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Original Research Article

Factors Influencing Production of ILVs by Smallholder Farmers in Kisii County, Kenya

Florence Bonareri Ondari[1*], Judith Achieng Odhiambo[2], Joseph Kimutai Langat[2]

[1]Department of Agricultural Education and Extension, Kisii University, Kenya P.O Box 408-40200, Kenya
[2]School of Agriculture and Natural Resource Management, Kisii University, Kenya P.O Box 408-40200, Kenya

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Abstract: Indigenous leafy vegetables (ILVs) are gaining popularity as a staple indigenous diet in Kenya. Most prominent farmers, however, are underestimate these vegetables despite a steadily expanding demand, as seen by a significant supply gap. ILVs costs increase faster than their exotic counterparts as demand outpaces supply, making them unaffordable for the bulk of eager consumers. The study location was Kisii County. The study is critical because it aims to gather, examine, and disseminate vital data required to achieve the Big Four agenda approved by the Kenyan Government for realizing Kenya Vision 2030. The purpose of the study was to investigate factors influencing the production of ILVs by smallholder farmers, in Kisii County, Kenya. The target population was smallholder farmers, traders, and consumers of the ILVs. These smallholder farmers, traders, and consumers of ILVs who live near 11 market centres of Kisii County made up the sampling group. Using Cochran's sample size calculation procedure for an unknown population, 349 responses comprised the study's sample size. Descriptive statistics like frequency and percentage were employed to describe the population's demographic and socioeconomic features. Inferential statistics was performed using the mean and standard deviation to examine the relationship between the independent and dependent variables. Data analysis involved several steps, beginning with data collection and ending with a complete presentation of the study findings. Related information was compiled during the procedure after the analysis of the data. The results indicated that ILVs benefitted smallholder farmers, traders and consumers in terms of finances and nutrition.

Keywords: Smallholder farmer, Trader, Consumer, nutrition, Indigenous leafy vegetables, Agricultural.

INTRODUCTION

As an essential component of the native cuisine in Kenya, African Indigenous Leafy Vegetables (ILVs) are becoming increasingly preferred. A vast supply gap, however, indicates that the largest growers need to be more utilized in the crops despite a continually rising demand. When demand exceeds supply, vegetable prices rise more quickly than their exotic equivalents, making them unaffordable for most eager buyers (Aworh, 2021).

Hawkes *et al.*, (2016) reported that over 70% of individuals in Sub-Saharan Africa (SSA) are estimated to rely directly on agriculture as their primary means of sustenance and income. To alleviate the continent's persistent poverty and hunger, engaging all initiatives to boost agricultural productivity and output is prudent. According to 2006 research by the Forum for Agricultural Research in Africa (FARA), the lowest agricultural productivity and value of agricultural output per person is found in SSA. Additionally, low agricultural output is made worse by the significant post-harvest losses experienced in SSA (World Bank, 2013).

Agriculture is under stress due to the rise in global demand for food and agricultural goods (FAO, 2008). Urbanization and technological development have significantly increased food production, but widespread hunger and malnutrition remain significant problems in many parts of the world. According to FAO (2011), population growth, climate change, and the loss of arable land have all continually contributed to

***Corresponding Author:** Florence Bonareri Ondari
Department of Agricultural Education and Extension, Kisii University, Kenya P.O Box 408-40200, Kenya

significant environmental effects due to increased food production and economic growth. The ability of the world to meet its food needs and the sustainability of the food system are both in peril due to all these developments. The primary industry in SSA is agriculture, which accounts for between 60 and 80 percent of jobs and 40 percent of the region's GDP. Despite this, it is the only area where rural populations earn less than $1 per day (FAO, 2012).

Food scarcity results in underfeeding and malnutrition among the public because of the expanding population and the restricted space for large-scale agriculture (Haddad *et al.,* 2016). Alternative crops are strongly encouraged to be adopted to improve human well-being and food security. Only 7,000 of the estimated 30,000 edible plants are grown or collected for food (Motti *et al.,* 2020). Achigan-Dako *et al.,* (2014) state that just 20 of the 3,000 plant species that have been commercialized are frequently consumed. ILVs are becoming more well-liked as prospective vitamin and bioactive chemical sources for Africans. Amaranths, one of the most well-known green vegetables in this region, are one of the many vegetable species found on the African continent (Achigan-Dako *et al.,* 2014).

ILVs are especially necessary for women who own intermediary and retail enterprises, participate in all facets of the supply chain, and have great potential for revenue generation (Aleni, 2017). The demand for ILVs is expected to be driven by Kenya's rapidly rising population and the market's anticipated expansion. For smallholder farmers, who frequently produce more than 70% of the vegetables exported, planting vegetables is a vital source of food, nutrition, and income. According to HCDA (2013), the percentage of indigenous vegetables in the overall value of vegetables sold domestically climbed from 4% in 2001 to 10% in 2007, despite no indigenous vegetables being exported. According to USAID-KHCP, 2015, ILVs production contributed 5% to the domestic value of vegetables despite making up 11% of the total amount of vegetables produced. This explains why Vegetables cultivated locally are not utilized regularly throughout the world.

According to Otang-Mbeng and Mashabela (2020), ILVs have additional protein, calories, vital vitamins, including A, B, and C, and minerals like calcium and iron. These Vegetables' high protein and vitamin contents can obviate shortages in susceptible groups, including juveniles and expectant mothers (Irungu *et al.,* 2008). The most famous native vegetables eaten include but are not limited to, black nightshade (Managu), Spider plant (Saga), cowpea leaves (Kunde), jute (mrenda), pumpkin leaves (Seveve, malenge leaves), amaranthus (Terere), Bacella alba (Nderema), spider plant (Saget, saga), and crotalaria (Mitoo).

Purpose of the Study

The purpose of this study was to Investigation of factors influencing production of ILVS By Smallholder Farmers in Kisii County.

Scope of the study

This study Investigated factors influencing production of ILVS By Smallholder Farmers in Kisii County. The sampling units were derived from smallholder farmers, traders, and consumers who reside in the market centers' immediate vicinity.

MATERIALS AND METHODS

Study Area

This study was conducted in Kisii County, Kenya's old Nyanza Province. The GPS coordinates for Kisii are -0.680482 latitude and 34.777061 longitude, or 0° 40' 49.7352" S and 34° 46' 37.4196" E. The county is bordered by six counties: Narok to the south, Migori to the west, Homa Bay to the northwest, Kisumu to the north, Bomet to the Southeast, and Nyamira to the east. In the Southeast, the county is close to Lake Victoria. Bomachoge Chache, Bomachoge Borabu, Bobasi, Bonchari, Kitutu North, Kitutu South, Nyaribari Chache, Nyaribari Masaba, and South Mugirango are the nine sub-counties that make up this county (Kenya Bureau of statistics (2019). Kisii County is home to 1,266,860 people. 1323 Km2 in size, Kisii County has 957 inhabitants per Km2. Since the primary goal of this study was to examine the factors that influence the production of particular ILVs by smallholder farmers in Kisii County, a sample of these individuals rather than the entire county was drawn from smallholder farmers, traders, and ILVs consumers.

Research Design

This study's methodology was a descriptive survey. The most effective research designs enable the gathering and analysis of both quantitative and qualitative data. Mugenda & Mugenda (2003) define descriptive research as the process of collecting data in order to evaluate theories or provide solutions. The study aimed to look into the factors that influence how smallholder farmers in Kenya's Kisii County produce locally grown leafy greens. The survey's goal was to gather information that would help the researcher better understand the study population regarding the production of the chosen ILVs, consumer knowledge and nutritional value, producer, trader, and consumer attitudes toward ILVs consumption, and their contribution to smallholder farmers' livelihoods.

Target Population

All Kisii County smallholder ILVs farmers, traders, and consumers made the study's target group. The sampling population consisted of smallholder farmers, traders, and ILVs buyers. The group of persons for whom the researcher generalized the study results Mugenda & Mugenda (2003).

Sample Size and Sampling Procedures

A sample, as defined by Mugenda and Mugenda (2003), is a discrete portion of the accessible population that has been selected. Due to the unknown number of Indigenous Leafy Vegetable (ILVs) smallholder farmers, merchants, and consumers in Kisii County, the sample size for this study was determined using Cochran's sample size calculation formula.

$$n_0 = \frac{3.8416 \text{ X } 0.65 \text{ X } 0.35}{0.0025}$$

$$n_0 = 349$$

Where;
n0 = is the sample size
Z2 = statistical parameter that depends on the confidence level at - 95%-1.960
p = is the estimated proportion of an attribute that is present in the population (65%)-0.65
q= is 1-p =1-0.65=0.35
e^2= is the desired level of precision (i.e. the margin of error) (5%) =0.05

Kisii County's nine sub-counties were purposefully chosen for the study. Using a stratified random sample approach, the shopping centres were selected from the sub-counties in order to identify smallholder farmers, ILV customers, and traders. Table 1 below shows the sample size that was applied from the market centres.

Table 1: Sample Size

Sub-County	Shopping Centres	Smallholder farmers	Traders	Consumers	Total
Bomachoge Chache	Ogembo	15	15	10	31
Bomachoge Borabu	Kenyenya	14	14	9	33
Bobasi	Nyamache	15	15	10	31
Bonchari	Suneka	15	15	10	31
Kitutu North	Mosocho	15	15	10	33
Kitutu South	Marani	13	13	9	33
Nyaribari Chache	Kisii town	15	15	10	31
Nyaribari Masaba	Keroka	15	15	10	31
South Mugirango	Nyamarambe	15	15	7	31
		132	**132**	**85**	**349**

The snowballing technique was also used to select at least 13 smallholder farmers and 13 traders from every sub-county who contributed 264 respondents to the sample size. In the non-probability sampling technique known as snowball sampling, additional units are enlisted by existing units to join the sample. Research about people with particular characteristics that might be challenging to identify otherwise can be conducted using snowball sampling (Bloor & Wood, 2006). At least seven consumers from each sub-county were chosen using a simple random selection technique to get 85. The researcher estimated that 349 respondents made the study's final sample. When using a simple random sample, researchers choose study participants randomly from a larger population without adhering to any process (Taherdoost, 2016).

RESULTS AND DISCUSSION

Gender of Participants

The gender distribution among the 264 participants showed that 186 (70.5%) were female while 79 (29.5%) were male as shown in figure 1.

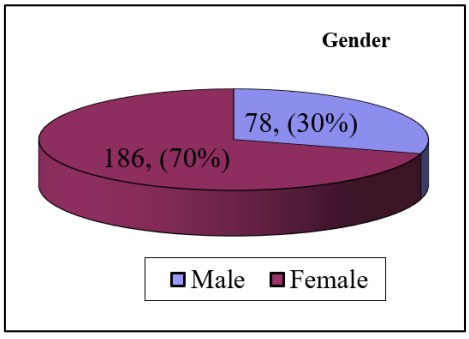

Figure 1: Gender of Participants Distribution

Age of Participants

The age distribution of participants was analyzed, revealing that the majority (34.1%) fell within the 21-30 years age range. This finding demonstrate that young people are embracing Agriculture particularly, the cultivation of ILVs to generate income other than waiting for white collar jobs. Additionally, 25.4% were aged 31-40, 15.2% were aged 41-50, and 25.4% were over 50, as shown in Figure 2. A total of 264 participants were

included in the analysis, providing insights into the age demographics of the sample.

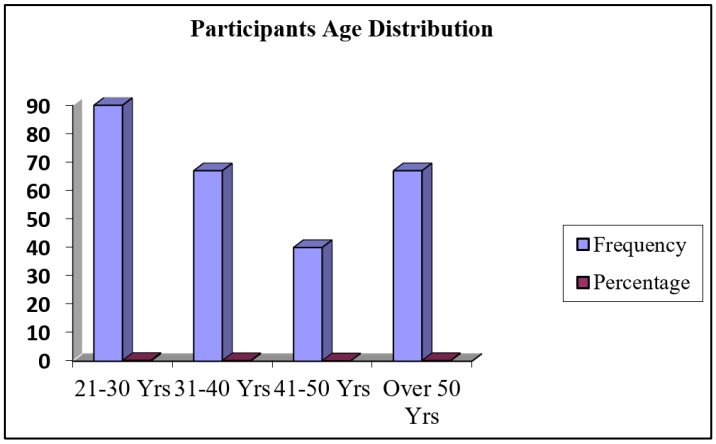

Figure 2: Participants Age Distribution

Participants Educational Level

Participants' educational attainment was examined, revealing diverse levels within the sample. The majority (42.8%) reported completing secondary education, followed by 37.5% with a primary education. These findings imply that there is high literacy level in Kisii County, courtesy of free primary and secondary education. Moreover, the findings underscore the fact that cultivation is for school dropout. Additionally, 11.7% held a diploma, and 8.0% reported obtaining a bachelor's degree as shown in Figure 3.

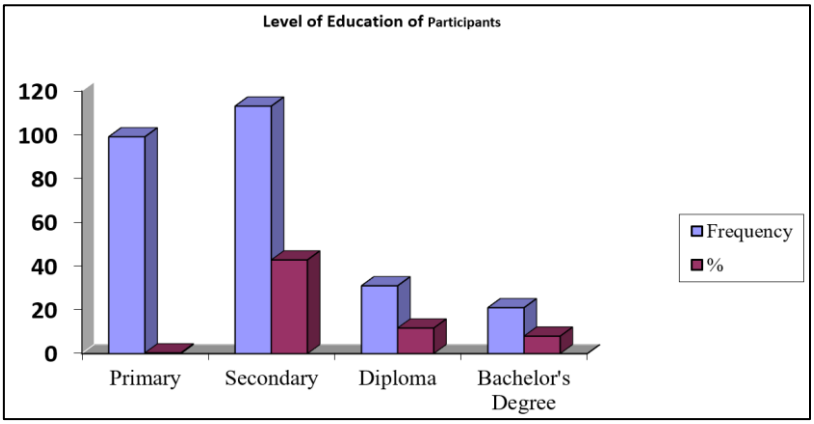

Figure 1 : Highest level of Education of Participants

Indigenous Leafy Vegetable Production

The presence of indigenous leafy vegetables on participants' farms was investigated, revealing that the majority (61.4%) responded affirmatively, indicating they have indigenous leafy vegetables on their farms. Conversely, 38.6% reported not having indigenous leafy vegetables Table 2. The analysis, shed light on the prevalence of indigenous leafy vegetables in the sampled population.

Table 2: Indigenous leafy Vegetables production

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	162	61.4	61.4	61.4
No	102	38.6	38.6	100.0
Total	**264**	**100.0**	**100.0**	

Types of Indigenous Leafy Vegetables Cultivated

The cultivation of indigenous leafy vegetables was explored, revealing that participants engage in the cultivation of various types. The most commonly cultivated indigenous leafy vegetables include Cowpeas (Kunde) at 61.5%, African nightshade (Managu) at 63.9%, Spider plant (Saga) at 58.7%, African Spinach (Enderema) at 57.1%, and Pumpkin Leaves (Risosa) at 59.1%. Notably, participants could cultivate multiple types of indigenous leafy vegetables. The findings resonate with Kebede, *et al.,* (2018) who asserts that many African communities, including those in Kenya,

people often consume various indigenous vegetables that are well-adapted to the local climate and rich in nutrients. The participants in this study alleged that the commonly cultivated ILVs in Kisii County are: i. The amaranth (omotere) leaves are nutritious and widely used in various dishes. ii. The spider plant (chinsaga): Also known as spiderwisp, it is a leafy green vegetable. iii. The african nightshade (managu): leafy green vegetable often used in soups and stews. iv. cowpea leaves (kunde): leaves of the cowpea plant are consumed as a vegetable. v. jute mallow (mwani): Known locally as mrenda or murere, jute mallow leaves are used vegetables. vi. pumpkin leaves (risosa): leaves from the pumpkin plant are nutritious and used in various dishes. Table 3 illustrates Indigenous Leafy Vegetables cultivated.

Furthermore, the study found that a variety of environmental, cultural, and nutritional variables affect the production of indigenous vegetables in Kisii County, just as they do in many other places. The participants said that native vegetables in Kisii County are frequently well suited to the regional temperature and soil types. They could need fewer outside resources, such insecticides and fertilizers. They are also rich in essential nutrients and contribute to a balanced and diverse diet. Growing and consuming various indigenous vegetables can help address nutritional deficiencies and improve the community's overall health. Cultivating indigenous vegetables contributes to biodiversity and maintains crop diversity in the region, which is essential for building resilient agricultural systems that can withstand environmental changes and uncertainties. Smallholder farmers in Kisii County may sell these vegetables in local markets, providing an income source for themselves and contributing to the local economy. Finally, the cultivation of indigenous vegetables helps preserve traditional farming knowledge and practices, often passed down through generations, and contributes to the sustainability of local agricultural systems.

Research by Makokha, Oniang'o, and Ojijo (2019) that was published in the Journal of Ethnic Foods claims that a variety of environmental, cultural, and dietary variables affect the production of ILVs. According to the study, ILVs often grow well in Kisii County's climate and soil, requiring less outside input like pesticides and fertilizers. They add to a varied and well-balanced diet and are abundant in important nutrients. In addition, growing indigenous vegetables contributes to biodiversity and maintains crop diversity in the region, which is essential for building resilient agricultural systems that can withstand environmental changes and uncertainties. Cultivating indigenous vegetables can also have economic benefits, as farmers in Kisii County may sell these vegetables in local markets, providing an income source for themselves and contributing to the local economy. Finally, indigenous vegetables are often well-suited to local farming practices, promoting environmental conservation and reducing the ecological footprint of farming activities.

According to the participants, the production and consumption of ILVs are influenced by several factors. The cultural significance of indigenous leafy vegetables can significantly affect production and consumption. Traditional recipes, culinary practices, and cultural beliefs around certain vegetables may drive their inclusion in local diets. The nutritional content of indigenous leafy vegetables is also a significant factor. If these vegetables are rich in essential nutrients and contribute to a balanced diet, they are more likely to be cultivated and consumed. The local climate and agroecological conditions are crucial in determining which indigenous vegetables thrive in Kisii County. Farmers are likely to cultivate vegetables well-adapted to the specific environmental conditions. Farmers may be more inclined to produce if there is a demand for indigenous leafy vegetables in local markets. Market dynamics, including pricing and consumer preferences, can influence production choices. The availability of seeds and planting material for indigenous leafy vegetables can impact production. If farmers have easy access to quality seeds, it may encourage the cultivation of these vegetables. The availability and ownership of land influence the extent to which farmers can cultivate indigenous vegetables. Land tenure systems and access to arable land can affect production levels. Finally, government policies and support can also promote the production and consumption of indigenous leafy vegetables in Kisii County.

Government policies, agricultural extension services, and support programs can influence the production of indigenous vegetables. Policies that promote sustainable agriculture and provide support to farmers may enhance output. The knowledge and awareness of farmers regarding the cultivation and benefits of indigenous leafy vegetables are essential. Education and extension services can play a role in promoting the cultivation and consumption of these vegetables. The role of indigenous vegetables in contributing to household food security is crucial. If these vegetables are seen as a reliable and accessible source of nutrition, they are more likely to be included in local diets. The availability of infrastructure and transportation can influence the ease with which indigenous vegetables can reach markets. Improved infrastructure can facilitate the distribution of these vegetables. Socioeconomic factors, such as income levels and employment opportunities, can impact production and consumption patterns. If cultivating indigenous vegetables is economically viable, farmers may be more inclined to grow them. Globalization and changing lifestyles may introduce new dietary preferences. The influence of external factors on local diets can impact the production and consumption of indigenous leafy vegetables.

Table 3: Indigeneous Leafy Vegetables cultivated

Cultivated ILVs[a]	Responses		Percent of Cases
	N	Percent	
Cow peas (Kunde)	**155**	**20.5%**	**61.5%**
Africa nightshade (Managu)	161	21.3%	63.9%
Spider plant (Saga)	148	19.6%	58.7%
African Spinach (Enderema)	144	19.0%	57.1%
Pumpkin Leaves (Risosa)	149	19.7%	59.1%
Total	**757**	**100.0%**	**300.4%**
a. Dichotomy group tabulated at value 1.			

Reasons for not Cultivating Indigenous Leafy Vegetables

Participants who reported not cultivating African leafy vegetables provided various reasons for their decision. The most commonly cited factors are theft (61.2%), small size of the land (60.5%), water unavailability (58.9%), changes in consumption tastes and preferences (56.7%), pests and diseases (58.6%), soil infertility (54.8%), unfavorable weather (55.5%), lack of awareness campaigns (54.8%), labor intensiveness (54.4%), high cost of seeds (53.6%), hailstones (52.9%), and other reasons (58.9%). Analysis provided insights into the multifaceted challenges and barriers participants face in cultivating Indigenous leafy vegetables. Table 4 demonstrates reasons given by those not cultivating indigenous leafy vegetables.

The persistent shortage of these vegetables suggests that, despite their many advantages and promising future contribution to family food dietary quality and income, agricultural families still need to utilize ILVs at a higher rate. The participants revealed that most vegetables are acquired from the neighbouring town of Narok through Kilgoris to satisfy the local market. The findings resonate with one carried out by (Ondabu, Mwamburi, & Ojijo, 2019), indicating low production of indigenous leafy vegetables in Kisii County.

Table 4: Reasons for not cultivating Indigenous leafy Vegetables

Reasons for not cultivating ILVs[a]	Responses		Percent of Cases
	N	Percent	
Size of land is small	159	8.9%	60.5%
Soil infertility	144	8.0%	54.8%
Changes in consumption tastes and preferences	149	8.3%	56.7%
Pests and diseases	154	8.6%	58.6%
Labour intensive	143	8.0%	54.4%
High cost of seeds	141	7.9%	53.6%
Theft	161	9.0%	61.2%
Hailstones	139	7.8%	52.9%
Water unavailability	155	8.7%	58.9%
Unfavorable weather	146	8.2%	55.5%
Lack of awareness campaigns	144	8.0%	54.8%
Others	155	8.7%	58.9%
Total	**1790**	**100.0%**	**680.6%**
a. Dichotomy group tabulated at value 1.			

Methods Used to Improve Soil Fertility

Various methods were employed by participants to enhance soil fertility. The most commonly reported methods are manure (56.4%), the use of artificial fertilizers (56.1%), crop rotation (55.7%), mulching (54.9%), application of crop residues (54.2%), addition of house refuse (53.8%), and. Additionally, participants cited other methods not explicitly listed in the survey, contributing to a cumulative percentage exceeding 100%. This information offers valuable insights into participants' diverse strategies to promote soil fertility in their agricultural practices. Table 5 shows various methods used to improve soil fertility. Comparatively, studies worldwide exhibit a similar trend in employing a combination of soil fertility enhancement methods (Makone, Basweti, & Ngeywo, 2015). Global research indicates a reliance on synthetic inputs, such as artificial fertilizers, and organic practices, including manure application and crop rotation. The prevalence of these methods suggests a universal recognition of the importance of maintaining soil fertility for sustainable agricultural practices. Moreover, the diversity of methods reported in the Kisii County study aligns with the global understanding that a holistic and context-specific approach is essential for effective soil management.

Additionally, smallholder farmers used a variety of techniques to improve the fertility of the land. Fallowing was one of these techniques, which involved

spreading manure, compost, agricultural wastes, and fertilizer trees like Pygeum africana and Calliandra. In addition, farmers used conservation agricultural practices such crop rotation and preserving permanent soil cover without uprooting the topsoil layer, as well as intercropping legumes with grains. Participants emphasized maintaining continuous water supply to farms through rainwater collection and storage, selecting drought-tolerant plants, incorporating 2 to 3 inches of organic mulch for soil moisture conservation, and safeguarding roots while amending soil with compost to augment water-holding capacity. Also, the smallholder farmers suggested optimizing growing conditions by correctly timing planting and harvesting, tillage, fertilization, and pest control, which also improves crop growth.

Table 5: Various Methods Used to improve Soil fertility

Method used to improve soil fertility[a]	Responses		Percent of Cases
	N	Percent	
Artificial fertilizers	148	14.3%	56.1%
Manure	149	14.4%	56.4%
Crop rotation	147	14.2%	55.7%
Application of crop residues	143	13.9%	54.2%
Addition of house refuse	142	13.8%	53.8%
Mulching	145	14.1%	54.9%
Others	158	15.3%	59.8%
	1032	**100.0%**	**390.9%**
Dichotomy group tabulated at value 1.			

Factors Influencing Cultivation of Indigenous Leafy Vegetables

Indigenous Leafy Vegetables Cultivation Benefits

According to Table 6, Participants reported various benefits associated with the cultivation of indigenous leafy vegetables, as indicated by the analysis of 766 responses. The most frequently cited benefits included financial gains (64.3%), food (61.9%), medicine (60.7%), and cultural significance (56.0%). Some participants indicated that the question was not applicable (20.1%). Respondents could select multiple benefits, contributing to a cumulative percentage exceeding 100%. This information provides valuable insights into the multifaceted advantages derived from the cultivation of indigenous leafy vegetables in the surveyed population.

In a study by Mawia and Ojijo (2021), the possible uses of native leafy greens as functional food components and emphasized the importance of these foods in supporting the lives of low-income people living in rural areas of many developing nations. Native green vegetables provide vital elements including dietary fiber, vitamins, and minerals, and are resilient in severe weather and soil conditions, which helps to ensure food security. These vegetables also help consumers since they include bioactive ingredients including carotene, vitamin C, dietary fiber, flavonoids, and phenolic compounds. A large body of research backs up the claim that eating enough and regularly in veggies can lower the chance of developing chronic illnesses including diabetes, cancer, metabolic disorders like childhood and adult obesity, and cardiovascular diseases.

In a broader context, studies globally reflect a parallel recognition of the multifaceted benefits associated with ILVs cultivation. The findings of these studies are consistent with the current study that indicates that financial gains, nutritional value, medicinal uses, and cultural significance influence the cultivation of ILVs in Kisii County. The diversity of benefits reported in the Kisii County study aligns with the broader global understanding that ILVs contribute to economic well-being and play a crucial role in food security, traditional medicine, and cultural practices.

Table 6: Indigenous leafy vegetables cultivation benefits

Benefits of ILVs	Responses		Percent of Cases
	N	Percent	
Finances	162	21.1%	64.3%
Food	156	20.4%	61.9%
Medicine	153	20.0%	60.7%
Not Applicable	154	20.1%	61.1%
Cultural	141	18.4%	56.0%
Total	**766**	**100.0%**	**304.0%**
a. Dichotomy group tabulated at value 1.			

Financial Benefits

Participants were asked about the financial gains from vegetable cultivation in the past year. Most participants (84.8%) reported making less than Kshs 100,000 from selling vegetables in the past year. The remaining participants reported making between Kshs 100,000 and Kshs 60,000. The highest frequency of participants (27.7%) reported making between Kshs 20,001 and Kshs 40,000. The lowest frequency of participants (6.8%) reported making between Kshs 60,001 and Kshs 80,000. Table 7 illustrates the financial benefits of indigenous leafy vegetables. In an investigation by Soo (2021) on the impact of Indigenous Leafy Vegetables (ILVs) on smallholder farmers in Kisii County, the study revealed that although these vegetables offer various benefits and show potential for enhancing household food dietary quality and income, their utilization by farming households remains suboptimal. This is evidenced by a persistent deficit in supply, indicating that further efforts are needed to encourage increased adoption and utilization of Indigenous Leafy Vegetables (ILVs) among smallholder farmers in the region.

Table 7: Financial Benefits

Financial benefit	Frequency	Percent	Valid Percent	Cumulative Percent
20000<	39	14.8	14.8	14.8
20001-40000	73	27.7	27.7	42.4
40001-60000	38	14.4	14.4	56.8
60001-80000	18	6.8	6.8	63.6
80000-100000	56	21.2	21.2	84.8
<100000	40	15.2	15.2	100.0
Total	**264**	**100.0**	**100.0**	

Monthly Expenditure on Vegetables

Most participants (64.8%) anticipated spending between Kshs 1,001 and Kshs 2,000 monthly on vegetables for their home table 11. A quarter of the participants (25.0%) indicated they anticipated spending less than Kshs 1,000 monthly, while 21.2% expected spending between Kshs 2,001 and Kshs 3,000 monthly. The remaining participants (14.0%) anticipated spending more than Kshs 3,000 monthly on vegetables for their home table 8. These findings provide insights into the varying budgetary considerations for purchasing vegetables within the surveyed population, highlighting the economic diversity in anticipated monthly expenditures in Kenyan Shillings.

According to the globe Bank (2021), the average daily cost of a nutritious meal in the globe, expressed in terms of current purchasing power parities, was $3.66. The average price was $3.37 in low-income nations and slightly higher at $3.43 in high-income nations. This report reflects varying patterns in anticipated monthly spending on vegetables. While the specific amounts may differ based on economic factors, dietary habits, and cultural contexts, the distribution of spending patterns aligns with a shared global awareness of the importance of vegetables in a balanced diet. The predominant allocation of budgets within the Kshs 1,001 to Kshs 2,000 range observed in this study mirrors a common trend where individuals allocate a significant portion of their budget to ensure regular access to fresh and nutritious vegetables.

Table 8: Monthly expenditure on vegetables

Monthly expenditure	Frequency	Percent	Valid Percent	Cumulative Percent
1000<	66	25.0	25.0	25.0
1001-2000	105	39.8	39.8	64.8
2001-3000	56	21.2	21.2	86.0
>3000	37	14.0	14.0	100.0
Total	**264**	**100.0**	**100.0**	

Contribution of Locally Cultivated Vegetables to the Household Income

Participants were queried about the monthly percentage contribution of locally grown vegetables to their household income, and the analysis revealed varied contributions. The table shows the monthly contribution of local Contribution tables to household income table 9. Most households (54.5%) reported that locally grown vegetables contribute between 21% and 50% of their monthly income. The remaining households reported the following percentages: 19.7% (1-20%), 17.0% (51-70%), 11.4% (71-90%), and 17.0% (91-100%). The cumulative percentage indicates that by the end of the distribution, 100% of the participants' responses were accounted for. These findings provide insights into the varying degrees to which locally grown vegetables contribute to household income, emphasizing the economic significance of vegetable cultivation within the surveyed population in terms of Kenyan Shillings.

Table 9: Contribution of locally cultivated vegetables to the household income

Percentage contribution of ILVs	Frequency	Percent	Valid Percent	Cumulative Percent
1-20	52	19.7	19.7	19.7
21-50	92	34.8	34.8	54.5
51-70	45	17.0	17.0	71.6
71-90	30	11.4	11.4	83.0
91-100	45	17.0	17.0	100.0
Total	**264**	**100.0**	**100.0**	

Family Needs Met by Selling Indigenous Leafy Vegetables

Participants were asked about the needs they have been able to meet for their families with the income from selling indigenous vegetables, the analysis revealed diverse outcomes. The majority of households reported that they use the money to purchase food items (30.7%), followed by buying livestock (19.7%) and meeting school needs (20.5%). The remaining households reported using the money to construct family houses (15.2%) and clothing (14.0%) table 10. These findings underscore the multifaceted impact of income from selling indigenous vegetables, highlighting its role in meeting various essential needs within the surveyed population.

Table 10: Family needs met by selling indigenous leafy vegetables

Family needs met by ILVs	Frequency	Percent	Valid Percent	Cumulative Percent
School	54	20.5	20.5	20.5
Food items	81	30.7	30.7	51.1
Purchase Livestock	52	19.7	19.7	70.8
Construction of Family House	40	15.2	15.2	86.0
Clothing	37	14.0	14.0	100.0
Total	**264**	**100.0**	**100.0**	

Reasons for Cultivating Indigenous Leafy Vegetables

Participants were asked to explain why they planted the vegetables. 22.7% of participants grew vegetables for food consumption. 36.4% planted vegetables for income generation. 15.2% planted vegetables for both consumption and income table 11. 11.4% planted vegetables for medicinal purposes. 14.4% grew vegetables for cultural reasons table 11. These findings illustrate the multifaceted motivations behind vegetable cultivation, emphasizing the dual role of vegetables in providing nourishment and contributing to income, as well as their significance for medicinal and cultural purposes within the surveyed population.

Table 11: Reasons for cultivating indigenous leafy vegetables

Reasons for cultivating ILVs	Frequency	Percent	Valid Percent	Cumulative Percent
For food consumption	60	22.7	22.7	22.7
For income	96	36.4	36.4	59.1
Both for consumption and for income	40	15.2	15.2	74.2
Medical	30	11.4	11.4	85.6
It is cultural	38	14.4	14.4	100.0
Total	**264**	**100.0**	**100.0**	

CONCLUSION

The study concluded that benefits from cultivating indigenous leafy vegetables, such as finance, favorable weather conditions, and soil fertility, motivated smallholder farmers to cultivate ILVs.

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