produce safe agricultural products is critical to guaranteeing a safe food supply. (FAO, 2016).

Good Agricultural Practices (GAP)

In recent years, consumer interest in safe food while also conserving the environment and maintaining worker well-being have grown. As defined by FAO in the year 2016, GAP is a "collection of principles to apply for on-farm production and post-production processes, resulting in safe and healthy food and non-food agricultural products, while taking into account economic, social and environmental sustainability". It can be simply defined as performing things correctly and ensuring that they are completed.

According to (FAO, 2016) four "pillars" of GAP are: economic viability, environmental sustainability, social acceptability and food safety and quality. By adhering to these practices, Farmers and their families are expected to acquire nutritious, high-quality food to ensure their nutrition and nourishment, resulting in value addition in their products and get improved market access.

GAP in Sri Lanka (SL GAP)

The Division of Agribusiness Council (DoAgbiz) in Sri Lanka has established a framework to ensure the quality and safety of agricultural commodities to local and export markets through GAP. In Sri Lanka, the project's goal is to create a locally relevant GAP program and an Agriculture Produce Safety Information System. The Good Agricultural Practices framework identifies components such as Land History, Land Management, Seeds and Planting material, Soil Nutrient Management, Water source and water management, pest and disease management, Harvesting and Post-harvest handling, Worker welfare, Environment conservation, Record Keeping, and Traceability (Bamunuarachchi, Hitihamu, and Lurdu, 2019). Good Agricultural Practices (GAP) are being introduced on a crop basis for fruits and vegetables. Producers are registered and certified at DOAgbiz as quality-assured suppliers while DOAgbiz act as a data hub to provide necessary information to the parties concerned (Department of Agriculture, 2022). The main duties and responsibilities of the officers attached to the DoAgbiz are instructing, inspecting, and monitoring the whole value chain from the field (soil and seed) up to the retail markets when it comes to the local market aspect and up to the exit point which is National Plant Quarantine Service (NPQS) gate when it comes to European export market to assure the quality of products (Department of Agriculture, 2022).

Background and Justification

The agriculture sector contributes about 7.4 per cent to the national GDP, out of which the fisheries sector contributes around 1.3 per cent, and the livestock sector accounts for 0.9 per cent. Over 30 per cent of Sri Lankans are employed in the agricultural sector (Sri Lanka – Country Commercial Guide, 2021). It is the most common livelihood of Sri Lankans, and almost eighty (80) different varieties of fruits and vegetables are grown in Sri Lanka in varied Agro-climatic areas. In the case of fresh fruits and vegetables, it is important to ensure that there are no negative health effects or harm, including physical injury, from taking these items in their natural state, as they are frequently consumed raw. Residues and contaminants, plant and animal pests and diseases, pathogens and microorganisms, physical contaminants and technological issues such as irradiation or GMOs, food allergens, persistent organic pollutants, claims and labeling issues such as an incorrect "best before" date and fraud are all major food safety concerns (FAO, 2016). Thus, maintaining a safe food supply requires applying GAP during on-farm production and post-production operations. DoAgbiz has given technical assistance to develop the SL-GAP standard. This was developed in collaboration with the Sri Lanka Standard Institute (SLSI), The Department of Agriculture, and other relevant public and private organizations, and standards have been published as Sri Lanka Standard 1523 part 1:2016, UDC 631.57:634 (Department of Agriculture, 2022). Sri Lankan Department of Export Agriculture in the year 2019 stated that Sri Lanka is adjusting well to the stringent ISO 22000 series and the health and safety regulations stipulated by the European

Community. Farmers are constantly educated to practice GAP at the nurseries and some farms are certified under the GLOBAL GAP certification. The Processing/Manufacturing facilities owned by the export companies comply with local standards (SLSI) and also with International Quality Standards such as ISO, HACCP, and EU Standards (SL-EDB, 2019). Food quality should be enhanced starting with the farmers. The use of GAP in the fields can help to improve food quality. It has been observed that the GAP program is progressing slowly, and it is critical to determine what factors are preventing the program from progressing (Bamunuarachchi, Hitihamu, and Lurdu, 2019). On the other side, attention must be given to determining why this program should be implemented, the level of awareness among farmers about this program, and the factors affecting farmer adaptation and continued participation.

RESEARCH PROBLEM

Considering the above information, we can interpret that there is immense importance in assuring Food Safety and Food Quality. As a strategy to keep food safety and food quality, the Government of Sri Lanka implemented an SL-GAP certification system in the year 2015, for fruit and vegetable farmers all over the country. Even though farmers participated in the training sessions and extension programs, it has been observed that farmers' adaptation to the GAP program and slow progress in farmer recertification to the program and the SL-GAP program is not performing well in the fruit and vegetable sector. It has not gained much popularity among fruit and vegetable farmers. Hence, it is vital to understand what factors affect the successful implementation of the SL-GAP program, and what are the major constraints faced by the SL-GAP certified fruit and vegetable farmers while continuing good agricultural practices. On the other hand, it is necessary to identify the satisfaction level for existing extension programs and the level of awareness among SL-GAP adopted and non- adopted farmers about these practices to make suggestions and improvements to this program.

OBJECTIVES

The broad objective was to analyze factors affecting the successful implementation of good agricultural practices (SL-GAP) and make recommendations to improve the gap adaption of fruit and vegetable farmers in Kegalle district. Specific Objectives were to identify the factors affecting for successful implementation of SL-GAP among fruits and vegetable farmers**,** to examine the level of awareness about good agricultural practices among SL-GAP certified and non-certified fruit and vegetable farmers**,** to identify constraints faced by the certified farmers when continuing Good Agricultural Practices in and to identify the satisfaction level of farmers with existing extension programs carried out by the Department of Agriculture (Division of extension services) among fruit and vegetable farmers in Kegalle District.

MATERIAL AND METHOD

The study approach is a deductive approach and the research is a descript-explanatory type of study. A survey strategy was adapted to collect the data for the study. The researcher was able to obtain a considerable amount of data from the target demographic using the survey approach, allowing the sample size to be completed. In the survey strategy, self-administered questionnaires are used to obtain data from the target population. In the research, the survey technique collects quantitative data that can then be examined using descriptive and inferential statistics. Data collection was carried out from 07th March to 03rd April 2022.

Conceptual Framework

The conceptual framework of this study was constructed by studying literature and the hy-

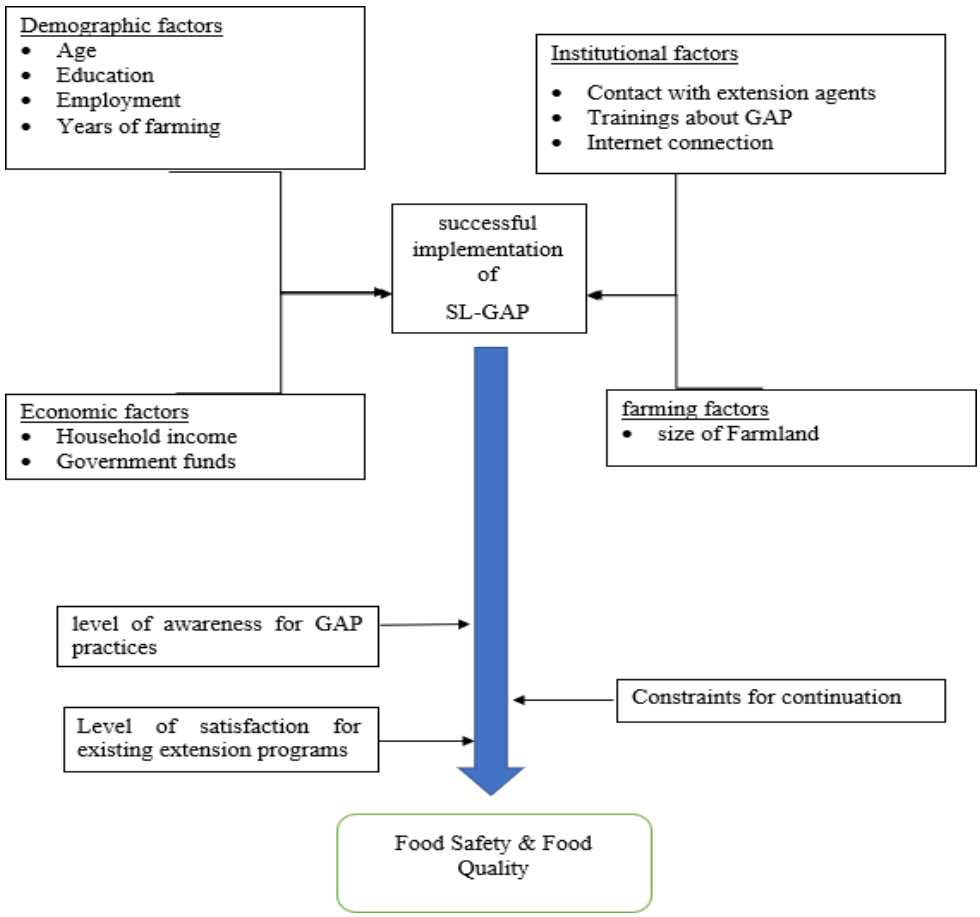

Fig. 1. Conceptual framework of the study

pothesis established in this study, the conceptual framework of this study is shown in Figure 1.

Research Area

Kegalle district was selected as the area of the study. There are eleven DS divisions in the district. The statistical and census data reveal, that in 2021 there was a total of 898,000 of the population in the Kegalle district. However, the researcher had identified 90 active farming households representing one person from each farming household who is certified under SL-GAP certification.

From the 11 DS Divisions, 5 DS divisions were selected to collect the data, considering the convenience of traveling and limitations. Aranayaka, Mawanella, Rambukkana, Kegalle and Warakapola DS divisions. As per the requirements of land size for GAP certification, vegetable farmers with a minimum of 0.25 acres and fruit farmers with a minimum of 0.5 acres of land were selected for this survey.

The purposive sample has been selected for this study. In this study total of 100 fruit and vegetable farmers were selected. Out of them, 50 farmers were SL-GAP certified and others were non-certified farmers. Most statisticians agree that the minimum sample size is 100, to get any meaningful result. In this study, the reasons for using the sample size of 100 due to limited time and money. The researcher selected 50 GAP-certified farmers and 50 non-certified farmers from selected DS divisions to carry out the research.

The field survey method was used as the major data collection method and data was collected via

interviewer administrated questionnaire and in-depth interviews. The list of GAP-certified fruit and vegetable farmers was obtained from the divisional Agrarian Service Center, Kegalle. The questionnaire consisted of three major sections. The first section aimed to find factors affecting the successful implementation of good agricultural practices. The second section aimed to find the level of awareness among the fruit and vegetable farmers about good agricultural practices. The third section aimed to find the satisfaction level of farmers with the existing extension programs.

RESULTS AND DISCUSSION

Socio-economic factors of the respondent

Socio-economic factors; gender, marital status, age, education, employment and farmland ownership of both groups of farmers were studied. According to the results, 44% of the adopted farmers are male and only 6% are female. Among the non-adopted farmers, 33% of the farmers were male and 17% of them were female. In the non-adopted farmers, we can see a higher percentage of female participation in farming. Among the adopted farmers 42% of the farmers were married and 47% of married farmers were there in the non-adopted farmer sample as well. When we consider land ownership 44% of farmers owned their farmlands and among the non-adopted farmers, there were 49% of farmers who are farming on their lands. As per the results, a low percentage (6%) shows that they are farming on rented lands. But among the non-adopted farmers mostly considered conventional farmers, most of them own their farming lands.

When we consider the education of the farmers, the adopted farmers and non-adopted farmers both showed a high percentage of secondary education and between the two groups of farmers, the adopted farmers showed 11% of farmers are having higher education but only 5% of non-adopted farmers showed higher education level. So, it's clear that farmers with higher education level are more tend to adopt into GAP program. The results show that, among adopted farmers higher percentage (16%) of farmers were in between 31 year to 40 years age range. 15% of farmers were in between the age range of 51 to 60 years old. According to the results, 14% of non-adopted farmers were between 51 to 60 years old. From the results, we can see that most of the young farmers who are at age range 31 to 40 years old are more tend to adopt the GAP program. A higher percentage (21%) of adopted and non-adopted respondents stated that their main employment was farming. Among adopted farmers 18% of them were engaged in government sector employments while farming. 16% of farmers non-adopted farmers were also engaged in government jobs. Non-adopted farmers show a higher percentage (8%) of self-employment than adopted farmers (3%) as per the results.

Factors affecting for successful implementation of SL-GAP program

The binary logistic model was used to analyse and identify the factors affecting for GAP adaptation.

With regard to the factors affecting for successful implementation of SSL-GAP program, VIF values are between 1 and 2 (do not exceed 5 or 10), and all tolerance values exceed 0.2. Therefore, (Table 1) results indicate that the independent variables have not faced the problem of multicollinearity. It can imply that the associated regression coefficients are not poorly estimated because of multicollinearity.

According to the omnibus test, (the Likelihood ratio chi-square of 85.423 with a p-value of 0.000 (lower than 0.05) tells us that our model as a whole fits significantly better than an empty model. Model summary interprets that a 75.2% change in the criterion variable can be accounted for the predictor variables in the model. According to the results, overall the accuracy rate was very good at 90%. The model exhibits good sensitivity. The model correctly classified 88% of cases overall.

Hypothesis for the test:

H0: Age, education, employment, years of farming, household income, government funds, contact with extension agents, received GAP training, availability of internet connection and size of the farmland do not have an effect for the GAP adoption;

H1: The age of the farmer has an effect on GAP adaptation;

Table 1. Coefficients for multicollinearity test

Model		Standardized Coefficients			t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.260	.263		-.989	.325		
	Age	.001	.004	.029	.318	.751	.605	1.652
	Education	.034	.057	.047	.587	.558	.785	1.273
	Years of farming	-.010	.004	-.229	-2.503	.014	.603	1.658
	Household income	6.505 E-007	.000	.181	2.201	.030	.752	1.330
	Contact with extension agents	.510	.085	.453	5.971	.000	.879	1.137
	Government funds	.134	.077	.129	1.728	.087	.906	1.104
	Got GAP training	.248	.084	.220	2.956	.004	.911	1.098
	Internet connection	.259	.082	.246	3.154	.002	.833	1.200
	Employment	.035	.035	.078	.995	.323	.814	1.228
	Size of Farmland	-.035	.022	-.119	-1.548	.125	.851	1.175

a. Dependent Variable: Gap Adaptation.

Table 2. Model test results of the logistic regression

	B	S.E.	Wald	df	Sig.	Exp. (B)	95% C.I.for EXP(B)	
							Lower	Upper
Age	.041	.039	1.092	1	.296	1.042	**.965**	1.126
Education	.071	.570	.015	1	.901	1.073	**.351**	3.283
Years of farming	-.155	.054	8.272	1	**.004**	.857	**.771**	.952
Household income	.000	.000	1.873	1	.171	1.000	**1.000**	1.000
Contact with extension agents	5.552	1.396	15.811	1	**.000**	257.840	**16.702**	3980.371
Government funds	1.992	.907	4.828	1	**.028**	7.330	**1.240**	43.329
Got GAP training	2.757	1.058	6.789	1	**.009**	15.746	**1.980**	125.216
internet connection	2.312	.875	6.986	1	**.008**	10.091	**1.817**	56.030
Employment	.442	.356	1.538	1	.215	1.555	**.774**	3.126
Size of Farmland	-.189	.244	.598	1	.439	.828	**.514**	1.335
Constant	-9.653	3.259	8.775	1	.003	.000		

a. Variable(s) entered on step 1: Age, Education, Years of farming, Household income, Contact with extension agents, Government funds, Got GAP training, Internet connection, Employment, Size of Farmland.

H2: The education of the farmer has an effect on GAP adaptation;

H3: The employment of the farmer has an effect on GAP adaptation;

H4: The years of farming of the farmer has an effect on GAP adaptation;

H5: The household income of the farmer has an effect on GAP adaptation;

H6: The government funds have an effect on GAP adaptation;

H7: contact with extension agents of the farmer has an effect on GAP adaptation;

H8: participation in GAP trainings by the farmer has an effect on GAP adaptation;

H9: The availability of internet connection for farmer has an effect on GAP adaptation;

H10: The size of the farmland has an effect on GAP adaptation.

The corresponding model ($\hat{P}$ is the estimated probability of Gap adaptation) is:

$\ln((\hat{\mathbf{p}})/(\mathbf{1}-\hat{\mathbf{p}})) = -9.653 + 5.552$ con_with_ext._agent + 1.992 Gvt_funds + 2.757 Got_gap_training + 2.312 Int_conection – 0.155 Yrs_farming

If $Y = \ln((\hat{p})/(1-\hat{p}))$, then $\hat{P} = (\exp(Y))/(1+\exp(Y))$

$\hat{P}(\text{no}) = 1 - \hat{P}$

When considering a person's contact with extension agents, versus a person who doesn't contact extension agents, increases the log odds of adopting to the gap by 5.552. So the odds of adopting to the gap for those who contact extension agents is e5.552 = 257.84 times higher than the odds of adopting for the gap for those who don't contact extension agents. The reason behind this result can be that of extension officers are paying their attention into individual farmers who have the potential to adapt into the GAP program. So they build close relationships with extension agents. Also, extension officers are paying more visits to those potential farmers. So, the result can be positive and significant. Finally, we can interpret that those who are getting more contact with extension agents are more likely to adopt the GAP program than those who are not getting that much contact with extension officers.

Government funds have a positive coefficient in the model. So, a person who has received government funds, versus a person who doesn't receive government funds, increases the log odds of adopting to the gap by 1.992. So, the odds of adopting to the gap for those who have received government funds is e1.992 = 7.330 times higher than the odds of adopting for gap those who don't receive government funds.

The results can be interpreted as farmers who want to get funds or 50% subsidies are more likely to enter into the GAP program. Under the GAP program at the initial stage, farmers can have a 50% subsidy for any kind of purchase costs. (farmers have to show the bill and get half of the amount from the government), solar panels, insect-proof nets, ladders, pig nets, electric fences, water motors, spray machines, grass cutters, sprinkler irrigation systems, farming equipment, etc. Thus, the farmers are more willing to purchase GAP certification because of these government funds.

According to the model, receiving gap training has a positive coefficient in the model. So, a person who received gap training, versus a person who doesn't receive gap training, increases the log odds of adopting to the gap by 2.757. So, the odds of adopting to the gap for those who have received gap training is e2.757 = 5.746 times higher than the odds of adopting for gap those who haven't received gap training.

Most of the potential farmers who receives trainings about GAP is willing to get the GAP certification because through trainings they have known the benefits from this program.

A person who has an internet connection, versus a person who doesn't have an internet connection, increases the log odds of adopting to the gap by 2.312. So, the odds of adopting to the gap for those who have an internet connection is e2.312 = 10.091 times higher than the odds of adopting of gap for those who don't have an internet connection.

The coefficient of the model for years of farming is significant. When increasing one unit years of farming, the log odds of adopting to the gap is decreased by 0.155. So, the odds of adopting to the gap for those who have lower number of years of farming is e0.155 = 0.857 times lower than the

odds of adopting of those who have higher number of farming years. Thus, there is a higher probability to GAP adoption by a person who has lower number of years of farming. Most of the farmers were young. So they don't have much experience in farming. This could be a reason for the negative effect. Also, conventional farmers are resistant to adopt new technologies. Even though they have more experience they don't like to change the way of farming and they do not like to get advice from extension officers that much. But the young farmers are always willing to get advice and always trying to do new things.

Level of awareness about Good Agricultural Practices among SL-GAP certified and non-certified fruit and vegetable farmers

Descriptive statistics were used to interpret the data. Likert scale questions were given under the 9 GAP practices; site management, irrigation, fertilizer application, pest and disease control, harvesting and post-harvesting management, storage, workers' health and welfare, record keeping and traceability. According to the level of awareness about GAP among respondents, results show that GAP-adopted farmers were fully aware of site management (24%), irrigation (24%), fertilizer application (26%), pest and disease control (21%) and storage practices. However, farmers were somewhat aware of the practices such as harvesting and postharvest management (21%), workers' health and safety (21%), record keeping (16%) and traceability (18%). Among non-adopted farmers, some farmers had an idea about GAP practices and they were willing to adopt into GAP program. Therefore, in the results, we can interpret that, they were aware of site management (16%), irrigation (15%), fertilizer application (14%), pest and disease control (13%), and they were fully aware of storage practices (14%). There are some Non-adopted farmers who are willing to adopt into the GAP program and some farmers were already participated in some GAP training sessions. Because of that, we can see some farmers know some of the GAP practices.

Constraints for continuation faced by GAP adopted farmers the fruit and vegetable farmers

Multiple response questions were given to the farmers according to the previously identified constraints identified by descriptive statistics. Among GAP adopted farmers' lack of fertilizers in the market, the high cost of production due to the high price of farm inputs, no high price in the local market and no proper marketing channel for the GAP certified products were the major constraints faced by the adopted farmers while continuing good agricultural practices. In the current situation of the country, there is a high demand for fertilizers in the market. But fertilizers are lacking in the market. With the economic crisis of the country almost all the essential goods are at high price. Thus, farmers' cost of production is high because of the high cost of farm inputs. Apart from that, farmers are joining the GAP program with high expectations that, it will be a greater demand for their production and it will be easy to sell production in high price. But in the current situation, the local market is not demanding the GAP produce. Thus, it is hard to obtain a high price in the local market. As for the export markets, only one farmer in the district is exporting. Through exporting, farmers can gain a high price but there is low level of link between export market buyers and local producer farmers. So, it is hard to enter into the export market for the local farmers. Even though the department is introducing the good agricultural practices, the government is not involved in the marketing of GAP produces. Government has introduced "Agri Fresh" marketing stalls in the all 25 districts, but at the moment they are not functioning very well.

Satisfaction level of farmers about existing extension programs carried out by the Department of Agriculture

Likert scale questions were asked from the farmers according to the identified extension programs such as field days, farm visits, exhibi-

tions, group discussions, advertisements/handouts/magazines, farmer trainings and seminars. Mann-Whitney u test was implied to find the test results.

***Test hypothesis for field days**:*

According to the Mann-Whitney U test, the *p*-value (0.000) is lower than 0.05. Therefore, there is enough evidence to reject the null hypothesis. Therefore, there is a significant difference between the satisfaction level of field days with gap adoption and without gap adoption. According to the mean value for rank, the satisfaction level for field days of adapted farmers is higher than GAP non- adopted farmers.

Test hypothesis for farm visits:

According to the Mann-Whitney U test, the *p*-value (0.029) is lower than 0.05. Therefore, there is enough evidence to reject the null hypothesis. Therefore, there is a significant difference between the satisfaction level of farm visits with gap adoption and without gap adoption. According to the mean value for rank, satisfaction level for farm visits of GAP non- adopted farmers are higher than adopted farmers.

Test hypothesis for leaflets/books/magazine:

According to the Mann-Whitney U test, the *p*-value (0.015) is lower than 0.05. Therefore, there is enough evidence to reject the null hypothesis. Therefore, there is a significant difference between the satisfaction level of magazines, leaflets, booklets with gap adoption and without gap adoption.

According to the mean value for rank, the satisfaction level for magazines, leaflets, and booklets of GAP-adopted farmers is higher than Non-adopted farmers.

Test hypothesis for exhibitions:

According to the Mann-Whitney U test, the p value (0.304) is higher than 0.05. Therefore, there is not enough evidence to reject the null hypothesis. Therefore, there is **no significant** difference between the satisfaction level of exhibitions with gap adopted and non-gap adopted farmers.

Test hypothesis for group discussions:

According to the Mann-Whitney U test, the *p*-value (0.413) is higher than 0.05. Therefore, there is not enough evidence to reject the null hypothesis. Therefore, there is **no significant difference** between the satisfaction level of group discussions with gap adopted farmers and non-gap adopted farmers.

Test hypothesis for farmer trainings:

According to the Mann-Whitney U test, the *p*-value (0.199) is higher than 0.05. Therefore, there is not enough evidence to reject the null hypothesis. Therefore, there is **no significant difference** between the satisfaction level of farmer trainings with gap adopted and non-gap adopted farmers.

Test hypothesis for seminars:

According to the Mann-Whitney U test, the *p*-value (0.536) is higher than 0.05. Therefore, there is not enough evidence to reject the null hypothesis. Therefore, there is **no significant difference** between the satisfaction level of seminars with gap adopted and non-gap adopted farmers.

CONCLUSIONS

The study aims to identify the factors affecting for successful implementation of SL-GAP in Kegalle District. The result of this study supports the proposed research objectives, and the following conclusions can be drawn. The first objective indicates that identifying factors affecting for GAP adoption among fruit and vegetable farmers. Out of the ten factors; age, education, employment, years of farming, household income, government funds, contact with extension agents, participation in GAP trainings, internet accessibility/ connection, and farmland size, only five factors; Contact with extension agents, years of farming, having internet connections, receiving government funds and trainings about GAP affects the farmers' decision for whether or not to adopt to GAP program. This can be because of the small sample size (only 100 respondents). Contact with extension agents, having internet connections, receiving government funds and trainings about GAP show a positive and significant effect on GAP adoption. This means an increase in these factors can increase the GAP adoption. The level of awareness about harvesting and postharvest management, workers' health and welfare, record

keeping and traceability was low even among the adopted farmers. Among non-adopted farmers, some farmers had an idea about GAP practices and they were willing to adopt into GAP program. Therefore, in the results, we can interpret that, they were aware of site management, irrigation, fertilizer application, pest and disease control, and they were fully aware of storage practices. With regards to the constraints faced by the GAP adopted farmers when they are continuing Good Agricultural Practices. The research results show that adopted farmers are majorly facing challenges such as lack of fertilizer, high cost of production, no premium price for GAP products and no proper marketing channels for GAP products when continuing their GAP practices.

When considering the satisfaction level of existing extension programs among GAP adopted and Non-GAP adopted farmers, Field days, farm visits and leaflets/books type extension programs show different satisfaction levels among adopted and non-adopted farmers. Adopted farmers show a high satisfaction level for field days and magazines/leaflets/booklets type extension programs while Non-adopted farmers show a high satisfaction level on farm visits.

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