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Smallholder Farmers' Practice and Perception of Organic Farming in Kisii Central Sub - County, Kisii County, Kenya

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Abstract
Organic farming (OF) is known to contribute to: healthy living, increase in farm income, and safe and sustainable environments. It is in view of the benefits that OF systems are encouraged across countries in Sub-Saharan Africa, including Kenya. This paper investigates smallholder farmers' practice and perception of organic farming in Kisii Central Sub – County, Kenya. The study employed descriptive survey research design where a total of 306 respondents were interviewed. Results show that nearly all (97%) of smallholder farmers are practicing OF with use of animal manure (87%), crop rotation (72%) and cover crops (55%) as the predominant practices. The high number of farmers practicing OF can be attributed to information on OF farming being easily available (52%); strong agreement on positive effects of OF farming on environment (69%), and the anticipated future demand for OF products (84%). This study recommends that promoters of organic farming should take note of the positive rating and perception of organic farming.
Key word*: Smallholder farmers, Perception, Adoption, Organic farming, Practices*

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I. Introduction

Globally, organic farming (OF) practices have continued to increase[6]. It is estimated that the global annual production growth rate of OF is between 20 and 30 percent[10]. Data shows that the land area under organic agriculture increased to 72.3 million hectares in the year 2019, constituting 1.5% of land covered in 187 countries of the world surveyed[6]. Organic land accounted for 2.3% of the total agricultural land (35 million hectares) in 2008 worldwide[35]. It is also evident that over 120 countries have adopted organic practices[33]. Estimates indicate that approximately 17.7 million hectares were under organic farmland within 170 countries, accounting for only 0.98 percent of farmland worldwide[12].

Organic farming relies on natural processes such as crops rotation, animal manure, green manure, pest-free plant varieties, companion planting, and integrated pest management among others thus controlling pests, weeds and diseases; maintaining health of soil and that of all the living organisms[11]. The focus of organic farming is to provide sustainable solutions, such as the protection of land and procedures to achieve, sustain, and improve environmental stability. The rise and increase in attention to OF in parts of the world is attributed to various factors. First, the practice is seen as a means of diversifying agricultural production with the aim of improving productivity, farm income and food as well as environmental safety[23]. Second is the contribution of OF products to family health. Other factors include concern for livestock health, a strong land stewardship ethic, peer pressure, a desire for independence, and quality of life issues[23].

Whereas the increase in organic farming has been on the rise in most industrialized countries, the practice is only gaining popularity in developing countries[11]. Its popularity in Africa is partly in view of the recognition of its contribution to the achievement of Sustainable Development Goals (SDGs) III and VIII on improved health and food security and economic development, respectively, and generally to the environmental conservation[27].

Over 481 organizations globally including International Fund for Agricultural Development (IFAD), International Federation of Organic Agricultural Movements (IFOAM), International Food Policy Research Institute (IFPRI), Food and Agriculture Organization (FAO) and Non-Governmental Organizations (NGOs) opened up to the idea that Organic farming (OF) and offer organic certification services[14]. Organic farming was identified at FAO and IFOAM forum as a sustainable agriculture approach since it conserves resources, it is environmentally non-degrading, is technically appropriate, and economically and socially acceptable[10]. Organic farming practices worldwide aim to optimize quality in all aspects of agriculture and environment while basing upon sustainable ecosystem, safe food, good nutrition, animal welfare and social justice[10].

The size of land under organic farming in Africa is more than 2.0 million hectares (0.2 percent of agricultural lands). This involves mainly permanent crops such as olives, tropical fruits, nuts, coffee, cocoa but also cotton, herbs/spices, etc.[14]. Comparative data on organic farming in 35 countries indicate that Tunisia have the largest organic area[36]. They further found out that the main countries with certified organic farms are: Sudan (650 farms), Kenya (15,815 farms), Uganda (45,000 farms), Tunisia (515 farms), Tanzania (43,791 farms) and Zambia (9,248 farms). Most certified organic production is geared toward export markets, mainly the European Union[13]. The continent, therefore, offers great potential basis for the development of non-certified OF; based on improved agro ecological management of traditional African agriculture, which is a de facto low external input system, practiced by smallholders who cannot afford expensive technologies and who lack functioning markets[16].

Organic farming in Kenya, started in the early 1980s mostly championed by rural Non-Governmental Organizations, Faith Based Organizations, Community Based Organizations and individual farmers as a low cost approach in response to declining agricultural productivity, rising poverty and food insecurity[16]. Kenya Organic Agriculture Network (KOAN), Kenya Institute of Organic Agriculture (KIOA) and Kenya Organic Farming (KOF) have been at the fore-front in promoting OF practices publication on organic farming practices in the country and marketing organic products in various parts of the country.

Kenya has relatively small number of farmers practicing OF although the sector is growing fast mainly led by NGOs and private sectors, including companies that grow organic produce for export. More than 85 per cent of organic produce in Kenya is exported mainly to Europe, the Middle East, Asia and the Far East [31]. There are more than 200,000 organic farmers in Kenya. About 12,647 farmers are involved in production of vegetables, fruits, chillies, coffee, tea, nuts, herbs and spices on 104,211 hectares[34]. The organic area in Kenya is about 301,128 hectares mainly consisting of organic agricultural land (123,744 hectares) and 177,384 of wild and extensive production[14]. Farmers in different parts of the country undertake different types of organic production. For instance, indigenous vegetables, rosemary, macadamia and raspberries are common organic products in Mt. Kenya region; coconut oil and avocado oil in the Coast region, chamomile, carcade, honey and wax in the Eastern region; indigenous vegetable, tomatoes and kales in Nairobi; straw berry, milk, coriander and borage, in the Rift-Valley region[34]. The OF practice is also being adopted within the urban, in-built and town informal settlements.

Kisii Central Sub - County, in Kisii County is a rich agricultural area dominated by smallholder crop and animal rearing practices. Agriculture in the county is rain fed, consist of food and cash crop farming and small scale. Agriculture is the main economic activity in Kisii County which employs over 70 percent of the workforce directly or indirectly. According to Kisii County Integrated Development Plan 2018-2022, agriculture sector in Kisii faces numerous challenges including high population density, outdated farming practices, poor eating habits and dwindling farm sizes. Most farmers in Kisii Central Sub - County mix traditional farming with adaptations of conventional technologies that suit their farming systems which lend themselves well to conversion to organic farming[17]. This study focus on perception of smallholder farmers' on adoption of OF in Kisii Central sub - County, Kisii County.

II. Materials and Methods

Study Area

This study was conducted in Kisii Central Sub-County of Kisii County (Figure 1). Data was collected in the eight sub-locations of Birongo and Ibeno locations Keumbu Division. Kisii Central sub - County lies in the Upper Midland agro-ecological zone of Kisii County where farming is the main source of livelihood. The area exhibits a highland equatorial climate with a bimodal rainfall pattern averaging approximately 1,500 mm per annum. The western part of the study area has an elevation of between 1500 – 1800 ms above sea level while the eastern and south eastern is 1800 m above sea level (Kisii County Integrated Development Plan, 2018-2022).

Kisii Central Sub – County had a population of 166,906 people with a population density of 1,229 persons per square kilometer (KNBS, 2020). The population growth rate for Kisii Central Sub – County is 2.0 percent. Children below 5 years make up about 18.5%, the youth of age group between 15 years and 30 year comprise 31.8% of the total population while the labour force comprise of 56.7% of the population (KNBS, 2019).

Agriculture is the predominant occupation of the people in in the study area. This can be attributed to the favourrable climate and soil. Cash crops grown in the study area include tea, coffee, pyrethrum, bananas, avocadoes and sugar cane, while subsistence crops include maize, beans, potatoes and finger millet. Dairy farming is another important activity practiced in the sub-County. The area has diversity of 20 different types of soils. Nitosols (constituting 49%), pheozomes (13%), planosols (8%), greyzems (4%), vertisols (2%), gleysols (2%) and solonetz (0.8).

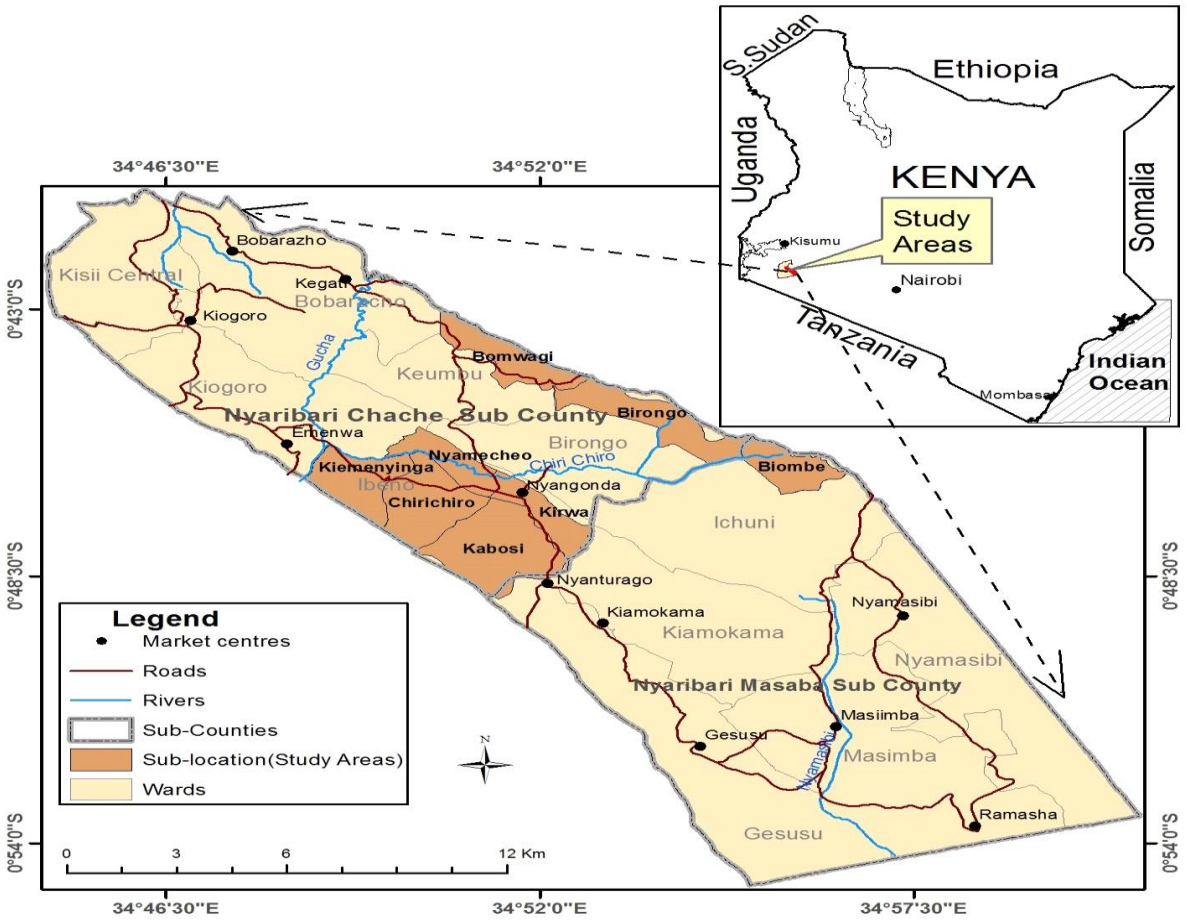

Figure 1: **Map Showing the Study Area in Kisii Central Sub-county**
Source: KNBS, 2020

III. Methodology

The study applied descriptive survey research design The choice for descriptive design was based on the fact that this study sought information on perception of smallholder farmers' adoption of organic farming practices Kisii Central Sub - County, Kisii County.

Multi-stage sampling design was used in this study to select two study locations in Kisii Central Sub-County; Birongo and Ibeno. In stage 1, Kisii County was purposively sampled from the 47 counties in Kenya because of the suitability of the area for diverse agricultural activities. In stage 2, Kisii Central Sub-county was purposively sampled because of its high population (166,906) as well as agricultural intensity of the various farming practices[7, 8]. At Stage 3, Keumbu Ward was also purposively sampled as data collection area based on its high population density (6,025 smallholder farmers) and its proximity to the county headquarters (rural). Stage 4, Birongo and Ibeno locations, within Keumbu Ward, was purposively sampled as data collection areas based on their high and low population densities, respectively. At stage 5, probability sampling procedures was used to select 306 smallholder farmers in Birongo (2,759) and Ibeno (3,265) Locations, which have several sub-locations, for study. Probability sampling is a sampling technique based on random process. Probability sampling techniques used included proportionate sampling procedure, simple random sampling and systematic sampling procedure. Proportionate sampling procedure was applied to collect data from smallholder farmers within the sub-locations in Birongo and Ibeno locations of Kisii Central Sub – County. Proportionate sampling technique is used when the population is composed of several subgroups that are vastly different in number. To sample the smallholder farmers for the study, proportionate sampling technique was used. Simple random sampling was applied to randomly pick the smallholder farmers practicing aspects of organic farming for administration of questionnaires within the sub-locations.

- Both primary and secondary data were collected from among the smallholder farmers and agricultural key informants. Structured questionnaire with both closed and open ended questions was used. Statistical

analysis of data was used done using the statistical software (SPSS) version 22. Frequencies, percentages, spearman's correlation and chi-square test of association were used to analyzed influence of smallholder farmers' perception on adoption of OF practice.

IV. Results and Discussion

Influence of Perception on Adoption of Organic Farming Practices among Smallholder Farmers

This section presents finding on how smallholder farmers' perception influence adoption of organic farming practices in Kisii Central sub-County.

Organic Farming Practices

To determine the influence of smallholder farmer's perception on adoption of organic farming, it was important to find out the respondents' understanding of organic agriculture.

The respondents were asked whether they practice organic farming (OF) or not. The study established that 97.1% claimed to practice OF. This concurs with findings that 86.3% of smallholder farmers in South West Nigeria practice organic methods of farming[1]. However, the finding differs with reported that agriculture sector in Kenya is largely dominated by conventional agricultural practices[22].

Respondents were asked to specify the organic farming practices they employ on their farms. It emerged that all aspects of Organic Farming envisaged in this study area are practiced in Kisii Central sub-County.

Result in Table 1 shows that use of animal manure has been practiced for a period of between 1 and 5 years (60%) and for more than 10 years (19%) while crop rotation has been practiced for a period of between 1 and 5 years (60%) and for more than 10 years (18%). The prevalence in the use of animal manure can be attributed to mixed farming that is common among the Kisii community – making animal manure readily available. The finding concurs with finding that use of manure (58.9%) was one of the most employed forms of organic farming in Kisii County[18]. However, it differs with finding that the most prominent OF method in the South West Nigeria included minimum tillage, crop rotation and mulching[1].

Table 1: Aspects and Duration (in %) of Organic Farming Employed by Smallholder Farmers (n=306)

	1 – 5 years	6–10 years	More than 10 years	Not applicable
Crop rotation	59.8	13.7	18.0	8.5
Biological Pests Managements	20.3	18.0	6.2	55.6
Use of legumes	38.6	18.6	10.1	32.7
Cover crop	34.6	22.9	15.0	27.5
Rotational grazing	25.2	16.7	17.3	40.8
Livestock-crop diversification	47.7	17.0	15.0	20.3
Use of crops residue	42.2	17.3	16.3	24.2
Use of animal manure	60.1	13.1	18.6	8.2
Green manures	49.3	14.7	11.4	24.5
Water conservation	32.4	18.3	16.0	33.3
Off farm organic wastes	27.8	16.0	18.0	38.2

Source: Research Data (2019)

A majority of smallholder farmers in Kisii Central sub-county are not practicing biological pest management (56%) and rotation grazing (41%). The high number of smallholder farmers not practicing biological pest management is attributed to lack of information within the study area. The high number of farmers not practicing rotational grazing can be attributed to the highly fragmented farms due to the high population density that characterize Kisii-Central. It is also of note that at least one third of the respondents are practicing water conservation (32%) while another one third are not practicing water conservation (33%). The almost equal percentage may be attributed to the reliable rainfall received in Kisii County Sub-County hence the respondents do not conserve water for farming.

Figure2 shows the organic farmers neighbouring the respondent[17].

Out of the 306 respondents who were interviewed, 34.3% indicated that they had approximately 6 - 10 neighbours that engage in organic farming practices. This further reinforces that organic farming is spread within Kisii Central. The spread of organic farmers within the study area is in tandem with diffusion theory of organic agriculture where OF innovation spread to farmers on discovery of the benefits of the adoption[28]. In addition, the finding implies that smallholder farmers who know other organic farmers are more likely to adopt organic agriculture. Organic farmers are an important source of relevant information when it comes to sharing their experience and persuading other farmers to adopt organic farming[24].

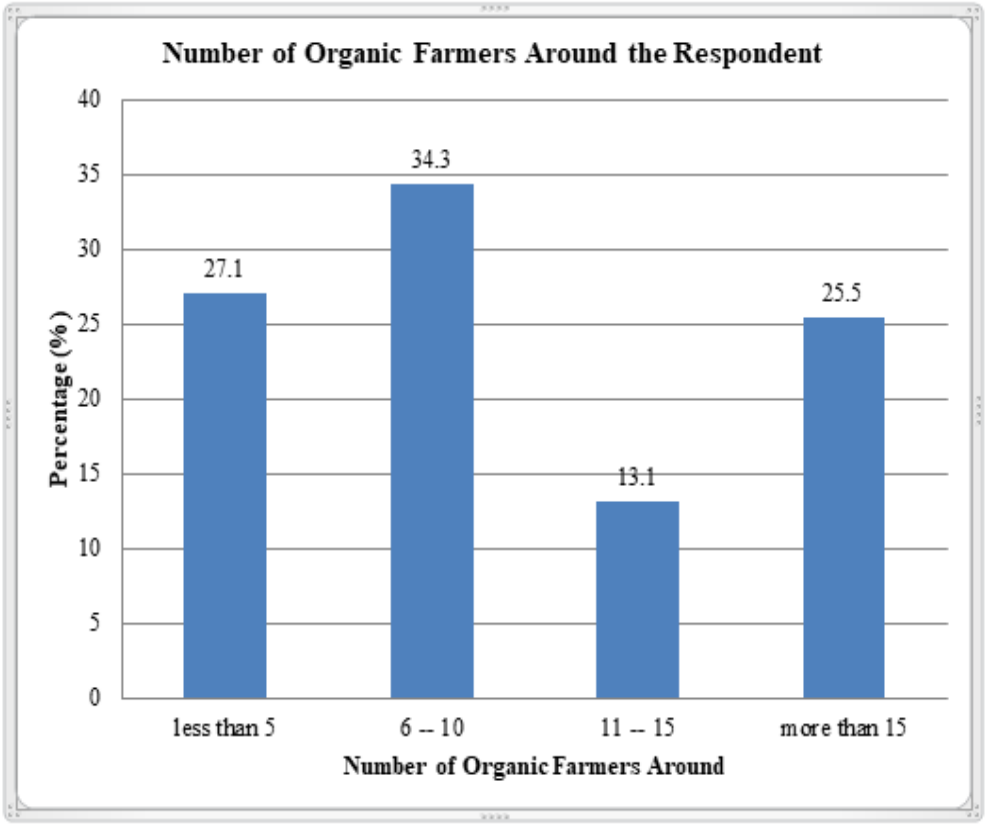

Figure 2: Number of Organic Farmers Around the Respondent (n=306)
Source: Research Data (2019)

The respondents were asked to identify the pre-dominant OF methods in Kisii Central. Figure 3 illustrate the pre-dominance of the various organic farming methods.

As indicated in Figure 3, use of animal manure (87.3%) and crop rotation (72%) are the most predominant OF method while use of biological pest management(14%) is the least pre-dominant OF method in the study area. The finding is attributed to the wide spread of livestock farming leading to availability of animal manure within Kisii Central. The finding was similar to finding that use of animal manure was the dominant organic farming practice in the nine provinces of Philippines. However, the results differed with observation that the most prominent OF method in the South West Nigeria included minimum tillage, crop rotation and mulching[1].

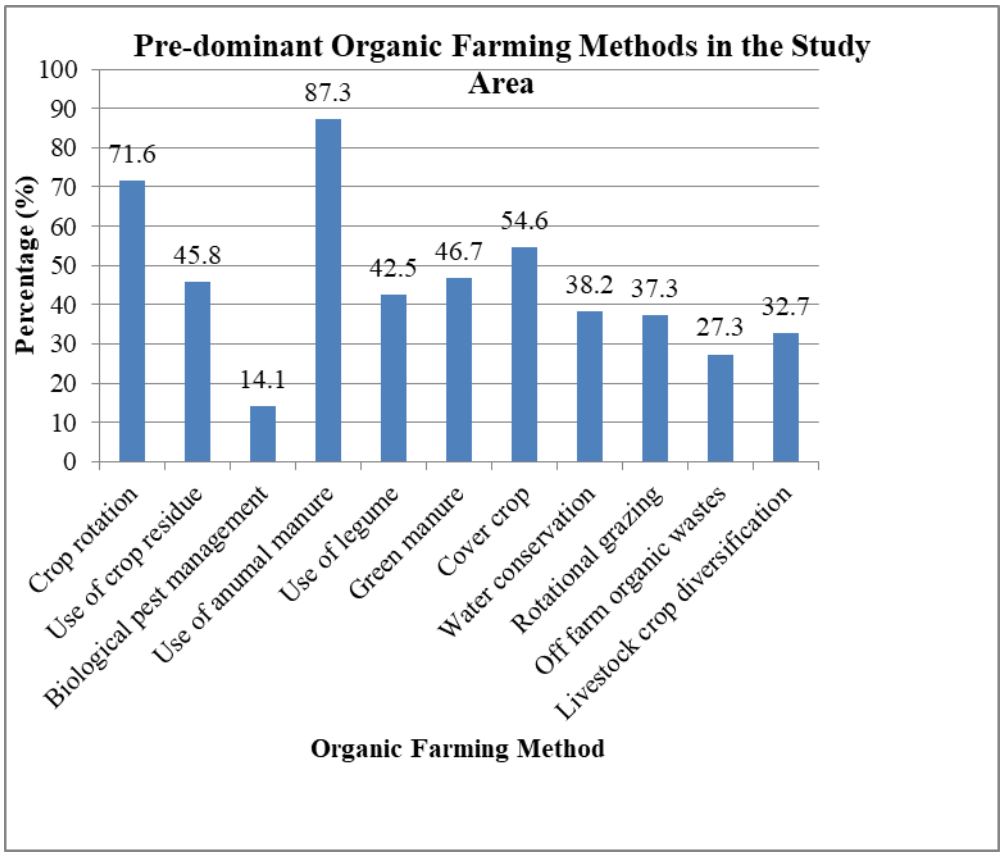

Figure 3: Predominant Organic Farming Methods in the Study Area (n=306)
Source: Survey Data (2019)

The size of farm under OF practices is an important requirement for an OF system. Figure 4 present the respondents' approximate acreage of land under organic products.

The results show that 52.3% of the respondents have approximately less than 1 acre of land is under organic farming. The findings are supported by the KNBS (2020) which shows that farm holding size in Kisii County is typically small holdings, ranging from 0.5 to 4.5 acres of land. The results concur with observation that the increasing land scarcity due to the growth in population in Kenya led to the progressive smaller farms as a result of fragmentation of agricultural farms for other land uses such as settlement[16]. The finding that larger farms are more difficult to manage as regards crops, inputs, and other supports, resulting in farmers having less motivation to cope with these problems[18]. Therefore, the small farms that characterize Kisii Central sub-County can potentially act as a catalyst for organic farming.

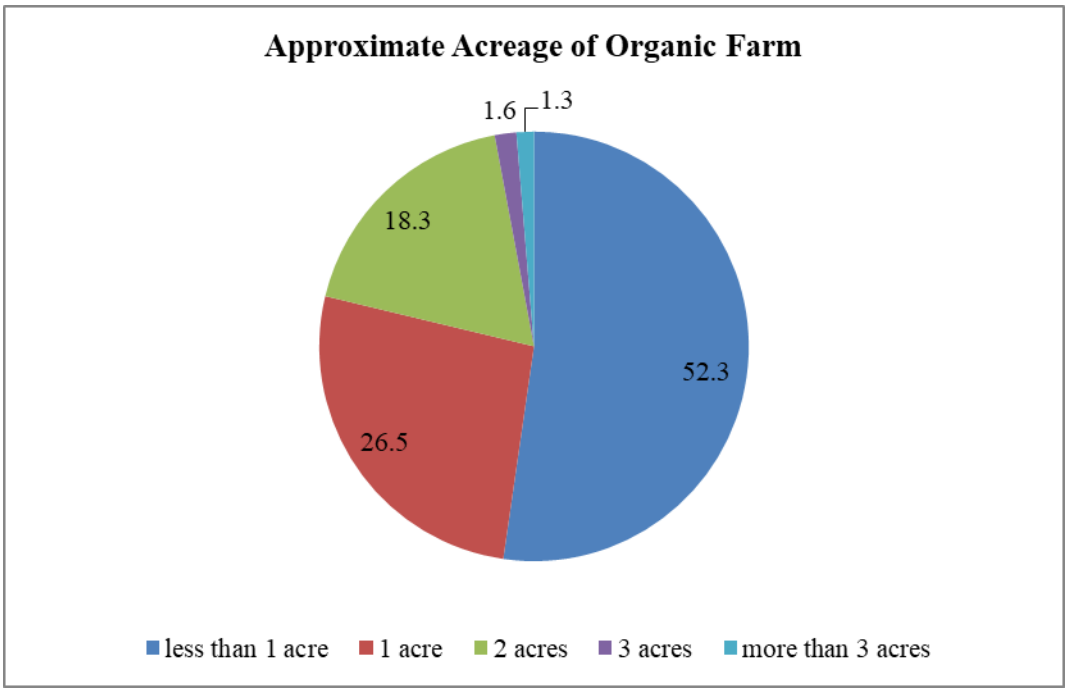

Figure 4: Approximate Acreage of Organic Farms (n=306)
Source: Survey Data (2019)

Perception on Organic Farming

Knowledge on availability of information on organic farming plays key role in determining the perception.

The results in Figure 5 indicate that 52% and 35% of the respondents consider information on organic farming to be *easily available*, and *available* respectively. Its only 11% and 2% of the respondents who noted that information on organic farming was not easily available and hardly available, respectively. Access to information on organic farming can be attributed to the increasing awareness on benefits of organic farming. Organic agriculture is gaining popularity as a result of the increasing awareness of its health and environmental benefits. In addition, there is growing interest on organic agriculture knowledge[32]. OF have gained a place in the spotlight of the mainstream media[30]. This finding has thus practices further concurs with Bernzen and Kristiansen that new peer-review research on organic agriculture are emerging annually giving various information on aspects of OF [4].

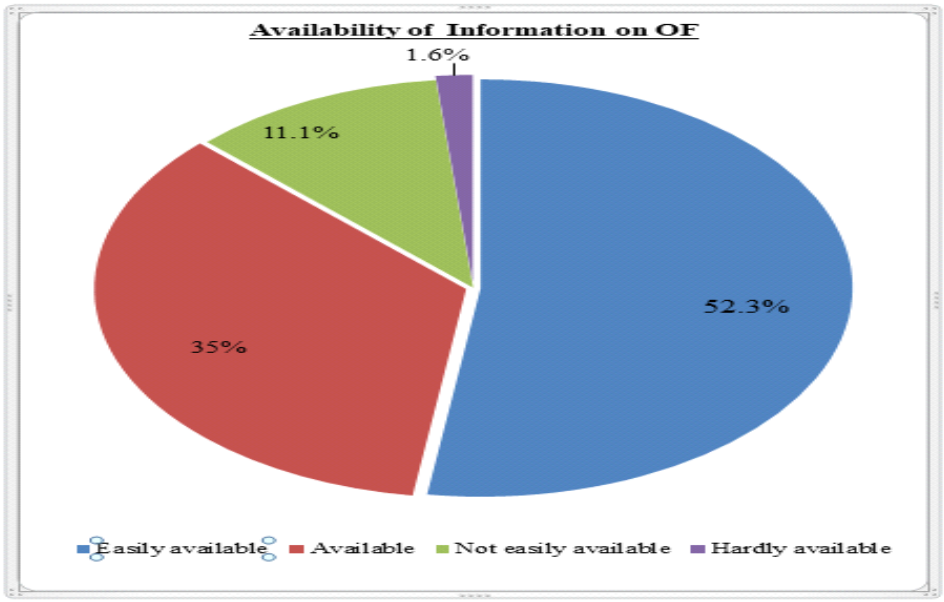

Figure5: Availability of Information on Organic Farming (n=306)
Source: Survey Data (2019)

Structured statements in regard to OF were posed to the respondents to give their views. Table 2 present results on the farmers' views.

Results indicated that 68.9% of the respondents strongly agreed that organic farming has positive effects on the environment. Conversely, 39.3% disagreed that organic farming has negative effects on the environment. The respondents also agreed that organic farming is a form of traditional agriculture (51.3%), organic products are readily available in the market (48.4%) and that most organic farms are small-scale (44.4%). The high percentage agreement with the views on OF imply that the smallholder farmers of Kisii Central sub-County are knowledgeable on the positive aspects OF. A study done in Pakistan showed that organic farming was more profitable than conventional farming. The study also tested soil nutrients in organ and conventional farms and it was found out that organic farms had improved and conserved soil fertility better than conventional farms[9]. Further, a study by Singh (2021) indicated that organic farming is beneficial to the environment as the practices enable farmers to live in accord with nature and profit from it economically. In another study done in Japan, the results indicated that organic fields supported the highest richness and abundance of animal and plant species[15]. This, therefore, confirms that organic farming practices have positive effects on the environment as suggested by respondents. The positive rating of organic farming among smallholder farmers of Kisii sub-County offer an entry point for scaling up commercial level organic farming.

Table 2 Farmers view on Statements about Organic Farming (n = 306)

Statement	No. of farmers (percentage)				
	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
Organic farming has positive effects on the environment	68.9	26.1	3.3	1.6	0.3
Organic farming has negative effects on the environment	11.4	25.8	36.3	20.9	5.6
Organic farming are more profitable than inorganic farms	46.7	37.6	9.5	3.6	2.6
Organic farming is a form of traditional agriculture	33.7	51.3	8.8	2.9	3.3
Organic products are readily available in the market	24.8	48.4	19.6	2.9	4.2
Most organic farms are small scale	40.5	44.4	9.2	2.0	3.9

Source: Research Data (2019)

In this study, respondents were asked the present demand of organic farm products. Their responses were categorized as follows: low, average and high.

As indicated in Figure6, 63.7% of the respondents were of the opinion that the present demand for organic farm products is average. The results are in tandem that the demand for organic agricultural products is on constant increase worldwide as consumers are shunning the use of chemical fertilizers and pesticides[37]. A research in Chicago revealed that shoppers preferred organic fruits and vegetables, albeit, the cost was a significant barrier to purchase them[38].

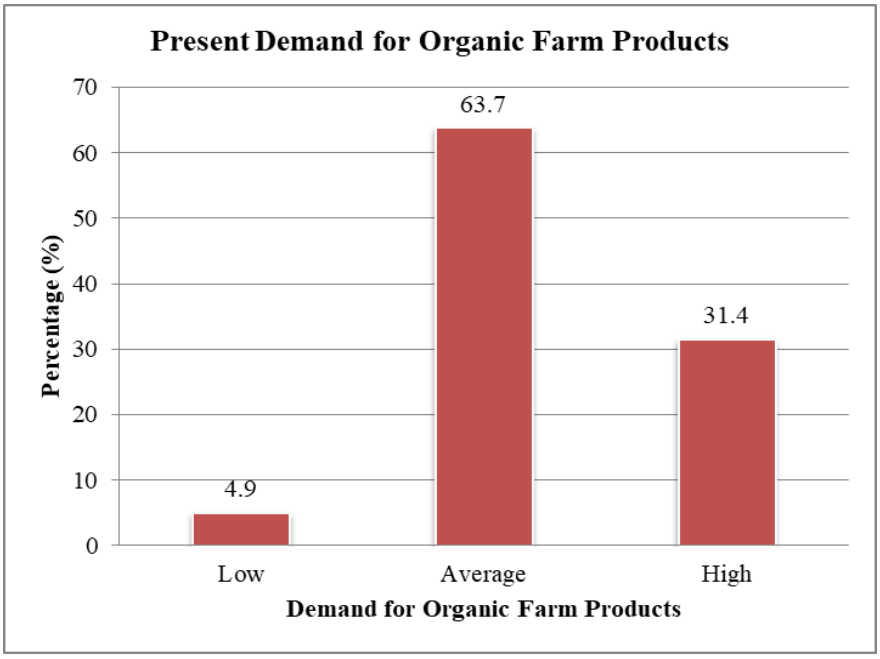

Figure 6: Present Demand for Organic Farm Products (n=306)
Source: Survey Data (2019)

An overwhelming 84% observed that the future demand for organic farming products increase significantly (Figure 7). The findings imply that although there is high awareness on organic farming, not as many households insist on organic farming products. It is possible that purely organic farming products are rare and expensive. Thus, not many households can access and afford them. This study finding concurs with a study in India which revealed that the rapid demand for organic products in future will be attributed to how to get enough sustainable healthy food[19]. In addition, it is argued that the future of organic agriculture will, to a large extent depend on consumer demand and their motive for paying extra price for organically grown food[3]. As such, a high price on organic food affects its consumption. The finding is similar to a study done which found out that there was a general increase in demand and expansion of organic food market in European countries[20]. However, the study also indicated that the demand might decrease unless the prices for organic products are reduced.

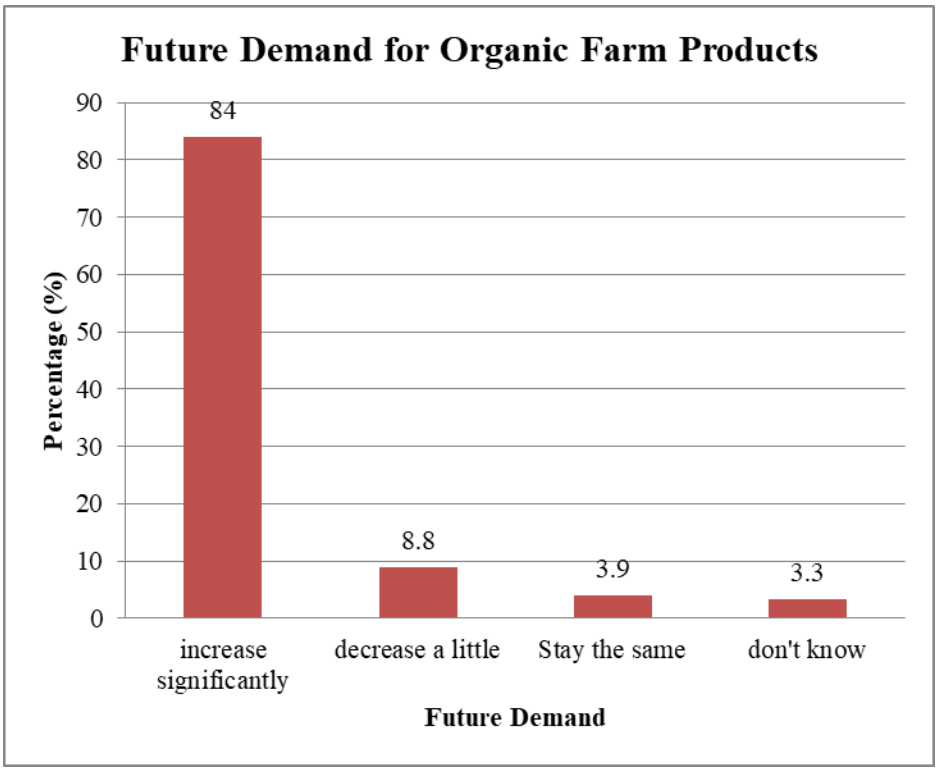

Figure 7: Future Demand for Organic Farm Products in Kisii Central (n=306)
Source: Survey Data (2019)

The study also sought to establish smallholder farmer's perception of organic farming practices compared to conventional farming.

The results are presented in Figure 8. A majority of respondents (56% - Easy and 40% - very easy) opined that organic farming practices are easy compared to conventional farming. This partly affects the adoption of organic farming practices. The finding is in tandem with generalization that since OF practices are known to exclude all synthetic off-farm inputs and include crop rotations, crop residues, animal manures, off-farm organic waste, mineral grade rock additives and biological system of nutrient mobilization and plant protection which are easier in terms of application[25].

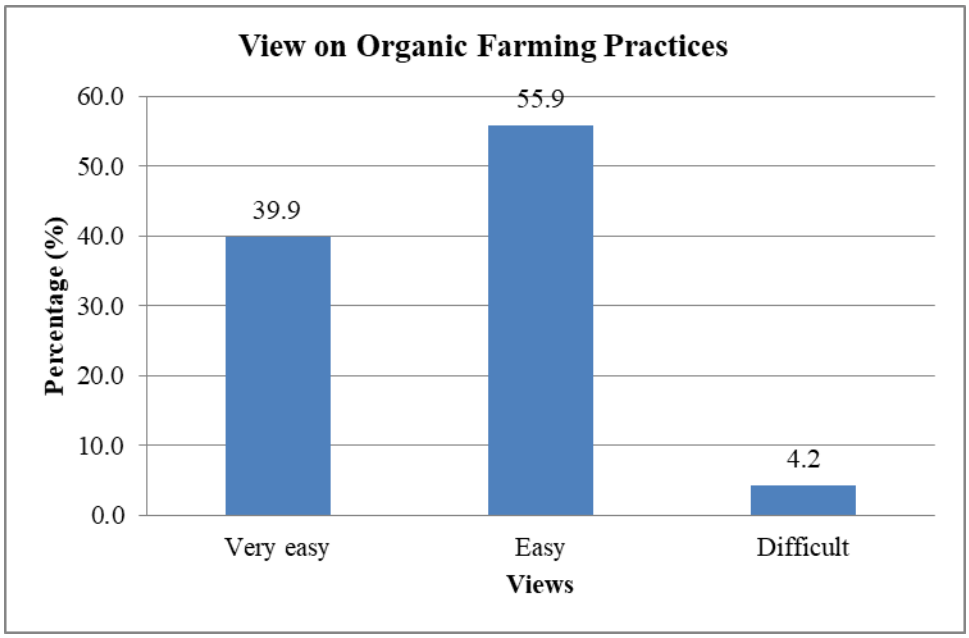

Figure 8 Views on Organic Farm Practices (n=306)
Source: Survey Data (2019)

V. Conclusion and Recommendation

Conclusions

The study has established that information on OF is easily available and smallholder farmers are aware of OF: methods, effects and products in the study area. The finding may indicates that access to information on OF among smallholder farmers plays a role in organic farming practice. Most smallholder farmers practice use of animal manure and crop rotation while very few are practice biological pest control. Therefore, the availability of information and awareness, and future prospects of organic farming can be utilized to increase the adoptability of organic farming. Based on the smallholder farmers information on organic farming, facts on OF should be separated to enable the farming sustainable.

Recommendations

Promoters of organic farming should take note of the positive rating and perception of organic farming. The regard of a significant increase in the demand for organic products should be a stepping stone to expansion of organic farming and improvement of livelihoods for smallholder farmers.

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