

Original Research Article
**The Level of Technology Utilization in the
Dissemination of Market Information to
Smallholder Vegetable Farmers of Vihiga
County, Kenya**

ABSTRACT

Aims: To investigate the level of information and communication technology used in the dissemination of market information to vegetable farmers of Vihiga County, Kenya

Study design: The study used a correlational research design to investigate the relationship between ICT tools and vegetable farmers concerning the dissemination of market information

Place and Duration of Study: Department of Agribusiness and Extension Management (ABE)-Operational, Masinde Muliro University of Science and Technology, between March 2022 and August 2022.

Methodology: We included 568 smallholder vegetable farmers (356 women, 212 men; age range 18-50 years) with the ability to produce and sell vegetables in respective local markets. Cross-tabulation was administered to generate information about the association between the dependent and independent variables.

Results: The findings indicated the availability of ICT tools such as radios, TV, mobile phones, and cyber cafes in the county. However, the use of ICT in vegetable farming was found to be limited to Radio, with 135(49.1%) of the respondents reporting owning one. This limitation contributed to the absence of market information on other ICT platforms. Still, Chi-square analysis established that ICT use in the dissemination of market information was statistically significant at P-value=0.000, with a 5% level of significance.

Conclusion: There was a positive correlation between ICT use in the dissemination of market information, and improved returns from the sale.

Keywords: Information and communication technology; agriculture market; information dissemination; ICT awareness

1. INTRODUCTION

The agricultural sector has the mainstay of most African economies, accounting for about 15% to the total GDP (World bank, 2017), employing over 50% of the rural population, while supporting 10%-25% of the urban livelihoods (Adenubi, Temoso, & Abdulaleem, 2021). Agricultural information is a key component in improving small-scale vegetable production and linking increased production to remunerative markets, thus leading to improved rural livelihoods, food security, and national economies. The role of ICT to enhance food security and support rural livelihoods was officially endorsed at the World Summit on the Information Society (Syiem & Raj, 2015). Recent studies documented the widespread application of ICT tools in Agriculture, especially the new generation ICT such as the Internet, mobile phones, and interactive video/CD-ROMs (Kiambi, 2018).

The Kenya Agricultural Commodity Exchange (KACE) collects, updates, analyses, and provides reliable and timely market information and intelligence on wide range of crops like vegetables and fruits and livestock commodities, targeting indicators in commodity value chains, with particular attention to smallholder farmers and small-scale agribusiness. It facilitates linkages between sellers and buyers of agricultural commodities. According to Karoney (2016), farmers get competitive and transparent market prices; K.A.C.E uses SMS to disseminate market information via mobile phones. In Vihiga County, there are various types of ICT, which can be used in the dissemination of agricultural market information and prices. However, the big question is whether there has been any impact on access to markets and prices. Therefore, a study on the contribution of ICTs to the dissemination of agricultural market information to smallholder vegetable farmers will enable them to contribute positively towards ensuring the County achieves MDGs goal no 1 and vision 2030. The purpose of the study was to investigate the level of information and communication technology use in the dissemination of market information to vegetable farmers. The problem was attributed to lack of access to essential ICT devices, and slow technological adoption in rural areas.

2. METHODOLOGY

The study adopted a correlational research design due to the need to investigate the relationship between ICT tools and vegetable farmers concerning the dissemination of market information. The researcher used structured and unstructured questionnaires, and checklists depending on the participants' level of literacy. Cross tabulation was used to generate information that was to analyze the association between the dependent and independent variables (Dickinson, 2020). The study explained the level of ICTs in the dissemination of agricultural market information to smallholder vegetable farmers. The dependent variable was the agricultural market information to vegetable smallholder farmers, while the independent variables were the types of various ICT tools and their level of utilization, including mobile phones, telephones, radio, and the internet.

3. RESULTS AND DISCUSSION

3.1 Duration for the usage of ICT tools

The study investigated the duration in which the respondent had used the ICT tool accessed. Table 1 shows the results of the investigation

Table 1. Duration for utilization of ICT tool by small-scale vegetable farmers in Vihiga County, Kenya

Duration For ICT usage	ICT Awareness		Total
	Yes	No	
Bellow 1 year	24(8.8)	24(8.1)	48(8.5)
Between 1-2 year	22(8.1)	73(24.7)	95(16.7)
Between 2-3 year	23(8.5)	70(23.6)	93(16.4)
Between 3-4 year	49(18.0)	0(0.0)	49(8.6)
Above 5 years	154(56.6)	129(43.6)	283(49.8)
Total	272(100)	296(100)	568(100)

The results revealed that 272 farmers were aware of the ICT use in market information dissemination, whereas 296 farmers were not. Out of the 272 farmers, 154 participants, representing 56.6%, had used the ICT tool for more than 5 years, with radio being the dominant tool. 49 participants, representing 18.0%, had used it between 3-4 years, while 22 participants, representing 8.1%, had used it between 1-2 years.

A cross-tabulation between the ICT tool awareness by the duration showed a significant influence for the duration of ICT usage by ICT awareness $\chi^2_{(4, 0.00)} = 100.021$ at α level of significance. This implies that the duration of ICT usage was influenced by the level of awareness of ICT tools.

Table 2. Influence of duration of ICT usage on the dissemination of market information

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	100.021 ^a	4	.000
Likelihood Ratio	121.239	4	.000
Linear-by-Linear Association	23.777	1	.000
N of Valid Cases	568		

a. 0 cells (0.0%) have an expected count of less than 5. The minimum expected count is 22.99.

The results corroborate the findings of Mukundente, Ndunda, and Gathuru (2019) who, in their study to assess the factors influencing smallholder farmers' decision to adopt agroforestry technology for improving production, the length (years) of household participation in farmer groups was found to positively and significantly relate to the adoption of fodder tree crops promoted by the World Agroforestry Centre. Thus, scaling up such technologies would initially target farmers belonging to such groups.

3.2 The frequency at which ICT tools are used in vegetable farming

The study investigated the frequency at which ICT tools were used. The result showed that out of 272 participants who were aware of ICT tools, 169 participants, representing 62%, had used it often, 68 participants, representing 25%, had used it sometimes, whereas 35 participants, representing 13%, had used it quite often.

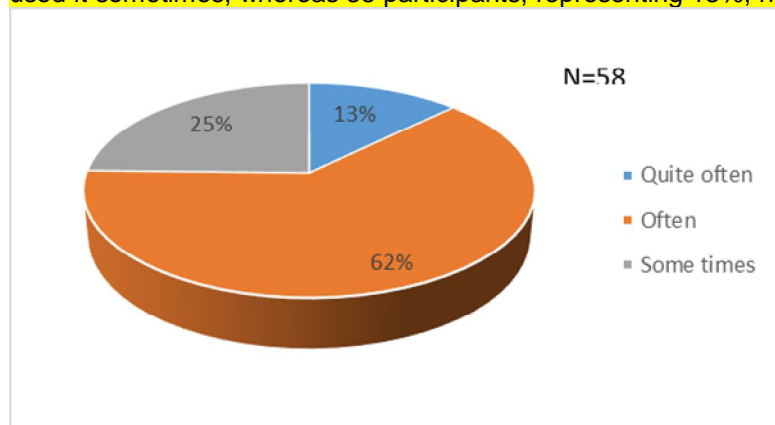


Figure 1 Frequency for use of ICT

Analysis of whether dissemination of market information among small-scale vegetable farmers was significantly influenced by the prolonged use of ICT tools was investigated by performing a cross-tabulation between the duration and public opinion of dissemination of market information. The chi-square analysis revealed that information dissemination was significantly influenced by the continuous use of the ICT tool at a level of significance with $\chi^2_{(8, 0.000)}=130.756$ as shown in Table 3

Table 3. Influence of market information dissemination by the usage of ICT tool in Vihiga County, Kenya

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	130.756 ^a	8	.000
Likelihood Ratio	165.320	8	.000
Linear-by-Linear Association	2.382	1	.123
N of Valid Cases	568		

a. 0 cells (0.0%) have an expected count of less than 5. The minimum expected count is 5.69.

3.3 Level of ICT Usage in Vegetable Farming

The study investigated the level of ICT usage in vegetable farming and the results were as depicted in Table 4.

Table 4. Level of ICT utilization by small scale Vegetable farmers in Vihiga County, Kenya

Level of Utilization	Frequency	Percent
No Utilization	134	23.6
Low	172	30.2
Moderate	116	20.5
High	123	21.7
Very high	23	4.0
Total	568	100.0

The results revealed that 172 participants, representing 30.2% of the respondents reported that the use of ICT within the study area for vegetable farming was low. 134 participants, representing 23.6% reported that there was no utilization of ICT tools in vegetable farming. 123 participants, representing 21.7%, reported high utilization of ICT tools in vegetable farming. 116 participants, representing 20.5% reported moderate utilization, whereas 23 participants, representing 4% reported very high utilization of ICT tools in the dissemination of market information.

The findings indicated that Vegetable farmers in Vihiga County had low utilization of ICT in enhancing their farming and marketing activities. However, this was contrary to Kiambi (2018), who suggested that the Internet and web-based applications were important for sharing and disseminating agriculture information. Besides, Mukundente, Ndunda, and Gathuru (2019) established that E-Agriculture was intended to promote the integration of agriculture stakeholders and technology with multimedia, knowledge, and culture to improve communication and learning processes.

The use of ICT promised great returns from vegetable farming. Lack of market information caused by low utilization of ICT subjected smallholder vegetable farmers to scarce market information. This was in line with Karoney (2016), who posited that dissemination of relevant information to farming communities facilitated the effective adoption of agricultural inputs, decision-making on the market, and adoption of the scientific method.

3.4 Influence of the level of ICT utilization on the dissemination of Market information in Vihiga County, Kenya

A chi-square was performed between the level of ICT Utilization and its influence on public opinion on the dissemination of market information among small-scale vegetable farmers in Vihiga County.

Table 5. Influence of the level of ICT utilization on the dissemination of Market information

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	128.212 ^a	16	.000
Likelihood Ratio	165.290	16	.000
Linear-by-Linear Association	19.976	1	.000
N of Valid Cases	586		

a. 3 cells (12.0%) have an expected count of less than 5. The minimum expected count is 1.92.

The result revealed that the level of ICT utilization had a statistically significant influence on the dissemination of market information among small-scale vegetable farmers in Vihiga County with $\chi^2=128.212$ and P-value=0.000 at α level of significance. This corresponded with Israel (2021), who argued that the use of ICT in farming and marketing farm produce was a direct approach to alleviating poverty. Accordingly, the impact of ICT on vegetable farmers in disseminating market information cannot be undermined, thus, needs to be embraced adequately through the provision of incentives to enhance access to the necessary ICT devices for effective communication.

4. CONCLUSION

The study investigated the level of ICT use in the dissemination of market information among smallholder vegetable farmers in Vihiga county. Using a correlation design, cross tabulation was done on the findings, revealing that the use of ICT tools in the dissemination of market information was still low in Vihiga County. Radio, mobile phones, television, and the internet were the available ICT tools used by vegetable farmers. Little attention given to the adoption of ICT in rural areas was considered a factor that contributed to the low utilization of ICT tools. Affordability was another challenge that made farmers not able to access ICT. Thus, the study recommended the use of incentives to resolve the challenge of low ICT utilization by making it possible for smallholder farmers to acquire necessary ICT devices for the realization of enhanced communication. Further, the study recommended the ministry of agriculture to partner with the local government in enlightening the public about the benefits of ICT use in establishing better market prices.

REFERENCES

1. Adenubi O, Temoso O, Abdulaleem I. Has mobile phone technology aided the growth of agricultural productivity in sub-Saharan Africa? *Southern African Journal of Economic and Management Sciences*. 2021;24(1): a3744. <https://doi.org/10.4102/sajems.v24i1.3744>.
2. Dickinson JR. MTABS analyses of Chi-square cross-tabulation at ABSEL. *Development in Business Simulation and Experiential Learning*. 2020;47:31
3. Karoney BK. A mobile based marketing information system for farmers and buyers in Kenya. *Electronic Theses and Dissertations*. 2016
4. Israel AB. Impact of information communication technology (ICT) on poverty reduction in rural areas in Kogi State. *International Journal of Economics & management Sciences*. 2021;10(11): 2162-2170
5. Kiambi, D. The use of Information Communication and Technology in advancement of African agriculture. *African Journal of Agriculture Research*. 2018;13(39):2025-2036. DOI: 10.5897/AJAR2018.13300.
6. Mukundente L, Ndunda E, Gathuru G. Agroforestry technologies adopted by smallholder farmers in Southern Province of Rwanda. *East African Journal of Forestry and Agroforestry*. 2019;1(1)
7. Syeim R, Raj S. Access and usage of ICTs for agriculture and rural development by the tribal farmers in Meghalaya State of North-East India. 2015;6(3): 24-41
8. World Bank, *Data Bank*. 2017. Viewed May 7, 2022, from <https://databank.worldbank.org/home.aspx>