ORIGINAL RESEARCH ARTICLE

Smallholder farmers' attitudes toward locally made commercial organic fertilizer

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ABSTRACT

Organic fertilizer has been identified as an agricultural technology that has the potential to lower direct production costs, enhance environmental benefits, and boost crop yields. Several Organic fertilizers such as bokashi and safi sarvi are being produced locally and commercialized to promote the use of the product. Yet the utilization is low among smallholder farmers in Kenya. Therefore, this study sought to assess the attitudes of smallholder farmers toward organic fertilizer utilization. Understanding farmers' attitudes is crucial as it influences the use of organic fertilizers. The study was conducted in Kirinyaga and Kiambu Counties in Kenya where some of these organic fertilizers such as bokashi and safi sarvi are being produced. A purposive and sample random sampling design was used to select a sample size of 109 smallholder farmers in the study areas. Descriptive statistics and exploratory factor analysis (EFA) were used to identify the attitudes of farmers toward organic fertilizer utilization and their underlying factors respectively. Results of a two-tailed t-test showed that farmers in Kiambu and Kiriyanga counties differ statistically in age and years of farming. Overall, the Chi-square test revealed that women (58.7%) were more involved in organic farming than men. Descriptive statistics revealed that the attitudes of the farmers toward organic fertilizers were positive and relatively homogeneous. Out of the 14 statements, 11 scored positively on the Likert scale (*agree and strongly agree*). The study established that majority of the farmers agreed and strongly agreed that organic fertilizers increased their yield (96.3%) and improved their livelihood (96.6%). EFA generated four factors that explained 62.578% of the total variance. “Preference of organic fertilizer” and “beneficial factor” had the highest factor loading respectively. The study therefore recommends that there is a need to improve sensitization of organic fertilizers among farmers to increase their utilization.

Keywords: Attitudes; Exploratory factor analysis; organic fertilizer

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1.0 Introduction

Agricultural development is key to ending extreme poverty and boosting prosperity toward a food-secure world. In Kenya, the agricultural sector contributes significantly to economic growth, food security, and poverty reduction. The sector accounts for about 25% of the total GDP and employs over 70% of the total labor force in rural areas (KNBS, 2020). Nonetheless, over the years agricultural productivity has declined across the globe due to climate change, the use of conventional fertilizers, human activities, and the rising population (FAOSTAT). The agricultural sector is encountering numerous challenges due to soil-related problems arising from the excessive application of chemical fertilizers and other agrochemicals (Das et al.,2019). A decline in soil fertility is the primary biophysical underlying cause of Kenya's decreasing per capita food production. (Gicheru, Patrick 2012). The use of organic fertilizers has been identified as one of the pathways with the potential to address soil fertility and soil health issues, thus improving crop production. Organic fertilizers are considered a substitute for chemical fertilizers to enhance soil fertility and maintain crop productivity (Girawale & Naik, 2016).

Organic fertilizers are natural substances derived from plants or animals, such as livestock manure, green manure, crop residues, household waste, compost, etc. Utilizing organic fertilizers is a method to attain maximum agricultural yield (Girawale and Naik, 2016). The practice of organic farming provides a beneficial framework for the agricultural industry as it serves as a basis for the production of nourishing and healthful food. With this method, poor-resource farmers can improve their crops' yields and soil nutrition without having to use expensive external resources (Morshedi et al., 2017). Organic fertilizer has been identified as an agricultural technology that has the potential to lower direct production costs, enhance environmental benefits, and boost crop yields (Kassie et al., 2009). They tend to be more cost-effective and easily accessible from local sources than non-organic fertilizers (Win, 2022). Nevertheless, the majority of the smallholder farmers in Kenya use chemical fertilizers despite the benefits of organic fertilizers. One significant drawback associated with organic fertilizer use among farmers is its inherent bulkiness and the subsequent high labor demand it entails (Maschner, 1995).

To promote the increased use of organic fertilizer among smallholder farmers, several organizations in Kenya including the Community Sustainable Development Empowerment Program (COSDEP) and Resource Oriented Development Initiatives (RODI) have trained farmers on organic fertilizer methods of preparation and application. Also, a local company called Safi Organics has promoted the use of organic fertilizers among smallholder farmers by making the products available for sale in farmers' fields. Some of these organic fertilizers include bokashi, safi sarvi, etc. However, the rate at which the farmers are using these fertilizers is still very low and those who are using them are doing so in inadequate amounts (Bellwood-Howard, 2013). Policy efforts aimed at promoting organic fertilizer practices (OFPs) without considering farmers' attitudes toward utilizing/adopting these techniques can lead to misguided outcomes (Martey, 2018).

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Attitude measures the intensity of an individual's liking or dislikes towards an idea, concept, or opinion about others (Ajzen and Fishbein, 1975). An individual's formation of attitudes is influenced by their perception of what is either true or false (Willock et al., 1999). Attitudes are frequently shaped by past experiences and they possess a significant impact on behavior.

Attitudes have been observed to lead to changes in individuals' behavior towards a product (Franke and Maximillians, 1999). Farmers may have knowledge about organic fertilizers and are practicing them, but attitudes and the desire to continue using them are more important. To successfully promote the increase of organic fertilizer utilization among farmers, the organic fertilizer practices (OFPs) being advocated for must be in line with farmers' attitudes (Lagerkvist et al., 2015). Currently, there is little scientific investigation into farmers' attitudes toward these locally-made organic fertilizers being promoted in Kenya. Understanding the attitude of farmers is crucial for understanding their behavior. For example, a farmer who has a positive attitude towards using organic fertilizer will desire to involve other farmers in using it and eventually, resulting in its widespread utilization. Therefore, this study was conducted to assess the attitudes of smallholder farmers toward the utilization of locally-made organic fertilizers and their underlying determinants.

2.0 Material and Methods

2.1 Research design

The study adopted a cross-sectional survey design. The design was preferred as it enables the researcher to study a specific phenomenon at a specific time. This type of design also ensures a high level of confidentiality, is convenient, and enables easier and speedier data collection (Kimambo et al., 2018). The data was collected between September 2023 and October 2023.

2.2 Description of study area

The study was conducted in Kiambu and Kirinyaga Counties of Kenya (Figure 2.1). Githunguri sub-county in Kiambu County and Mwea sub-county in Kirinyaga County were selected purposively since organic fertilizer is been advocated for in these sub-counties. Additionally,

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organic farming is practiced by households within the sub-counties.

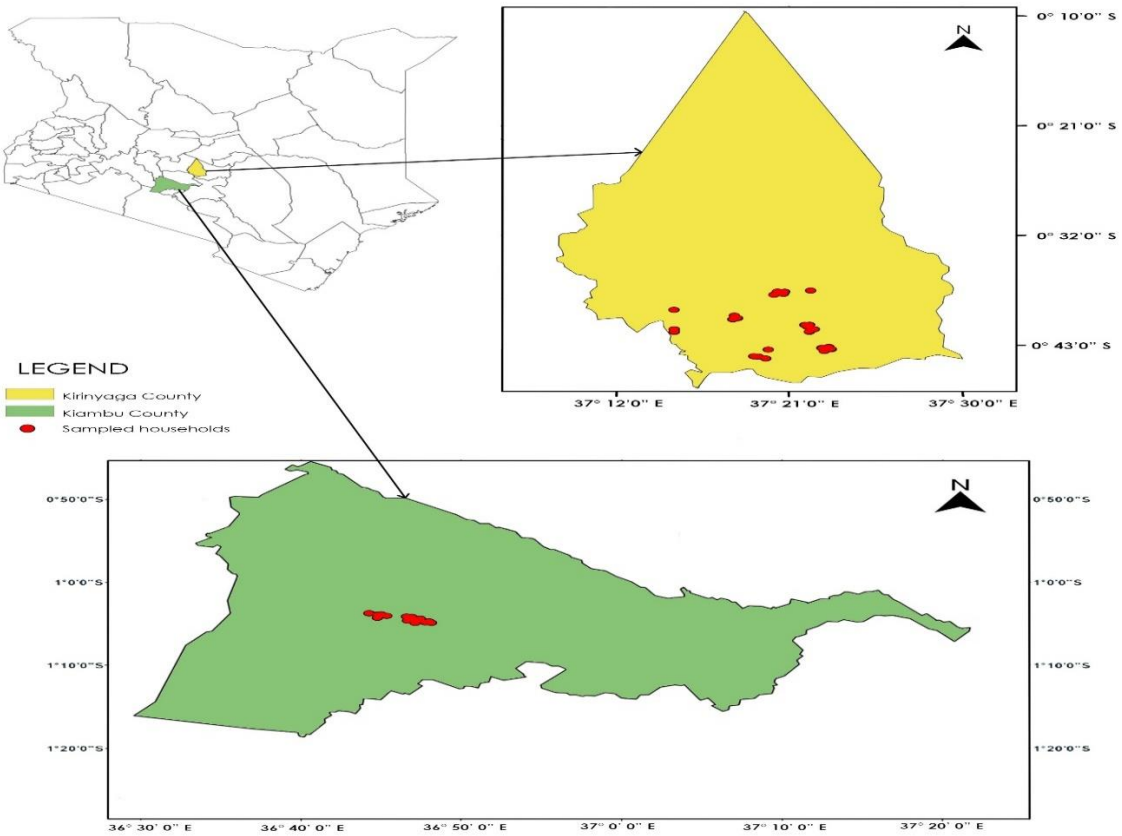

Figure 2.1: Map of Kiambu and Kirinyaga Counties

2.3 Sampling and data collection

Purposive sampling was used to identify and select the study sites where smallholder farmers majorly rely on organic fertilizers such as bokashi and safi sarvi for crop production. A simple random sampling design was employed to draw the respondents in the study areas. Lists of farmers were obtained from project records of the Community Sustainable Development Empowerment Program (COSDEP), and Safi Organics. Respondents were then drawn randomly from the list.

Following the fishers' formula, a sample size of 109 smallholder farmers was drawn randomly across the study areas. According to Gorstein. (2007), the formula can be given as:

$$n = \frac{z^2 . p . q}{d^2}$$

where:

n= sample size

Z= 1.65 (Z score which corresponds to 90% confidence interval)

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P= Proportion of the population with the desired characteristic 0.5.

Q = Proportion of the population without the desired characteristic and it is given as 1-p =0.5

d = is the uncertainty margin, level of significance, or the error estimated within ± 0.079 or

7.9% of precision is accepted for this study. Therefore, $(1.65)^2$ X (0.5) X (0.5)/0.079^2 = 109

The study adopted purposive and sample random sampling to select the 109 farmers across the sub-counties. A structured questionnaire was developed and pre-tested to establish its validity and relevance to the study. Once the applicability of the tool was confirmed, it was administered to the farmers by trained enumerators. The data obtained was on socio-economic characteristics and attitudes of farmers towards locally-made commercial organic fertilizers. Eventually, the data was cleaned, coded, and entered into a statistical tool (SPSS version 25).

2.4 Analytical Framework

The data from smallholder farmers was analyzed using descriptive and inferential statistics. Descriptive statistics such as mean and percentages were used to identify various farmer's socio-economic characteristics and attitudes toward local commercial organic fertilizers. Independent sample t-test and chi-square test were carried out to compare differences in socioeconomic characteristics and attitudes of farmers in the two study areas. Exploratory factor analysis (EFA) was employed to investigate factors influencing farmers' attitudes toward locally-made commercial organic fertilizers. EFA was chosen due to the absence of any previous research on farmers' attitudes.

2.4.1 Farmers Attitudes Toward Organic Fertilizers utilization

Attitudes have been observed to lead to changes in individuals' behavior towards a product or a service (Franke and Maximillians, 1999). Therefore, understanding the attitude of farmers toward organic fertilizer is crucial to understanding their behavior. For example, if a farmer has a positive attitude toward organic fertilizer, the willingness and likelihood of such farmer to use organic fertilizer is expected to be much higher and vice versa. Ultimately, leading to the widespread utilization of such fertilizers.

In the study, attitudes were operationalized as the degree of positive or negative emotions of farmers towards locally-made commercial organic fertilizers such as bokashi and safi sarvi. 14 attitudinal statements regarding the benefits, access, availability, and costs of organic fertilizer were developed and presented to farmers Table 1. Farmers were asked to rate each statement based on a 5-point Likert scale (*strongly agree, agree, neutral, disagree, or strongly disagree*). A reliability test for EFA was conducted using Cronbach's alpha coefficient test to evaluate the internal consistency of the 14 statements presented in Table 1. A Cronbach's alpha value

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greater than 0.7 is regarded as satisfactory (Mutua et al., 2023; Olaniyi, 2019). The study achieved an overall alpha value of 0.780, with individual values ranging between 0.754 to 0.799.

Table 1. Attitudinal statements measuring farmers' attitudes towards organic fertilizers

Variables description	
ATT1	Need for support from the government to increase organic fertilizer use
ATT2	The use of organic fertilizer makes me popular among my friends/family
ATT3	Organic fertilizer has a long-term sustainability
ATT4	Consumers are willing to pay higher prices for organic produce
ATT5	Organic fertilizer is cheaper than chemical/synthetic fertilizer
ATT6	Organic fertilizer improves farmers' livelihood
ATT7	I get better yield when I use Organic fertilizer on my farm
ATT8	Organic fertilizer improves soil fertility
ATT9	Organic fertilizer is a plausible alternative to chemical/synthetic fertilizer
ATT10	I am aware of policy on the use of organic fertilizer
ATT11	I am willing to continuously use organic fertilizer on my farm
ATT12	Local market for organic produce is available
ATT13	Organic fertilizers are preferred to chemical fertilizers for the health reasons
ATT14	I receive personal satisfaction from using organic fertilizer in my farm

After the reliability of the 14 attitudinal statements was confirmed, exploratory factor analysis (EFA) was employed to group them into a smaller set of uncorrelated latent variables that do not correlate with each other. EFA was preferred as there were no predefined structures to the outcome or prior studies on the farmer's attitudes toward locally-made commercial OF. Principal component analysis (PCA) was used to extract and obtain fewer uncorrelated factors from the correlated variables that are correlated while preserving the majority of the original information (Jollife and Cadima, 2016).

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The study employed orthogonal varimax to rotate the new latent variables in order to obtain a simple structure and improve interpretation of the factors. This rotation was appropriate since it assumes that all factors are uncorrelated (Dean, 2009). Prior to PCA extraction, the study performed Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity (BTS) to evaluate the sampling adequacy and suitability of the model. KMO greater than one and BTS with a *p*-value <0.05 is considered adequate for exploratory factor analysis. Additionally, the study adopted Kaiser rule of eigenvalue to determine the number of factors to retained. Normally, the factors with eigenvalues greater than one are retained and explained.

3.0 Results and Discussion

3.1 Descriptive statistics for socioeconomic characteristics of farmers

Table 2 presents the results of a two-tailed t-test and chi-square (χ^2) analysis for continuous and categorical characteristics of smallholder farmers using organic fertilizers. The t-test showed that farmers in Kiambu and Kirinyaga counties differ statistically in age and years of farming. However, they were relatively similar in terms of household size membership. The average household size was 4.3. This finding corroborates with those of Kavoi & Kimambo (2021) which indicated that household membership of farmers was relatively low (4.2). Farmers in Kiambu were more experienced in using organic fertilizers as compared to farmers in Kiriyanga. Further, the study revealed that the was a significant difference in farm size across counties. The mean farm size (0.98) of smallholder farmers in Kiambu could be associated with the convenience of applying organic fertilizer in adequate amounts.

Table 2: Descriptive Summary of Socio-economic characteristics of smallholder farmers

	Mean			t-ratio	Sig (2-tail)
Continuous variables (n=109)	Overall	Kiambu	Kirinyaga		
Age	46.13	49.39	42.86	2.773	0.007
Household size	4.34	4.50	4.18	0.857	0.393
Years of farming	3.02	3.45	2.59	2.979	0.004
Farm size	1.65	0.98	2.32	-0.398	0.000
Categorical variables		**Percentages**		**χ^2**	**Sig**
Gender					
Female	58.7	74.5	44.8	9.863	0.002
Marital status					
Married	82.6	80.4	84.5	2.330	0.507
Single	15.6	15.7	15.5	2.330	0.507
Divorced	0.9	2.0	0.0	2.330	0.507

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Widow	0.9	2.0	0.0	2.330	0.507
Education level					
Secondary	40.4	43.1	37.9	3.900	0.564
Primary	38.5	37.3	39.7	3.900	0.564
Tertiary	12.8	15.7	10.3	3.900	0.564
University	5.5	2.0	8.6	3.900	0.564
Group membership					
Yes	73.4	100	50.0	34.744	0.000
Access to credit					
Yes	47.7	45.1	50.0	0.261	0.609
Access to Training					
Yes	95.4	100	91.4	4.608	0.032
Land tenure					
Own	94.5	96.1	93.1	0.462	0.497

Source: Author's computation based on stallholder farmers survey

The χ^2 analysis (Table 2) revealed that marital status, education level, access to credit, and land tenure were relatively similar across counties. However, gender, group membership, and access to training had significant difference among the farmers using organic fertilizers in the study counties. Overall women (58.7%) were more involved into organic farming than men (41.3%). This could be associated to farming as the main source of income for women in the study areas. Marital status showed that majority (82.2%) of the farmers were married, followed by those who were single (15.6%), divorced (2.0%), and widowed (2.0%). This finding aligns with that of Ejigu and Yeshitela (2024) who found that majority (91.39%) of respondents' farmers were married followed by those who were not married (3.37%), divorced or separated (3.37%), and widowed (1.87%). The result also indicated that a good number of farmers across the two counties obtained formal education involving attending secondary (40.4%) primary (38.5%), tertiary (12.8%), and university (5.5). This degree of literacy suggests that information on organic fertilizer can be easily spread among farmers and impact their decision to adopt. This is in concurrence with Yengoh (2010), who found that individual characteristics, including education, impact rural agricultural producers' acceptance of new technologies in Nigeria.

Descriptive statistics further showed that all (100%) of the farmers in Kiambu belong to a farm group while only half (50%) of them in Kiriyanga belong to a farm group. This can be concluded that farmers in Kiambu are more socialized than farmers in Kiriyanga.

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3.2 Attitudes of farmers toward organic fertilizers utilization

3.2.1 Descriptive analysis of farmers' attitude toward organic fertilizers

The results of the analysis of the statements are displayed in Table 3. The study observed that most of the attitude scores were high on the positive end of the Likert scale (i.e., strongly agree and agree). Out of the 14 attitudinal statements, 11 of them scored over 85% on the Likert scale responses (both strongly agree and agree), as shown in table 3: "need for support from the government to increase organic fertilizer use;" "The use of organic fertilizer makes me popular among my friends/family;" "Organic fertilizer has a long-term sustainability;" "Organic fertilizer is cheaper than chemical/synthetic fertilizer;" "Organic fertilizer improves farmers' livelihood;" "I get better yield when I use Organic fertilizer on my farm;" "Organic fertilizer improves soil fertility;" "Organic fertilizer is a plausible alternative to chemical fertilizer;" "I am willing to continuously use organic fertilizer on my farm;" "Organic fertilizers are preferred to chemical fertilizers for the health reasons of consumers;" and "I receive personal satisfaction from using organic fertilizer on my farm".

Two other statements i.e. "Consumers are willing to pay higher prices for organic produce" and "Local market for organic produce is available," had positive scores of 70.6% and 69.7% respectively. Therefore, all two statements indicated positive attitude towards locally-made commercial organic fertilizers. However, regardless of the rapid increase in the use of these commercial organic fertilizers, the statement "I am aware of the policy on the use of organic fertilizer" scored at the lower positive end of the scale 52.3%. This was due to the lack of formal regulation/policy at the local or national level.

The study concluded that smallholder farmers from Githunguri and Mwea have positive attitudes toward the use of locally-made commercial organic fertilizers bokashi and safi sarvi. These findings align with that of Jaganathan (2004) who reported that farmers had positive attitudes toward organic farming.

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Table 3: Descriptive Analysis for Smallholder Farmers Attitude towards Organic Fertilizer

Attitudinal statements	Overall percent within the response (n=109)						Percent of Kiambu farmers within response (n=55)					Percent of Kirinyaga farmers within response (n=64)				
	SD	D	A	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
Need for support from the government to increase organic fertilizer use	9.2	1.8	1.8	25.7	61.5	9.2	5.9	0.0	2.0	15.7	76.5	12.1	3.4	1.7	34.5	48.3
The use of organic fertilizer makes me popular among my friends/family	1.8	1.8	8.3	37.6	49.5	1.8	3.9	2.0	11.8	43.1	39.2	0.0	3.4	5.2	32.8	58.6
Organic fertilizer has a long-term sustainability	0.9	0.0	0.9	37.6	60.6	0.9	0.0	0.0	0.0	49.0	51.0	1.7	0.0	1.7	27.6	69.0
Consumers are willing to pay higher prices for organic produce	6.4	6.4	16.5	42.2	28.4	6.4	11.8	7.8	19.6	35.3	25.5	1.7	5.2	13.8	48.3	31.0
Organic fertilizer is cheaper than chemical/synthetic fertilizer	2.8	0.9	2.8	34.9	58.7	2.8	2.0	0.0	3.9	41.2	52.9	3.4	1.7	1.7	29.3	63.8
Organic fertilizer improves farmers' livelihood	0.9	0.9	1.8	26.6	69.7	0.9	2.0	0.0	0.0	35.3	62.7	0.0	1.7	3.4	19.0	75.9
I get better yield when I use Organic fertilizer on my farm	0.9	0.9	1.8	22.9	73.4	0.9	2.0	0.0	0.0	29.4	68.6	0.0	1.7	3.4	17.2	77.6
Organic fertilizer improves soil fertility	1.8	0.0	0.9	20.2	77.1	1.8	2.0	0.0	2.0	15.7	80.4	1.7	0.0	0.0	4.1	74.1
Organic fertilizer is a plausible alternative to chemical fertilizer	0.9	3.7	8.3	38.5	48.6	0.9	0.0	0.0	2.0	35.3	62.7	1.7	6.9	13.8	41.4	36.2
I am aware of the policy on the use of organic fertilizer	30.3	3.7	13.8	26.6	25.7	30.3	39.2	5.9	11.8	13.7	29.4	22.4	1.7	15.5	37.9	22.4

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I am willing to continuously use organic fertilizer on my farm	0.9	0.0	3.7	12.8	82.6	0.9	0.0	0.0	0.0	5.9	94.1	0.0	1.7	6.9	19.0	72.4
Local market for organic produce is available	7.3	4.6	18.3	35.8	33.9	7.3	13.7	9.8	23.5	31.4	21.6	1.7	0.0	13.8	39.6	44.8
Organic fertilizers are preferred to chemical fertilizers for the health reasons of consumers	1.8	0.0	0.9	18.3	78.9	1.8	0.0	0.0	0.0	13.7	86.3	3.4	0.0	1.7	22.4	72.4
I receive personal satisfaction from using organic fertilizer on my farm	0.0	0.9	0.0	16.5	82.6	0.0	0.0	0.0	0.0	15.7	84.3	0.0	1.7	0.0	17.2	81.0

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3.2.2 Exploratory factor analysis results

The data was subjected to factor analysis using principal component and orthogonal varimax rotation. Exploratory factor analysis (EFA) was used to group similar variables and reduce the number of dimensions representing the connections among these interconnected variables. The factors were determined by using an eigenvalue cut of 1.0. Figure 1. Based on this, items that have factor loading values of 0.50 and above are normally considered good and significant (George & Mallery, 2003).

Kaiser's overall measure of sampling adequacy obtained was 0.846, which suggests that the data was appropriate for factor analysis. Four factors that had an eigenvalue of 1.0 and above were identified. The analysis produced a solution with four factors that accounted for 62.578% of the total variance explained. Each item that fell under a certain factor had to meet a minimum requirement of having a primary factor loading of 0.5 or higher. The findings are displayed in the table and figure below.

Table 4. Kaiser-Meyer-Oklin and Bartlett's Test of Principal Components

Kaiser Meyer –Oklin Measure of Sampling Adequacy	0.846
Bartlett Test of Sphericity Chi-square	489.287
DF	91
P-value	0.000

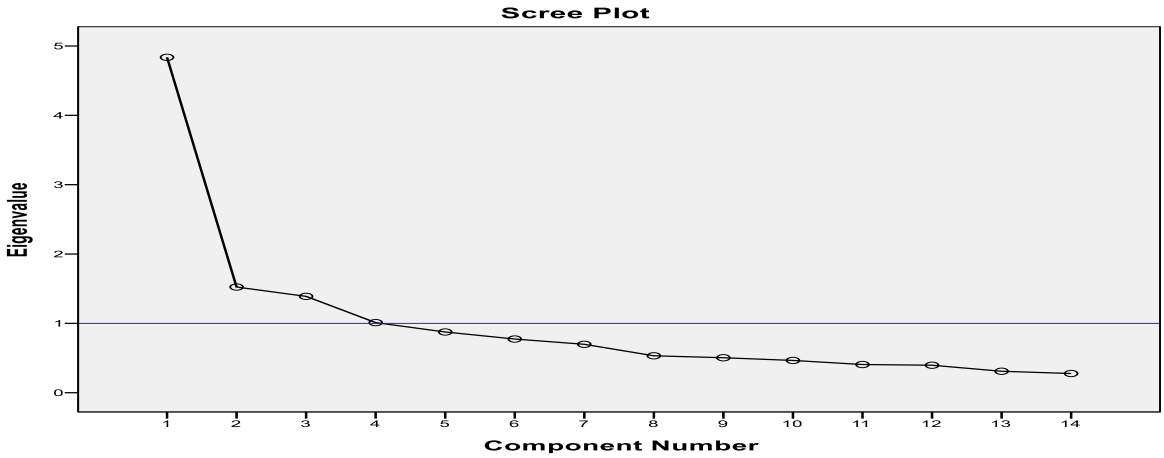

Fig 1. A scree-plot showing farmer's eigenvalue vs. factor number

Four attitude variables concerning willingness, satisfaction, health, and sustainability of organic fertilizer were loaded on Factor 1 with the cross-correlation coefficients of 0.824, 0.786, 0.650, and 0.614 respectively. Health concern is among the key reasons why farmers use organic fertilizers (Marsden et al., 2002). Also, Surekha et al. (2011) reported that farmers expressed satisfaction with organic farming and disclosed that they have experienced no health issues and have observed improvements in their well-being after consuming organic produce. These attributes partially shaped farmers' attitudes positively toward organic fertilizer. This factor accounted for 34.547% of the total variance and was termed 'Preference of organic fertilizer'.

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Higher scores and favorable responses on this factor indicated an overall perception of the importance of using organic fertilizer.

Factor 2 had a cross-correlations coefficient of 0.654, 0.646, 0.636, 0.568, and 545. This was termed 'Beneficial factor' since it has attributes that were concerned with livelihood improvements, soil fertility, cost, support, and organic fertilizer as an alternative to chemical fertilizer. This finding indicates that farmers are convinced that organic fertilizer can replace chemical fertilizers, improve farmers' livelihood, and improve soil fertility. Therefore, these attributes partly shaped farmers' attitudes positively toward organic fertilizer. This finding aligns with the survey done by Janjhua et al. (2018) who reported that farmers exhibited a positive attitude towards organic farming and believed that it was the appropriate method for protecting soil quality. Farmers agreed that using organic fertilizer gives them benefits (Win, 2022). Factor 2 accounted for 10.886% of the total variance explained

Table 5: Exploratory Factor Analysis results

Factor and item description	Factor loading	% of variance explained
Factor 1. Preference of Organic fertilizers		
I am willing to continuously use OF on my farm	.824	
I receive personal satisfaction from using OF on my farm	.786	
OFs are preferred to chemical fertilizers for health reasons of consumers	.650	
OF has a long-term sustainability	.614	34.547
Factor 2. Beneficial factor		
OF is a plausible alternative to chemical fertilizer	.654	
Organic fertilizer improves soil fertility	.646	
Organic fertilizer is cheaper than chemical/synthetic fertilizer	.636	
	.568	
Need for support from the government to increase OF use	.545	
Organic fertilizer improves farmers' livelihood		10.886
Factor 3. Awareness and availability factor		
I am aware of policy on the use of OFs	.819	
Local market for organic produce is available	.779	9.924
Factor 4. Income factor		
Consumers are willing to pay higher prices for organic produce	.743	

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The use of organic fertilizer makes me popular among my friends/family	.700	
I get better yield when I use OF in my farm	.511	7.221
Total variance explained		**62.578**

Source: Author's computation based on smallholder farmers

The third factor was termed 'Awareness and availability factor' and it accounted for 9.924% of the total variance explained. Two attitudinal statements concerning organic fertilizer "I am aware of policy on the use of OFs" and "Local market for organic produce is available" were loaded with correlation coefficients of 0.819, and 0.779. The two variables had positive coefficients. Therefore, they influenced farmers' attitudes positively toward organic fertilizer.

The fourth and final factor three attitudinal variables loaded with cross-correlation coefficients of 0.743, 0.700, and 0.511 and was labelled "Income factor". Hence, income is among the key factors that influence farmers' attitudes positively toward organic fertilizer. Farmers utilize organic fertilizer to save production costs and increase their income (Win, 2022). Therefore, this aspect of organic fertilizer partly shaped farmers' attitudes positively toward using organic fertilizer. Similarly, Kassie et al. (2009), found that the use of organic fertilizer can lead to significantly higher yields. This factor accounted for 7.221% of the total variance explained.

4.0 Conclusion and Recommendation

Organic fertilizer has been identified as an agricultural technology that has the potential to lower direct production costs, enhance environmental benefits, and boost crop yields. The main objective of the study was to assess smallholder farmers' attitudes toward organic fertilizer in Kiambu and Kiriyanga counties of Kenya. Descriptive statistics and Exploratory factor analysis were used to assess farmers' attitudes. The finding indicates that a good proportion of farmers had positive scores on the Likert scale (i.e *strongly agreed and agreed*). Out of 14 attitudinal statements concerning organic fertilizer, 13 of them scored positive across the counties. Hence, the study concluded that farmers have positive and relatively homogenously attitudes toward organic fertilizer. Also, the study found that the attitudes of farmers were associated with preference for OF, beneficial factor, awareness and availability factor, and Income factor. Thus, it was concluded that farmers' attitudes toward organic fertilizer had some effect on their use. The study therefore recommends that there is a need to improve sensitization of organic fertilizers among farmers to increase their utilization.

5.0 Acknowledgment

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