

Research Article

Adoption and Utilization of Organic Farming Practices on Cabbage Production Among Small Scale Farmers in Sheema Municipality

Annet Kyarisiima*, Fina Opio, Gershom Nuwemuhwezi

Agriculture and Agribusiness, Bishop Stuart University, Mbarara, Uganda

Abstract

The study focused on assessing the adoption and utilization of organic farming practices on cabbage production among farmers in Sheema Municipality. It specifically looked at; finding out the existing organic farming practices on cabbage production, factors influencing the adoption of organic farming practices on cabbage production among smallholder farmers and suggesting the possible ways of motivating smallholder farmers to increase the adoption of organic farming practices in cabbage growing. The study employed a cross-sectional research design and primary data was collected from 322 respondents. The study used questionnaire and interview guide to collect data. The data was analysed using SPSS version 22.0. The study concluded that there were major existing organic farming practices on cabbage production among farmers. Such as; crop rotation, mulching, cultural weed control and intercropping respectively, use of crop residues and organic fertilizer application. The study also concluded that there were significant factors influencing the adoption of organic farming practices on cabbage production among smallholder farmers which included; land ownership at ($p=.002$), knowledge on use of organic farming practices ($p=.029$), limited off and on-farm income ($p=.003$) extension training services ($p=.025$) and availability of credit services ($p=.024$). The study concluded that there were significant and non-significant possible ways of motivating smallholder farmers to increase the adoption of organic farming practices which included; awareness campaigns and emphasis on training workshops on use of organic farming practices was significant at ($p=.002$), increasing easy access to credit to famers at low interest rate was also significant at ($p=.005$), subsidization of organic farming materials at a least cost by government was also significant at ($p=.001$), Capacitating the national extension systems to respond to organic agriculture needs was significant at ($p=.000$) and non-significant ones were; encouraging collaboration between farmers and trading institutions at ($p=.144$) trading and marketing organic agriculture products at ($p=.590$) and establishment of market infrastructures for organic products at ($p=.199$). The study recommends that; there is a need to develop a cadre of trained and certified organic agriculture professionals to support move towards use of organic farming practices, there is a need to ensure constant extension trainings on organic farming to cabbage farmers to enhance adequate knowledge that would change their negative attitude and perception towards use of organic farming practices and there is a need for credit institutions to lower their interest rate under the government policy to allow most cabbage farmers access credit.

Keywords

Adoption, Utilization, Organic Farming, Cabbage Production, Smallholder Farmers, Sheema Municipality

*Corresponding author: Annetkyarisiima260@gmail.com (Annet Kyarisiima)

Received: 1 February 2024; **Accepted:** 22 February 2024; **Published:** 12 April 2024



1. Introduction

Globally, in many parts of the world like Brazil, China and Germany, soil depletion and imbalanced nutrient use have become serious hindrances to agricultural development, in turn affecting food security and environmental stability. Studies by Wu and Ma, Powlson, et al. [20, 15] argue that the soil management techniques used in organic agriculture maintain a stable soil and nutrient balance in the environment, thereby making it a more sustainable way of exploiting the natural resource base. The absence of chemical inputs also implies less of a cost for the farmer since the manufactured fertilizers and pesticides that are usually imported will not be purchased [21]. Organic products are noted to pose lesser health to the farmer and consumers as observed in studies by [3] where it is estimated that globally more than 350,000 people die from pesticide poisoning each year.

Liu, et al., [9] have concluded the organic farming systems are suitable for smallholder farmers given that they rely on locally available resources and build on indigenous knowledge which allows for the development of highly productive farming systems that yield a variety of products and services to sustain the livelihood of farmers and also increases the food security of farmers' families while the international market for organic agricultural produce offers good value for their products in Germany [6].

In Africa, organic farming is affected by factors ranging from political, economic, socio-cultural, and environmental as well as technological advancement. These have been echoed for advocating and embracing organic farming [5, 7]. The negative environmental impacts associated with increasing industrialization of agricultural production and the belief that agricultural problems can be solved by the appropriate use of machines and chemicals has accelerated the development of alternative farming methods [4].

According to [14] in Sub-Saharan Africa Organic farming was as a result of failure of green revolution to meet the expectations, especially that of increasing agricultural production. [10] Opines that organic farming is a cheap and a sustainable alternative in which farmers can produce without causing health or environmental damages and further over-emphasized on the financial benefits at the expense of other aspects.

Uganda is one of the leading African countries producing and exporting organic products to the EU, US, Japan and other export destinations. Organic Agriculture contributes approximately 17.1% of the value of agricultural exports which currently stand at USD 291.2 million per annum. Recent data of the export volumes per crop is limited, however according to the national organic agriculture policy (2019).

In 2009/2010 the leading export organic products ranked by volumes in metric tons were coffee (3,451.7), cocoa (2,914.8), sesame (2,160), cotton (1,689.5), fresh fruits (1,501.9) and dried fruits (115.6), bird eye chillies (101), vanilla (99.30), garments (81.153 pieces), shea nuts (54),

frozen fruit pulp (8.26). In total, the country managed export sales worth USD 56.9 million in 2016 and USD 50 million in 2018. Through the recently launched National Organic Agriculture Policy (December 2019), the Government of Uganda recognizes the huge potential for Organic Agriculture, both for increased and sustainable food production to safeguard food security as well as for enhanced income for farmers. Although the sector is currently export-driven, branded organic products are slowly penetrating the shelves of local supermarket chains and restaurants, attributed to the growing health consciousness and wellness trends in the country.

2. Problem Statement

Agriculture in Uganda is heavily dependent on nature due to the very minimal use of external inputs. For example, apart from other aspects, the use of chemical fertilizers is among the lowest in the world between 1–1.5kg per hectare [16]. This implies that the conversion to organic agriculture potential is high for most Ugandan smallholder farmers. However, the production of organic products remains marginal with about two percent of the country's agricultural land devoted to organic agricultural production. It is estimated that out of the USD 500 million worth of organic products demand from Uganda alone, only USD 50 million is being met [12]. A number of factors have contributed to the failure to realize Uganda's full organic agricultural potential – low yields due to heavy reliance on natural weather cycles, traditional methods and equipment; high cost of certification for most smallholders; high logistical costs to export destinations; and limited infrastructure for processing and value addition [12].

In Sheema Municipality, Most of farmers are producing cabbages commercially and provide the merchandise to urban areas [18]. But the dark side is that they're producing cabbages by using different synthetic chemicals intensively. Only a few people comprehend the harmful potential effects of those chemicals [18]. These chemicals are dangerous to human health, animal health, soil and environment. Although most of the non-government organizations and government bodies are advocating for organic farming, most of the cabbage farmers still use conventional farming methods especially the use of chemical fertilizers, herbicides and pesticides since they are perceived to be less expensive, quicker to use and results into increased yields. This forced farmers to abandon organic farming practices hence increasing the rate at which the environment is degraded since most of the cabbages are grown in wetlands lands and near water sources like water streams. It was from above background that this research was conducted to assess the adoption and utilization of organic farming practices among cabbage farmers in Sheema Municipality, South western Uganda.

3. Research Objectives

The general objective of the study was to assess the effect of adoption and utilization of organic farming practices on cabbage production among cabbage farmers in Sheema Municipality. The specific objectives were to; find out the existing organic farming practices on cabbage production, (determine the factors influencing the adoption of organic farming practices on cabbage production among smallholder farmers, and suggest the possible ways of motivating smallholder farmers to increase the adoption of organic farming practices in cabbage growing.

4. Significance of the Study

The research findings will be helpful to a number of development stakeholders (Researchers, Policy makers, Extension systems, Private and Public Sector, NGOs among others) in implementation of agriculture policy. It is hoped that, the study will be used to develop more comprehensive knowledge about organic farming practices, its application and challenges that come with its use. The findings of the study shall equip policy makers during decisions making concerning cabbage farmers by informing them on the relationships and effective diffusion delivery systems. The findings shall be relevant to researchers, extension agents and stakeholders concerned with the issues of food security. The study shall serve as the basis for the development of further research while adding to the existing body of knowledge. The knowledge gained from this study will encourage more farmers to adopt organic farming practices as well as allocate bigger proportions of land under organic agriculture hence, increasing cabbage yields. The associated organic farming practices will lead to many improvements to the natural environment including increased water retention in soils, reduced soil erosion and improved organic matter in the soil, increased biodiversity. The farmers will benefit by exploring factors constraining them from adopting the different organic farming practices, they shall be equipped with information that will provide advice on how to address the challenges and benefits from improved organic banana-growing practices. This will eventually enable them to engage in improved farming techniques and increased incomes, as well as food security. The study will be of important for policy makers, extension officers, individual farmers and therefore will provide supplement information to those who may wish to conduct similar studies.

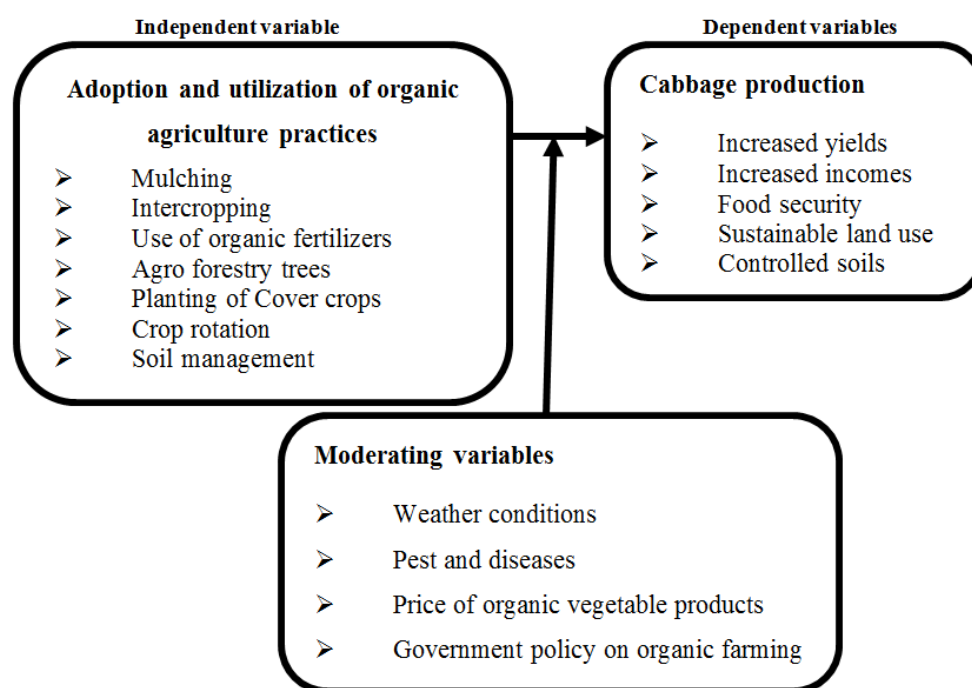
5. Justification of the Study

Cabbage is an essential cabbage crop in Uganda, and its production plays a significant role in the country's food security and economic development. However, conventional farming practices such as the use of synthetic fertilizers and pesticides have negative impacts on the environment and human health. Therefore, the adoption of organic farming practices in cabbage farming can promote sustainable agriculture and improve farmers' livelihoods. Although some improvement in their household income has been realized; majority of the farmers have been producing cabbages with chemicals particularly during weed and pest control. The increased demand for organic cabbages across the globe necessitates majority of the farmers to adopt organic farming but the adoption of the practices is still low in the study area.

Organic cabbages production is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony [12]. Organic cabbages is sold at a premium at the retail level; higher margins have been generated for all those involved in the marketing chain although the distribution of these margins may be skewed against producers [12]. Both the adoption of the organic farming practices among cabbage farmers is still low in most of cabbage producing areas including Sheema Municipality. This study is therefore important and timely since it looks forward to finding out why farmers are not adopting organic practices in cabbage production given the associated benefits. It will recommend which interventions stakeholders should consider if improvement of the smallholder farmers' livelihoods is to be achieved through organic farming.

6. Conceptual Frame Work

Conceptual framework is an illustration of the relationships between the variables identified for the study. It shows the relationship between the independent and the dependent variables. The conceptual framework is based on a three factor-general systems model. General Systems model which posits that in order to achieve the objectives, identified entities come together to achieve the objective. In this case the conceptual framework is based on a three factor model consisting of i) Independent variables, ii) Dependent variables and iii) intervening variable. As shown in Figure 1, below. For this particular study, adoption and utilization of organic farming practices (independent variable) and cabbage production (Dependent variable).



Source: Researcher's own construct, 2023

Figure 1. Conceptual frame work.

$$= 3.8416 \times 0.60 \times 0.35 / 0.0025$$

$$n = 322 \text{ respondents}$$

7. Materials and Methods

The study was conducted in Sheema municipality, South western Uganda.

The study used a cross sectional research design to assess the level of adoption and utilization of organic farming practices on cabbage production among cabbage farmers in Sheema Municipality. This design was used for the study because it was useful in securing evidence concerning an existing situation as well as identifying standards and norms with which to compare present conditions in order to plan the next step.

The study used pragmatic research philosophy since it catered for both quantitative and qualitative methods that played a part, depending on the research questions and the context of the study. This philosophy was deemed appropriate because it manifested in studies that adopted a mixed-method approach, utilizing a combination of different data types and analysis methods.

The sample size was drawn using a formula by Kish and lisle (1965).

Where n - Sample size

e^2 - Degree of accuracy 0.05

p – Estimated number non adopters of organic farming (60%)

q – Farmers who practice organic farming adopters (35%)

z^2 - 1.96 standard normal deviation

$$n = 1.96^2 \times 0.60 \times 0.35 / 0.05^2$$

The study employed both simple random and purposive sampling techniques to select respondents who will participate in this study. This method was applied in selecting cabbage farmers because research findings resulting from the application of simple random sampling was generalized. Purposive sampling was used to select local leaders and agricultural extension workers. These were selected because of their positions and roles in the implementing of different agriculture programs at community level.

The research used two research tools which included questionnaire and interview guide; Questionnaires were used due to their cost-effectiveness, as they could be distributed to a large number of respondents at a relatively low cost, they were standardized since all respondents were asked the same questions in the same way, which reduced the potential for bias in the data and allowed for anonymity, which encouraged respondents to provide honest answers to sensitive questions.

The collected data was analyzed qualitatively and quantitatively; Qualitative data was analyzed using thematic content analysis where the researcher wrote the responses from respondents, conceptualize the data, segment the data basing on the study objectives. Quantitative data was analyzed using SPSS version 22.0.

8. Study Results

Respondents during survey were asked to mention their demographic characteristics like age, gender, family size and

education level as these are important proxy indicators for individual behaviors and are commonly used as explanatory variables for adoption decisions. Data collected on various characteristics are presented in table below;

Table 1. Socio-demographic description of the respondents.

Variable	Value	Frequency	Percent	Cumulative Percent
Gender	Male	232	72	72
	Female	90	28	100.0
	Total	322	100.0	
Marital status	Never married	62	19.3	19.3
	Married	212	65.8	85.1
	Separated	29	9.0	94.1
	Divorced	19	5.9	100.0
	Total	322	100	
Age group	20-30	50	16	16
	30-40	120	37	53
	40-50	100	31	84
	50 and above	52	16.1	100.0
	Total	322	100.0	

Source: Field data, 2023

According to the findings in table 1 above, more three quarters (72%) of the respondents were male and 28% female. The study implied that both sex participated in the study which showed that the study did not suffer from gender bias. Three quarters 65.8% were married, 19.3% single, 9% had separated and 5.9% widow. Majority of respondents were married ones

because they had involved in cabbage production to meet household member needs unlike other statuses. The study findings revealed that the majority of respondents 37% were aged between 30-40, followed by 31% who were aged 40-50, followed by 16.1% who were aged 50 and above and the least number of respondents were aged 20-30.

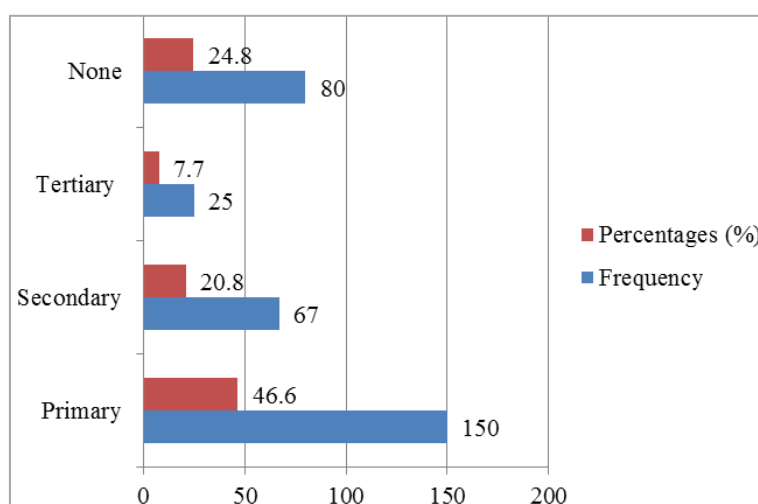


Figure 2. Education level of respondents.

The findings in the [figure 2](#) shows that majority of respondents constituting to 46.6% had completed primary level of education, followed by 24.8% of respondents who had no formal education, 20.8% had completed secondary level, and the least number of respondents had studied up to tertiary level. However, the dominance of farmers with low level of education implied that most of them lacked school fees to

join higher institutions for further studies and this had denied them enough knowledge on adopting and utilizing organic farming practices unlike counterparts who had joined tertiary institutions as this affects their cabbage production.

During survey respondents were asked how long have they been in cabbage growing in their area; responses were captured, analysed and presented in [figure 3](#);

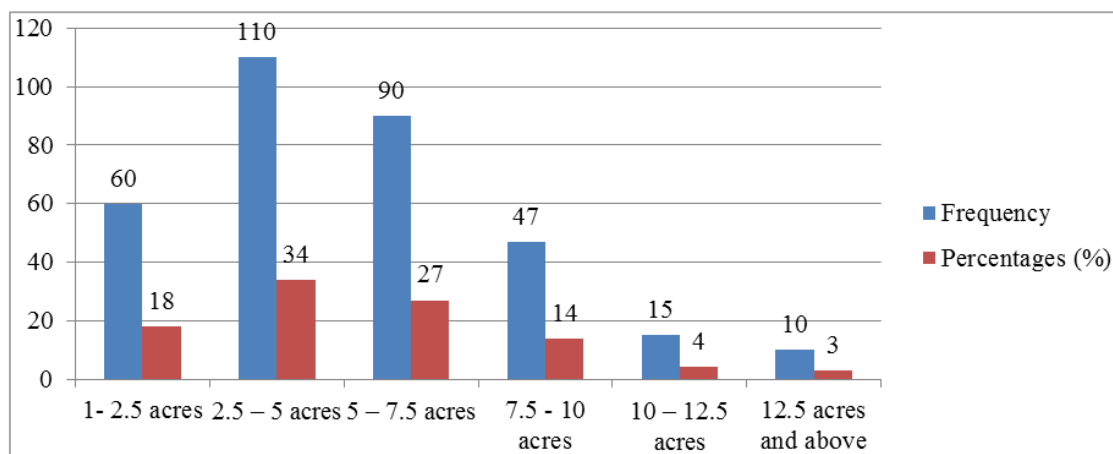


Figure 3. Size of land (acres).

The study results from [figure 3](#) revealed that majority of respondents 34% revealed 2.5-5 acres, 27% of the respondents revealed 5-7.5 acres, 18% revealed 1-2.5 acres, 14% revealed 7.5-10 acres, 4% revealed using 10-12.5 acres and 3% revealed 12.5 acres and above. The result

implied that farmers use average size of land for cabbage production in Sheema municipality.

Respondents also during survey were asked the type labour used during cabbage production, responses were captured, analysed and presented in the [figure 4](#) below;

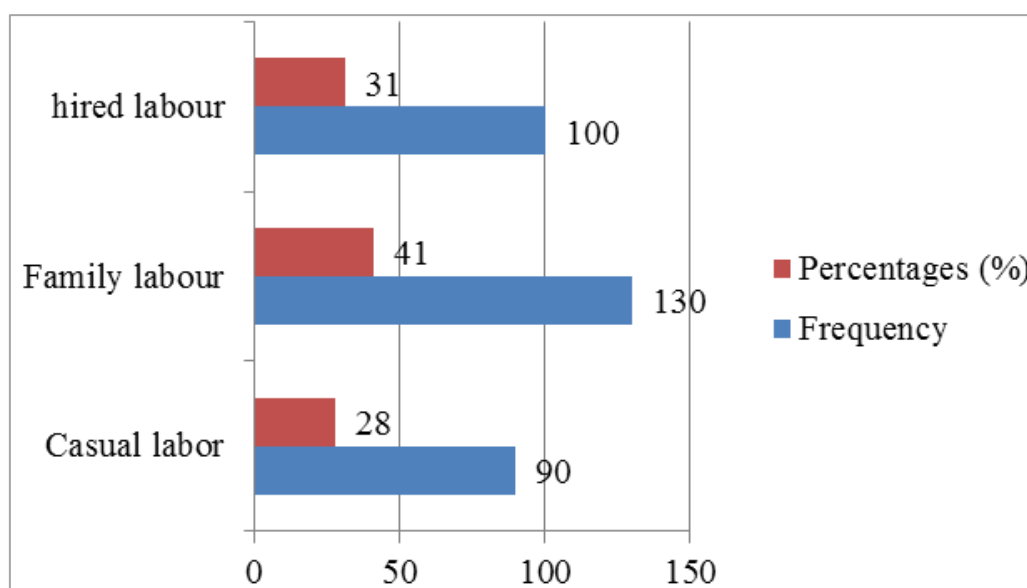


Figure 4. Type of labour used during cabbage production.

The study findings revealed that majority of the respondents constituting to 41% revealed use of family la-

bour during cabbage production, 31% revealed use of hired labour and 28% revealed use of casual labour.

During questionnaire survey, respondents were also asked

to mention organic farming practices adopted and utilized, responses were captured, analysed and presented in [table 2](#).

Table 2. Existing organic farming practices.

	Frequency	Percent	Cumulative Percent
Mulching	69	21.4	21.4
Organic fertilizer application	26	8.1	29.5
Use of cultural weed control	51	15.8	45.3
Valid Intercropping	51	15.8	61.2
Use of crop residues	48	14.9	76.1
Crop rotation	77	23.9	100.0
Total	322	100.0	

Source: Field data, 2023

[Table 2](#) above shows that 23.9% of the respondents had adopted and utilized crop rotation during cabbage production, followed by 21.4% who had adopted and utilized mulching during cabbage production, 15.8% revealed use of some other cultural weed control and intercropping respectively, followed by 14.9% who revealed use of crop residues and 8.1% revealed organic fertilizer application. The study results im-

plied that majority of the farmers had adopted and utilized crop rotation due to being cheap and easy for them unlike fertilizer application which seemed not to be cost friendly.

Respondents were further asked how they best got to know such organic farming practices, responses were also captured, analyzed and presented in the [figure 5](#) below;

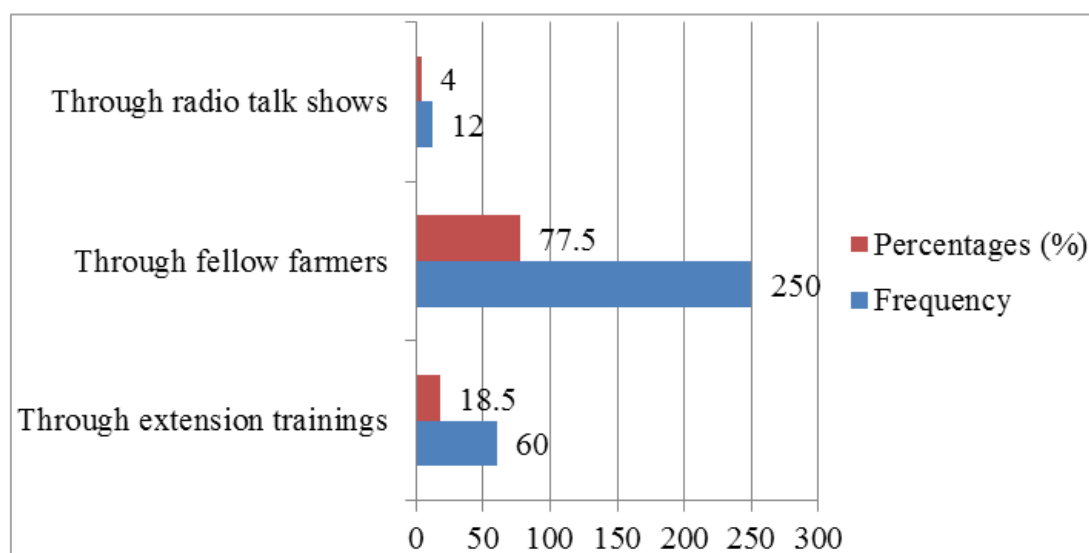


Figure 5. How farmers got to know organic farming practices to use in cabbage production.

The study results revealed that majority of farmers got to know organic farming practices through their fellow farmers as this was reported by 77.5%. Followed by 18.5% who revealed that they got to know such practices through exten-

sion training services and 12% revealed that they got to know organic farming practices through radio talk shows related to agricultural programmes.

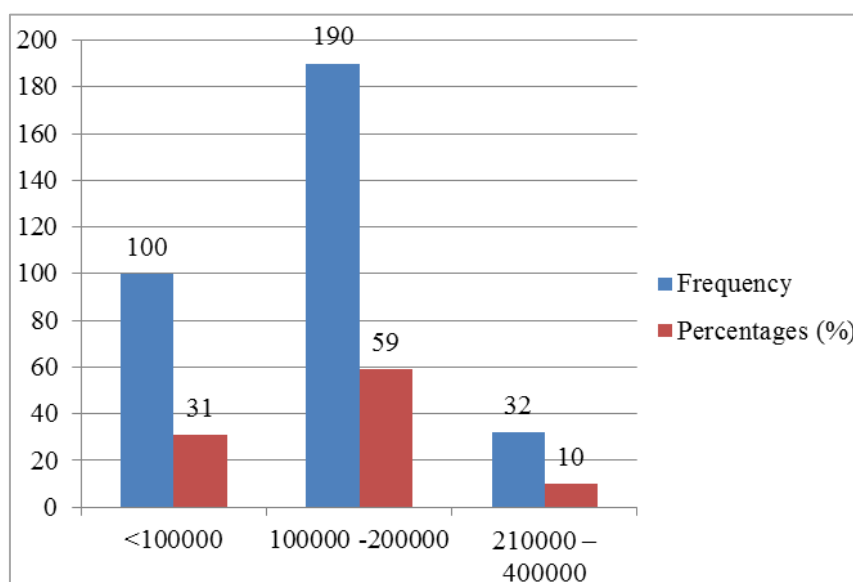
Table 3. Cabbage yields in last 3 years before and after adopting organic farming practices in kilograms.

Test Value = 0						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Cabbage yields before adoption of practices ('00s kgs)	31.753	321	.000	70.332	65.97	74.69
Cabbage yield after adoption ('00s kgs)	38.088	321	.000	96.407	91.43	101.39
Cabbage yield before ('00s kgs)	23.175	321	.000	23.820	21.80	25.84
Cabbage yield after ('00s kgs)	24.216	321	.000	33.848	31.10	36.60
Cabbage yield before ('00s kgs)	31.588	321	.000	8.568	8.03	9.10
Cabbage yield after ('00s kgs)	41.718	321	.000	12.224	11.65	12.80

According to the results in table 3 above, there were changes in cabbage yields before and after adopting organic farming practices. The changes in cabbage yields across three years were statistically significant at ($p < 0.05$). In the first year, there was a mean difference in kilograms from 70.332 to 96.406 ('00s), the second year, there was a mean

difference from 23.820 to 33.848 ('00s) and third years, there was a mean difference from 8.568 to 12.224 ('00s).

Respondents were asked how much were earned from cabbage before adopting organic farming practices; responses were captured, analyzed and presented in figure 6 below;

**Figure 6.** How much were earned from cabbage before adopting organic farming practices.

The study results revealed that majority 59% revealed earnings between 100,000-200,000 shillings before adoption and utilizing organic farming practices, followed by 31% who revealed earnings less than 100,000 shillings and 10%

who revealed earnings between 210,000-400,000 shillings.

Respondents were also asked to mention the earnings from cabbages after adopting organic farming practices; responses were captured, analyzed and presented in figure 7 below;

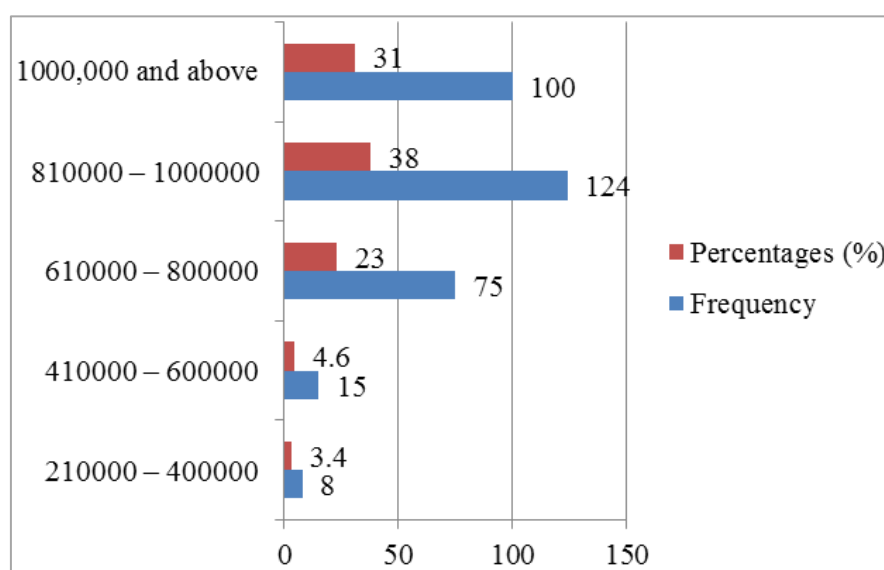


Figure 7. The earnings from cabbages after adopting organic farming practices.

The study results revealed that majority of respondents experienced increased earnings after adoption and utilization of organic farming practices as this was reported by 38% whose earnings were between 810,000-1,000,000, followed by 31% who earnings were 1,000,000 and above, followed by 23% whose earnings were between 610,000-800,000, followed by 4.6% who revealed earnings between 410,000-600,000 and 3.4% who revealed 210,000-400,000. The study

implied that majority experienced drastic increase of one hundred ninety thousand shillings in their earnings from harvested cabbages after adopting and utilizing organic farming practices unlike before adoption of practices.

Respondents were asked during questionnaire survey on the factors influencing the adoption of organic farming practices on cabbage production among smallholder farmers; responses were given, analysed and presented in table 4 below;

Table 4. Regression output for the factors influencing the adoption of organic farming practices on cabbage production among smallholder farmers.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	17.913	1.845		9.709	.000
Land ownership	3.631	1.121	.136	1.424	.002
Knowledge on use practices	2.025	1.232	.158	2.792	.029
Attitude and perception	.203	.410	.044	.494	.623
Limited off and on-farm income	4.066	1.133	.210	-2.253	.003
Level of education	-.181	.1223	-.114	-.600	.258
Extension training services	.263	.097	.319	2.644	.025
Availability of credit services	2.221	1.089	.153	1.034	.024

Regression results for the factors influencing the adoption of organic farming practices on cabbage production among smallholder farmers were presented in Table 4 above. Among the seven factors, five were found to be statistically significant at $p \leq 0.05$. These included; land ownership

($p=.002$), knowledge on use of organic farming practices ($p=.029$), limited off and on-farm income ($p=.003$) extension training services on use of organic farming practices ($p=.025$) and availability of credit services ($p=.024$) while two factors were not significant because their p -values were greater than

0.05 and these included attitude and perception and level of education of farmers respectively ($p=.623$ and $p=.258$).

Respondents during questionnaire survey were also asked to

mention possible ways of being motivated to increase the adoption and utilization of organic farming practices, responses were captured, analysed and presented in [table 5](#) below;

Table 5. Regression estimates for possible ways of motivating smallholder farmers to increase the adoption of organic farming practices.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	18.057	6.774		2.666	.008
Awareness campaigns and emphasis on training workshops	2.657	1.584	.131	1.677	.002
Increasing easy access to credit to famers at low interest rate	1.068	1.038	.139	1.782	.005
Encouraging collaboration between farmers and trading institutions	.283	.193	.242	1.472	.144
Trading and marketing organic agriculture products	-.161	.298	-.038	-.540	.590
Establishment of market infrastructures for organic products	-1.871	1.451	-.096	-1.289	.199
Subsidization of organic farming materials at a least cost by government	3.935	1.531	.202	2.570	.001
Capacitating the national extension systems to respond to organic agriculture needs	4.062	1.554	.206	2.642	.000

Statistically significant at 5%

Results in [Table 5](#) above showed the regression output for possible ways of motivating smallholder farmers to increase the adoption of organic farming practices. Out of seven possible strategies; four were significant and two were non-significant. Awareness campaigns and emphasis on training workshops on use of organic farming practices was significant at $p=.002$ as farmers had 2.6 chances of increasing their adoption to use of organic farming practices during cabbage production. Increasing easy access to credit to famers at low interest rate was also significant at $p=.005$ as farmers had 1 chance of being motivated to increase their adoption rate to use of organic farming practices during cabbage production. Subsidization of organic farming materials at a least cost by government was also significant at $p=.001$ as farmers had 3.935 chances of increasing their adoption rate to use of organic farming practices during cabbage production. Capacitating the national extension systems to respond to organic agriculture needs was significant at $p=.000$ with 4 chances of farmers being motivated to adopt use of organic farming practices during cabbage production.

Encouraging collaboration between farmers and trading institutions was not significant at $p=.144$ trading and marketing organic agriculture products was also not significant at $p=.590$ and establishment of market infrastructures for or-

ganic products, ($p=.199$).

9. Discussion of Results

The study results discovered that there were existing organic farming practices on cabbage production among farmers in Sheema municipality. The study results established that crop rotation is a critical feature of all organic cropping system, because it provides the principal mechanisms for building healthy soils, a major way to control pests, weeds, and to maintain soil organic matter. This finding can be compared with [\[11\]](#) who in their study revealed that crop rotation helps to; improve soil structure: some crops have strong, deep roots. The same authors reported that crop rotation practice can break up hardpans, and tap moisture and nutrients from deep in the soil. The same authors further reported crop rotation practice taps nutrients near the surface and bind the soil.

It was established that 15.8% of the respondents said that intercropping is one of the best organic farming practices used by cabbage farmers in Sheema municipality. Respondents further revealed that this practice requires additional management to keep competition between intercropped spe-

cies in balance. When two or more crops are growing together, each must have adequate space to maximize cooperation and minimize competition between them. This finding is consistent with [11], who reported that three major basic spatial arrangements were used in intercropping such as row intercropping which be beneficial in situations when using tall crops to reduce drought or heat stress of shorter crops, by providing shade and reducing wind speed, strip intercropping which permit separate crop production using machines but close enough for the crops to interact, for example, intercropping beans and maize and mixed intercropping; growing two or more crops together in no distinct row arrangement where sown crops act as trap crops at the hedges of the main crop to reduce pests.

The study results established that 21.4% of the respondents had adopted and utilized mulching during cabbage production. Respondents reported that mulching helps to retain soil moisture, prevents weed growth, and enhances soil structure and is a soil and water-conserving practice in which any suitable material is used to spread over the ground between rows of crops. This finding concurs with [17] who revealed that there are various types of mulching such as surface mulching, vertical mulching, polythene mulching, pebble mulching, dust mulching live vegetative barriers, straw mulching. The same authors revealed that mulching has demonstrated efficacy to enhance soil health by reducing evaporation, increasing moisture retention, regulating temperature, enhancing nutrient availability and root absorption, decreasing salinity, encouraging biological activity, and controlling crop pests and diseases.

The study results revealed that extension training was so significant in influencing the adoption of organic farming practices on cabbage production at $p=.025$. Respondents further reported that that access to extension services for adopters enriches users with knowledge about organic fertilizers, giving farmers an advantage in implementing the technology with best management practices that ultimately enhance productivity. This finding can be compared with [13] who in their study reported that agricultural extension program is a crucial agrarian and political tool that encourages the expansion of agricultural production. The same authors explained extension services also increase the adoption of technology and the productivity of crops (yield, output per capita).

The study results further established that knowledge on use of organic farming practices also influences the adoption the adoption of organic farming practices. Respondents explained that constant trainings attended had helped them improve on the knowledge of utilizing organic farming practices and have thus increases the adoption rate as well as improved cabbage production. This finding concurs with [20] who reported that knowing organic farming is essential to farmers' agricultural operations since it improves communication between farmers, technicians, and researchers and gives everyone a common language to discuss advances.

It was established that education level influences adoption and utilization of organic farming practices though not significant. Respondents further explained that high level of education among farming population is more conveniently supplied with technical information; as such farmers can assimilate information from various sources. On the other hand, education increases the effectiveness of the use of organic fertilizers. This finding can be compared with [2], who in their study reported that farmers use increasingly more organic fertilizers as they more educated. The same authors said that illiterate farmers use more organic fertilizers than literate ones which thus affect soil fertility and production.

The study results established that attitude and perception towards adoption and utilization of organic farming practices. Respondents further reported that it becomes hard for them to shift from conventional practices to organic farming practices because of negative attitude and perception towards cabbage yields. This finding can be compared with [1] who in his study reported that the existence of the attitude relies on the cognitive part, which is primarily dependent on the knowledge, perceptions, and facts associated with the attitudinal object.

The study results revealed that awareness campaigns and emphasis on training workshops on use of organic farming practices was significant and this has increased chances of adopting to use of organic farming practices during cabbage production. Farmers who attend constant trainings on how organic farming practices are utilized are more motivated to use organic farming practices unlike those who are limited to training services. This finding concurs with [19] who in their study revealed that investing in building awareness, training, and capacity development support a shift towards predominantly organic agriculture. The same authors most farmers lack enough skills and information about the application of different organic farming practices and this limits their capacity to adopt and use organic farming practices as this would the increase the production of different organic products.

The study results established that capacitating the national extension systems to respond to organic agriculture needs which was significant at $p=.000$ with chances of farmers being motivated to adopt use of organic farming practices during cabbage production. This finding can be compared with [20] who reported that adoption and utilization of organic farming practices would be achieved by supporting structures for organic sector, education, extension, building and fostering knowledge management for organic, and maintaining the traditionally organic system and transitioning to organic.

It was established that increasing easy access to credit to famers at low interest rate was also significant at $p=.005$ as farmers had 1 chance of being motivated to increase their adoption rate to use of organic farming practices during cabbage production. Respondents further explained that credit accessibility would help in buying quality organic inputs that

would give rise to high yields. Access to credit would also help to fund production activities during production process. This finding is in line with [19] who in their study reported that access to credit has proved to have a positive impact on poverty reduction on long term basis due to investment in organic farming that leads to high cabbage production. The same authors revealed that various 'innovative finance possibilities' exist in rural areas, such as mobile banking, links between financial institutions and weather-index-based insurance for agriculture to avoid total harvest loss among farmers.

The study results revealed that subsidization of organic farming materials at a least cost by government was also significant and had some chances of increasing their adoption rate to use of organic farming practices during cabbage production. This was because more farmers would not afford to buy organic materials due to low farm and off farm income. This finding can be compared with [8] who in their study stated that emphasis on government support in form of subsidies, grants, and other incentives can encourage farmers to adopt organic farming practices and even this would help to reduce the cost of organic inputs and provide financial incentives for farmers to adopt sustainable practices.

10. Conclusion

The study concluded that there were major existing organic farming practices on cabbage production among farmers in Sheema municipality. Such as; crop rotation, mulching, cultural weed control and intercropping respectively, use of crop residues and organic fertilizer application.

The study also concluded that there were significant factors influencing the adoption of organic farming practices on cabbage production among smallholder farmers in Sheema municipality which included; land ownership at ($p=.002$), knowledge on use of organic farming practices ($p=.029$), limited off and on-farm income ($p=.003$) extension training services on use of organic farming practices ($p=.025$) and availability of credit services ($p=.024$).

The study finally concluded that there were possible ways of motivating smallholder farmers to increase the adoption of organic farming practices in cabbage production in Sheema Municipality which included; awareness campaigns and emphasis on training workshops on use of organic farming practices during cabbage production, Increasing easy access to credit to famers at low interest rate, subsidization of organic farming materials at a least cost by government, capacitating the national extension systems to respond to organic agriculture needs, encouraging collaboration between farmers and trading institutions and establishment of market infrastructures for organic products.

11. Study Recommendation

There is a need to develop a cadre of trained and certified

organic agriculture professionals to support move towards predominantly use of organic farming practices, and developing and deploying organic agriculture-specific university degree courses at the bachelors, masters, doctoral, and post-doctoral levels to improve knowledge on organic farming among the population.

There is a need to ensure constant extension trainings on organic farming to cabbage farmers to enhance adequate knowledge that would change their negative attitude and perception towards use of organic farming practices. Such trainings would help some cabbage farmers who use conventional practices to switch to organic farming practices to improve cabbage production.

There is a need for credit institutions to lower their interest rate under the government policy to allow most cabbage farmers access credit that would help them to invest in buying quality organic farming materials to improve production.

There is a need to reduce the cost of organic farming materials and farmers be supplied with such materials at subsidized cost. This will make such organic farming materials more affordable and accessible to farmers in Sheema Municipality.

Abbreviations

EU: European Union
US: United States
USD: United States Dollar
NGOs: Non-Governmental Organizations

Acknowledgments

The successful completion of this research work owes much from individuals who contributed in one way or another. Heartfelt thanks should go to Sheema municipality authorities for allowing the researcher to carry out study in their area. Earnest gratitude goes to my research supervisors; Prof. Fina Opio and Rev. Nuwemuhwezi Gershom for having spared their adequate time for me right away from the start of this research to the end, your work will always never be underrated.

Conflicts of Interest

The authors declare no conflict of interest during research process.

References

- [1] Adebisi, J. A., 2019. A Livelihood and Systems-based Approach for Understanding Drivers of Adoption and non-adoption of Organic Farming in Ibadan, Nigeria. Michigan State University.

- [2] Bello, R. O., & Abdulrahman, A. A. (2018). Organic farming: A review. *International Journal of Sustainable Agricultural Research*, 5(1), 1-18.
- [3] Cha, E. S., Khang, Y. H. and Lee, W. J., 2014. Mortality from and incidence of pesticide, 9(4), 4-29.
- [4] David, P. 2017. People's Farming Workbook: Environmental and Development Agency. Claremont: South Africa. pp. 46-59.
- [5] Davies, G., 2012. Organic cabbage production: a complete guide. Crowood. *International journal of environmental science*.
- [6] Dessart, F. J., Barreiro-Hurlé J. and van Bavel, R., 2019. Behavioural factors affecting the adoption of sustainable farming practices: a policy-oriented review. *European Review of Agricultural Economics*.
- [7] Kelly V, 2017. A. Review: Dubious nexus between natural resources and conflict. *J. Eurasian Stud.* 2018, 9, 72–81.
- [8] Lampkin, N., Measures, M., Padel, S., & Foster, C. (2015). Sustainability assessment of organic farming. DEFRA.
- [9] Liu, T., Bruins, R. J. and Heberling, M. T., 2018. Factors influencing farmers' adoption of best management practices: A review and synthesis. *Sustainability*, 10(2), p. 432.
- [10] Mock, K, 2017. Factors impacting adoption of organic farming in Chitwan district of Nepal. *Asian Journal of Agriculture and Rural Development*, 5 (393-2016- 2015), Pp. 1-12.
- [11] Mohler, M. E and Johnson, T (2019). "Market-Led Versus Government-Facilitated Growth: Development of the U. S. and EU Organic Agricultural Sectors." United States Department of Agriculture Economics Research Service.
- [12] Mukasa, A., Nicolopoulou, K. and Sahasranamam, S., 2021, May. A centennial cross-national venture creation model for social entrepreneurs. In 9th IPMA Research Conference.
- [13] Muluneh, D, Johnson, E and Macdonald, D. 2022. "The effects of organic farming on pest and non-pest butterfly abundance." *Agriculture, Ecosystems & Environment*. Vol. 64: 2, 133-139.
- [14] Njorege, M. K., 2015. Challenges and benefits of organic farming among farmers in Nembure Division, Embu County-Kenya. *International journal of Humanities and Social sciences*, 5(12), pp. 1-11.
- [15] Powlson, D. S., Gregory, P. J., Whalley, W. R., Quinton, J. N., Hopkins, D. W., Whitmore, A. P., Hirsch, P. R. and Goulding, K. W., 2011. Soil management in relation to sustainable agriculture and ecosystem services. *Food policy*, 36, pp. S72-S87.
- [16] PROFILE, A. B., 2016. Uganda Investment Authority. Prosdocimi, M., Tarolli, P. and Cerdà A., 2016. Mulching practices for reducing soil water erosion: A review. *Earth-Science Reviews*, 161, pp. 191-203.
- [17] Prosdocimi, M., Tarolli, P. and Cerdà A., 2016. Mulching practices for reducing soil water erosion: A review. *Earth-Science Reviews*, 161, pp. 191-203.
- [18] Sheema Municipality Production Report (2021). The policy and regulatory environment for organic farming in Shema municipality, Uganda: Country reports. Organic Research Centre.
- [19] Veisi, H., Carolan, M. S., Alipour, A. and Besheh, A. V., 2022. Competing fields in sustainable agriculture: on farmer-expert understandings of good farming, good farmers and organic farming. *International Journal of Agricultural Sustainability*, 20(3), pp. 289-301.
- [20] Wolini, M. and Anderson, C., 2014. Spatial patterns of organic agriculture adoption: Evidence from Honduras. *Ecological Economics*, 97, pp. 120-128.
- [21] Wu, W. and Ma, B., 2015. Integrated nutrient management (INM) for sustaining crop productivity and reducing environmental impact: A review. *Science of the Total Environment*, 512, pp. 415-427.