



# Are women indigenous vegetable farmers from Kakamega County competent enough to meet quality standards of high value markets in Kenya?

Annah Indeche <sup>1\*</sup>, Albert Obeng Mensah <sup>2</sup>, Festus Annor-Frempong <sup>2</sup>

<sup>1</sup> Faculty of Agriculture, Jomo Kenyatta University of Agriculture And Technology, Kenya

<sup>2</sup> College of Agriculture And Natural Sciences, Department of Agricultural Economics and Extension, University of Cape Coast, Ghana

## Abstract

Consumers are aware of African Indigenous Vegetables (AIVs) high nutritive value and their demand among Kenyans is growing. This is an opportunity for rural women to produce for specific markets and earn income which can improve farmers' livelihoods. However, to access high value markets such as supermarkets, the products must meet quality standards and product safety requirements. This study assessed the perceived competence level among women AIV farmers in Kakamega County to satisfy quality standards for high value markets (HVMs). Descriptive survey design, multistage sampling technique and interview schedule were used to collect data from 276 women farmers. The study revealed that most farmers perceived themselves to have low competence in complying with quality standards of HVMs. The study recommends that the Ministry of Agriculture train farmers on quality standards and certification.

**Keywords:** Perceived Competence; Women Farmers; African Indigenous Vegetables; Quality Standards; High Value Markets

Published by ISDS LLC, Japan | Copyright © 2018 by the Author(s) | This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.



**Cite this article as:** Indeche, A., Mensah, A.O. and Annor-Frempong, F. (2018), "Are women indigenous vegetable farmers from Kakamega County competent enough to meet quality standards of high value markets in Kenya?", *International Journal of Development and Sustainability*, Vol. 7 No. 1, pp. 93-106.

---

\* Corresponding author. E-mail address: [indecheannah@gmail.com](mailto:indecheannah@gmail.com)

## 1. Background information

According to the International Standards Organization [ISO] (1987) in its ISO 9000-9003 standards protocol, quality constitutes all the features and characteristics of a product or service, that bear on its ability to satisfy stated or implied needs. Quality factors are classified as quantitative (ingredients, weight); hidden (nutritive, toxic substances); and sensory (appearance, kinaesthetic, flavor). Organoleptically, vegetables are valued for their supreme flavors and aroma, crisp texture, attractive colors, and their overall appeal to human senses of smell, taste, touch, and sight (Shitanda and Wanjala, 2006).

Existing high value markets for AIVs in Kenya are exerting pressure on farmers to supply quality produce. This is to satisfy consumers who have become aware about issues of agricultural sustainability, food safety and quality that first dominated global trade in fruits and vegetables motivated partly by food scares. In Europe, codes of conduct, traceability and quality meta-systems such as Hazard Analysis and Critical Control Points (HACCP) have been established by supermarkets to reassure consumers of the quality and safety of products (Henson and Caswell, 1999). On the local scene, Kenya's Horticultural Crops Development Authority (HCDA) developed a code of conduct covering among others good business practices between exporters and suppliers, guidelines for good agricultural practices (e.g. use, application and control of pesticides), and traceability (HCDA, 1995).

The standard, for which farmers obtain certification, depends on the market supplied. Examples of certification bodies for fresh export produce are KenyaGap, GlobalGAP, Tesco supermarket's Nature's Choice or Sainsburrys' supermarket's Farm to Fork. In addition, the produce must be accompanied by a phytosanitary certificate issued by a competent authority in the country of origin guaranteeing absence of prohibited pests (Okello and Okello, 2010). In Kenya, the Kenya Plant Health Inspectorate Services (KEPHIS) is the body mandated to issue such certificates. According to Graffham, Karehu and MacGregor (2007) crop and environmental protection, and personal hygiene are mandatory critical control points in the certification process to KenyaGAP/GlobalGAP standard.

Most AIVs production is rain-fed and therefore supply is seasonal. In the dry season production is by irrigation or is done along riverbanks. Shepherd (2007) asserted that small-scale farmers face difficulties in providing consistent supply, even before they are required to meet sophisticated safety standards and good commercial practices. Most AIVs like many other horticultural products are highly perishable with a shelf life of less than 24 hours at room temperature, a factor that affects the quality of the produce at the market (Madakadze et al., 2004). Some of these processes are as simple as sorting, cleaning, trimming and bundling, whilst others are as complex as fermentation and different types of drying. Smith and Eyzaguirre (2000) noted that even though drying has been an African way of processing leafy vegetables to make them available during periods of shortages and is one solution to the problem of perishability, it does not satisfy the needs of a large population of consumers, particularly urban dwellers who prefer freshly harvested vegetables.

Pre-bundled, fresh, succulent vegetables represent a market advantage due to quality of presentation. Supermarkets have had a major effect on the marketing of AIVs in Kenya (Ngugi et al., 2007). In Central Kenya, Kiambu County precisely, farmer groups have successfully penetrated the high-value segment of markets for leafy indigenous vegetables through collective action and collaboration with a support system

(Weinberger and Pichop, 2009). This eliminates brokers, guaranteeing markets for farmer produce all-year round and maximizing income. Ngugi et al. (2007) further showed that profits as high as 35 to 72 percent were realized by farmers organized in groups, compared to farmers not organized in groups.

A lot of studies have been done to find out the costs and benefits of complying with agri-regulation standards such as GLOBALGAP and KenyaGAP by small-scale growers. By the design and intent of them, GLOBALGAP standards require farmers to practice good agricultural practices thus constraining their behaviour to that which is considered relatively more sustainable and acceptable (Wanderi, 2013). Research conducted by IIED and NRI (2008) found that farmers who had attained GLOBALGAP certification were clearly reaping benefits from adoption of good agricultural practice, record-keeping and improved hygiene. Results further stated that many farmers said that they were using GLOBALGAP records to understand their financial viability and run their farms more commercially. However, Luvai (2008) noted that compliance can be difficult for smallholder farmers who have neither the resources nor the capacity to comfortably meet standards.

Several studies (Asfaw et al., 2008; Cuyno et al., 2001; Okello and Okello, 2010) have found that quantifiable health benefits accrued to compliant farmers owing to the use of protective clothing, proper storage and application of agro-chemicals as well as the use of what are considered to be safe human agro-chemicals. Compliant farmers were much more likely to practice more sustainable agricultural practices such as integrated pest management (IPM) as opposed to non-compliant farmers possibly leading to some environmental benefits. Similar results were found by findings of IIED and NRI (2008) further revealing that by expanding the potential markets for Kenyan produce, standards provide incentives to upgrade and are a stimulus for farmers to improve their practices. The objective of this study was to determine the perceived competence level of women AIV farmers from Kakamega County to meet quality standards demanded by high value markets in Kenya.

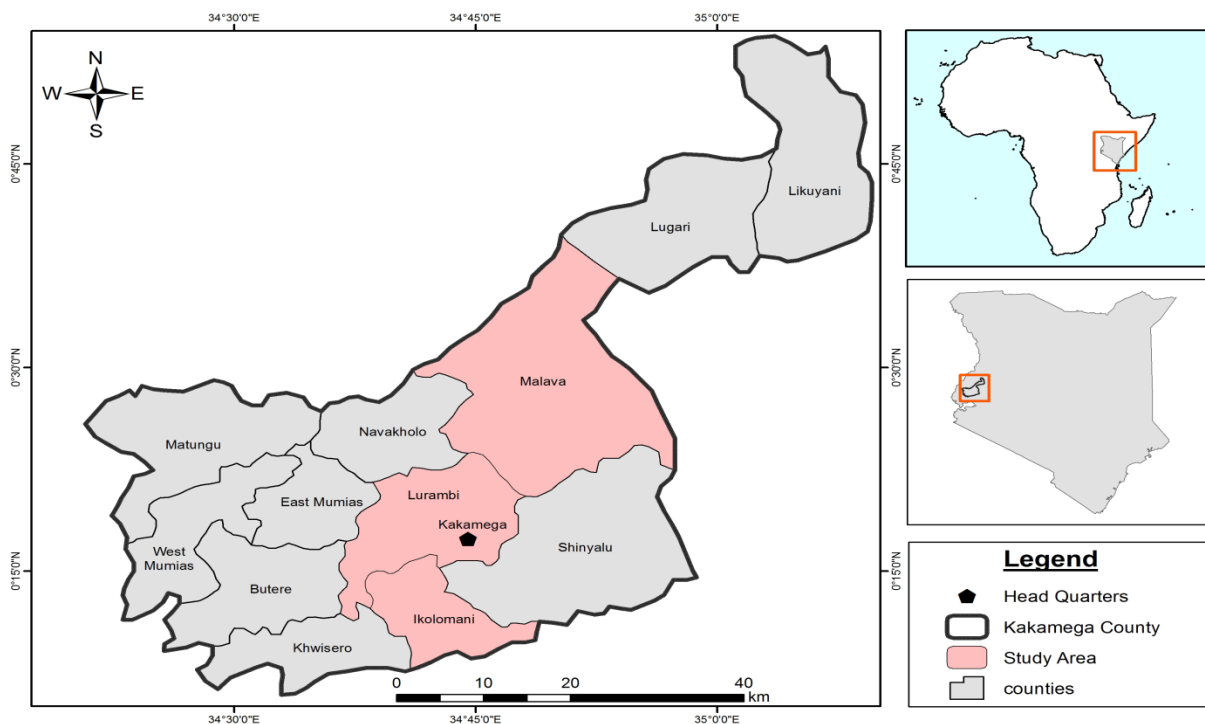
### 1.1. Study area

The study was conducted in Kakamega County in the Western Region of Kenya which is 30km north of the equator. Kakamega covers an area of 3,244.9 Km<sup>2</sup>. The average rainfall ranges from 1250-1750mm per annum and an average temperature of 20.5°C (minimum of 10.3°C and maximum of 30.8°C). Agriculture is the main economic activity in the county. However non-agricultural economic activities such as supermarkets, wholesale and retail shops, hotels, and transport business commonly known as “Boda- Boda” (bicycles and motor cycles taxis) and “Matatu” (Privately owned minibuses) exist.

### 1.2. Data collection

Structured and validated interview schedule was used to collect primary data. An interview schedule was used mainly because some women farmers were illiterate and could not read and write. Information was also sought from key informants such as extension officers, staff of supermarkets, women farmers’ group leaders.

Unobtrusive observations were also done in the markets. The face validity of the instrument was ensured by the researcher. The content validity was ensured by extension specialists.



**Figure 1.** Map of Kakamega County (Source: KNBS (2013) and Redrawn by Department of Geography and Cartography, UCC, 2015)

## 2. Results and discussion

### 2.1. Socio-demographic Characteristics of AIV Women Farmers in Kakamega County

**Table 1.** Age of Women African Indigenous Vegetables Farmers in Kakamega County

Age range	Frequency	Percent	Mean	SD
20-29	27	9.8	46.8	12.1
30-39	49	17.8		
40-49	76	27.6		
50-59	85	30.5		
60-69	31	11.3		
70-79	8	2.9		
Total	276	100.0		

Source: Field data (2014)

The study revealed that many of the women were above 40 years of age ( $M=46.8$ ,  $SD=12.1$ ) as indicated in Table 1. This implies that AIV activities are dominated by older women. There is need to motivate the younger women to engage in AIV production and marketing to sustain production.

Over 65 percent (65.6%) of the women farmers are married and in male headed households. Over a fourth (26.4%) are single women as shown in Table 2 and were heading households.

**Table 2.** Marital Status of Women African Indigenous Vegetables farmers in Kakamega County

Marital Status	Frequency	Percent
Single- Female headed	73	26.4
Married -Female headed	22	8.0
Married- Male headed	181	65.6
Total	276	100.0

Source: Field data (2014)

This study revealed that majority of the women had at least 8 years of schooling ( $Mean=8.7$ ,  $SD=3.6$ ). Over a tenth (11.2%) had no formal education and close to 40 percent (39.5%) had attained secondary school level education (Table 3). This implies that most of the women AIV farmers should be literate.

**Table 3.** Educational Attainment of Women African Indigenous Vegetables Farmers in Kakamega County

Level (Yrs of schooling)	Frequency	Percent	Mean	SD
No formal education (0)	31	11.2	8.7	3.6
Primary (1-11)	136	49.3		
Secondary and above (12 and above)	109	39.5		
Total	276	100.0		

Source: Field data (2014)

Results of this study (Table 4) show that majority (70.2%) of the women had less than 10 years of selling AIVs ( $Mean=7.4$ ,  $SD=0.88$ ). The standard deviation shows that there was very little variability among the women in terms of experience. This result contrasts Mwaura et al. (2014) study in Kiambu which found mean years of experience among AIV female farmers to be 14.53. In Mwaura et al. (2014) study, most farmers were supplying to HVM and AIVs were found to be a very important contributor to household income of the farmers with more than 10 years' experience. This implies that probably the more years a farmer interacts with the market the more they gain experience and seek better markets for the crop hence increasing income.

In the literature, one strategy that has been found to increase the capital available to increase uptake of the modern purchased inputs is diversification of household income through having off-farm income opportunities (Diirro, 2013). This study revealed that 56.5 percent of the women AIV farmers had no off farm

activity. Further, less than 10 percent (9.6%) of the women AIV farmers were engaged in formal employment. This implies that many of the women do not have other sources of income apart from that received from sale of farm produce.

**Table 4.** Experience (Years) in Marketing Indigenous Vegetables by Women Farmers in Kakamega County

Years	Frequency	Percent	Mean	SD
0-9	181	70.2	7.4	0.88
10-19	47	18.2		
20 and above	30	11.6		
Total	258	100		

*Source: Field data (2014)*

## 2.2. Perception of AIV Farmers on Status of Resources Required To Satisfy Quality Standards and Market Demands of High Value Markets

The perception of farmers on the status of resources that are required to assist them to satisfy QSMDs was assessed and the result is presented in Table 5.

Women AIV farmers in Kakamega agreed that most resources required for meeting the QSMDs of HVMS, such as seeds ( $M=4.39$ ,  $SD=1.14$ ), fertilizers ( $M=3.73$ ,  $SD=1.43$ ) and pesticides ( $M=3.62$ ,  $SD=1.44$ ) were available in the market (Table 5). However, despite the availability of these inputs, farmers cited distance and high cost of transportation as constraints and disagreed that these inputs were affordable. A discussion with women leaders revealed that it was easy to get AIV seeds preserved from previous cropping from neighbours' and friends for kitchen gardening but not for commercial purposes.

Fertilizer was perceived to be available but not affordable. In Kenya, fertilizer is available to small scale farmers from the government at subsidized prices if the fertilizer is purchased from the National Cereals and Produce Board (NCPB) a Kenyan government run company. Using di-ammonium phosphate (DAP) as an example, 50kg retails at Sh2500 (around US\$25) subsidized. If the same is purchased from private traders, it would cost between Sh3500 (US\$35) and Sh3,700 (\$37US). This, to an ordinary farmer is expensive in a society with a high poverty level.

Results of the study in Table 5 further revealed that farmers disagreed to availability of irrigation equipment ( $M=2.64$ ,  $SD = 1.42$ ) and simplicity of implementation of irrigation technologies ( $M= 2.84$ ,  $SD=1.39$ ). This implies that irrigation equipment should be made more available and affordable to the women farmers and irrigation technologies made easier for the women to adopt through making them labour saving and appropriate. Sijali and Okumu (2002) posited that small-scale scale farmers tend to look for irrigation technologies that they can understand and afford to buy.

One main channel of transmission of agricultural information is through the process of extension service. This study revealed that women AIV farmers feel they don't have adequate information on production ( $M=3.32$ ,  $SD= 1.41$ ) and marketing ( $M=3.15$ ,  $SD=1.44$ ) of AIVs. More than half (54%) of the women indicated

that public extension service was the main source of information. The finding of this study on sources of information for farmers is contrary to that of Nlerum et al. (2012) that friends and family members are main source of agricultural information to farmers in Eleme area of Rivers State in Nigeria. It further contrasts a study by Olajide (2011) in which fellow farmers represented the most common (76.3%) source of information for farmers. It further contrasts Alfred and Fagbenro (2006) that radio was the most used source of information for fishermen in Nigeria. However, it confirms Wanderi (2013) who observed a similar trend for households in Eastern and Central Kenya which showed that 56 – 68 percent of households use services as major source of information. Okonya et al. (2014) also made similar observations in Uganda. This suggests that the type of information source dominating in a place depends on the place and its contextual factors.

**Table 5.** Women Farmers Perception of Status of Resources in Kakamega County

Statement	Agree		Disagree		Mean	SD	Verdict
	Freq.	%	Freq.	%			
Land is fertile for AIV production	259	93.8	17	6.2	4.83	1.02	A
AIV seeds are easily available	222	80.4	54	19.6	4.39	1.14	A
Labour is readily available	211	76.4	65	23.6	4.36	1.28	A
Fertilizer are easily available	159	57.6	117	42.4	3.73	1.43	A
Pesticides are easily available	147	53.3	129	46.7	3.62	1.44	A
Hired labour is affordable	138	50.0	138	50.0	3.47	1.44	A
AIV seeds are affordable	129	46.7	147	53.3	3.08	1.45	D
I have information on production	125	45.3	151	54.7	3.32	1.41	D
Fertilizers are affordable	110	39.9	166	60.1	3.04	1.33	D
I have information on marketing	108	39.1	168	60.9	3.15	1.44	D
Pesticides are affordable	100	36.2	176	63.8	2.93	1.32	D
Irrigation technologies are simple	88	31.9	188	68.1	2.84	1.39	D
Easily get Irrigation equipment	79	28.8	197	71.4	2.64	1.42	D
Credit is easily accessible	76	27.5	200	72.5	2.67	1.38	D

*n=276. Scale: 1.00-3.44-Disagree (D); 3.45-5.00-Agree (A); Source: Field data (2014)*



The media ranked second in disseminating agricultural information. The media sources that were indicated by some farmers included radio and Television. ICT has been lauded as an effective tool for extension delivery and the mobile phone is being used for this purpose in some areas in Africa. Eighty eight percent (88 %) of the women farmers owned a mobile phone and further provided the mobile phone number. Ten (10) of the numbers in each Sub county were randomly called to ascertain who the respondent would be and majority (9 in Lurhambi, 7 in Malava and 6 in Ikolomani) answered the call personally.

Majority of the farmers (72.5%) perceived credit to be inaccessible with a mean of 2.67 (SD=1.38) which indicates disagreement. Results in Table 6 show that close to 61 percent (60.9%) of the farmers had not accessed credit before. Of the 39 percent women farmers who had accessed credit before, 74.1 percent accessed from an informal source whilst 25.9 percent accessed from formal source. This confirms findings by Atieno (2001), which showed that most farmers in Kenya had not used credit before. Out of those who had, the majority had used informal sources.

**Table 6.** Source of Credit for Women Farmers in Kakamega County

Source	Frequency	Percentage
Not accessed credit before	168	60.9
Accessed from informal sources	80 (80)	29.0 (74.1)
Accessed from formal sources	28 (28)	10.1 (25.9)
Total	276 (108)	100 (100)

*NB: Figures in brackets indicate those who had accessed credit of some kind. Source: Field data (2014)*

In this study, formal sources of credit indicated by the farmers were commercial banks, cooperatives and micro finance banking institutions. Informal sources of credit indicated by the farmers were non-bank financial institutions, rotating savings and credit associations, commercial moneylenders, friends and relatives. This result supports the assertion by van Bastelaer (2000) that loans from family and friends are a common form of informal finance as they are characterized by uncollateralized loans that carry no or little interest, feature open-ended repayment arrangements, and have a strong focus on reciprocity.

This study further revealed that close to 57 percent of the farmers had no alternative livelihood activity apart from farming. Of the 43 percent who indicated having an alternative livelihood activity, less than 10 percent were in a meaningful employment for example teaching and nursing. The rest indicated involvement in petty trading, casual labour and operation of village shop commonly known as "Kiosk". This result confirms the consensus arrived at, at the World Economic Forum (2013) that if women are employed, they are more likely to be in part-time, seasonal and low-paying jobs. In most cases in Kenya, financial institutions



use monthly salary as collateral security. This implies that credit is not easily accessed by majority of women since most are engaged in informal employment. This study sought to find if the perception of farmers on accessibility of credit was independent of their socio-demographic characteristics. Results of the Chi square test of independence are shown in Table 7.

The study results revealed that the perception of the women farmers on accessibility of credit differed in the three sub counties. More women farmers in Lurambi (Sugarcane/Maize zone) perceived credit to be accessible than those in Malava (Sugarcane zone) and Ikolomani (Maize zone). The perception of the women farmers on accessibility of credit also depended on marital status of the women ( $X^2=34.27$ ,  $p=0.00$ ) and their educational level ( $X^2=29.52$ ,  $p=0.001$ ). On the contrary, perception on accessibility of credit did not depend on farmer's age ( $X^2=19.51$ ,  $p=0.77$ ) or experience (years) ( $X^2=25.28$ ,  $p=0.19$ ). This contrasts with findings of Anyiro and Oriaku (2011); Obisesan (2013) in Nigeria that age is a determinant of credit accessibility among other components.

Less women in female headed households perceived credit to be accessible. Only two (2) women in female headed households in Malava perceived credit as being accessible. More married women in male headed households agreed that credit was accessible than married women in female headed households in all the three sub counties. This result confirms assertions by Fletschner and Kenney (2011), that rural financial programmes have been largely designed, crafted and implemented with the male head of household as the intended client and fail to recognize that women are active, productive and engaged economic agents with their own financial needs and constraints.

In terms of education, majority of the farmers with some formal education agreed that credit was accessible. With the exception of Ikolomani where more with primary level education perceived credit to be accessible, more women farmers with secondary education and above in Lurambi and Malava agreed that credit was accessible. Anyiro and Oriaku (2011) and Obisesan (2013) also found that accessibility to credit was influenced by education. Similarly, in Rwanda, Muhongayire et al. (2013) observed that the likelihood of farmers participating successfully in formal credit markets increased with education. This implies that the higher the educational level of the farmer the more likely the farmer is to seek credit.

### 2.3. Perceived competence to comply with quality standards among women indigenous vegetables farmers in Kakamega County

To determine the perceived competence of the farmers to comply with existing quality standards, results revealed that majority of the women farmers had "Very Low" competence in record keeping, irrigation of vegetables and negotiation for contracts as shown in Table 8.

The perceived competence level among women farmers to comply with QSMDs was "Average" for use of organic manure ( $M=3.40$ ,  $SD=1.44$ ), pest identification ( $M=3.18$ ,  $SD=1.34$ ) and application of recommended postharvest procedures ( $M=3.04$ ,  $SD=1.33$ ), the perceived competence level to comply for all the other QSMDs among the women AIV farmers was to 'Low". Women AIV farmers (71%) had "Low to Very Low" mean perceived competence level ( $M=2.62$ ,  $SD=2.63$ ). Only One (1) percent of the farmers had "Very High" perceived competence to comply with QSMDs in Kakamega County. Inadequate capital to purchase inputs,

poor infrastructure, lack of knowledge and skills were cited as contributory factors to the inability of the farmers to comply with QSMDs.

**Table 7.** Analysis of Socio Demographic Characteristics of Women Who Perceived Credit to be Accessible in the Different Sub-Counties

Credit is easily accessible	Sub-county			Total	X <sup>2</sup>	p-value
	Lurambi	Malava	Ikolomani			
<b>Marital Status- Household head</b>						
Single-FH	7(19%)	1(5%)	3(18%)	11(15%)	34.27	0.00
Married- FH	8(22%)	1(5%)	1(6%)	10(13%)		
Married-MH	22(60%)	20(90%)	13(77%)	55(72%)		
Total	37(100%)	22(100%)	17(100%)	76(100%)		
<b>Educational level</b>						
No formal education	1(3%)	1(5%)	1(6%)	3(4%)	29.52	0.001
Primary	13(35%)	10(46%)	10(59%)	33(43%)		
Secondary and >	23(62%)	11(50%)	6(35%)	40(53%)		
Total	37 (100%)	22 100%)	17(100%)	76(100%)		
<b>Table 7 Continuation: Analysis of Socio Demographic Characteristics of Women Who Perceived Credit to be Accessible in the Different Sub-Counties</b>						
<b>Age</b>						
20-39	12(32%)	8(36%)	5(29%)	25(33%)	19.51	0.77
40-59	20(54%)	13(59%)	10(59%)	43(57%)		
60 and >	5(14)	1(5%)	2(12%)	8(11%)		
Total	37(100%)	22(100%)	17(100%)	76(100%)		
<b>Experience (years)</b>						
0-9	25(69%)	15(75%)	10(63%)	50(69%)	25.28	0.19
10-19	4(11%)	3(15.0%)	4(25%)	11(15%)		
20 and>	7(19%)	2(10.0%)	2(13%)	11(15%)		
Total	36(100%)	20(100%)	16(100%)	72(100%)		

\*Significant at  $p < 0.05$  MH-Male headed; FH-Female headed (Source: Field data, 2014)

This result agrees with the assertion of Luvai (2008) that compliance can be difficult for smallholder farmers who have neither the resources nor the capacity to comfortably meet standards. This implies that for women farmers to meet QSMDs the cost of compliance should be affordable, their technical capacity and

knowledge should be enhanced and the requirements should be easily implementable within the local context.

**Table 8.** Frequency Distribution for Women Farmers' Perceived Competence to Comply with Existing Quality Standards

QSMD	Level of Perceived Competence					Mean	SD
	Very Low	Low	Average	High	Very High		
	Frequency	Frequency	Frequency	Frequency	Frequency		
Use of Organic Manure	40	40	59	44	93	3.40	1.44
Pest identification	34	61	64	54	63	3.18	1.34
Apply Post harvest procedures	42	55	79	44	66	3.04	1.33
Seek market information	81	63	38	47	47	2.70	1.47
Safe use of pesticides	78	62	46	44	45	2.69	1.44
Disease identification	73	76	52	35	40	2.61	1.38
Proper crop nutrition	73	74	63	30	36	2.57	1.33
Consistently supply	62	87	67	27	33	2.57	1.27
Pest control measures	68	90	51	25	32	2.49	1.30
Disease control measures	87	67	63	25	34	2.46	1.34
Negotiate for contracts	93	72	45	29	37	2.44	1.39
Produce in bulk (above 100 kg)	71	95	62	25	23	2.40	1.20
Irrigate AIVs in the dry season	100	78	39	18	41	2.36	1.41
Adopt irrigation technologies	101	79	42	23	31	2.29	1.34
Keep records of farm activities	130	68	32	21	25	2.07	1.31
<b>Overall</b>						<b>2.62</b>	<b>2.63</b>

*N=276 Scale for Means: 1.00-1.44=Very Low Competence; 1.45-2.44= Low competence; 2.45-3.44= Average competence; 3.45-4.44= High Competence; 4.45-5.00= Very High competence (Source: Field data, 2014)*

Production of large volumes of vegetables was perceived by the farmers to be difficult (M=2.40, SD=1.20). Considering that the farmers have small land holdings and that the portion allocated to AIVs was even

smaller, to satisfy this QSMD would mean that either more land is put under AIVs by individual farmers or several farmers have to collectively produce and bulk it to meet the required volume by the HVM and this can have an implication on the system. The system would need 'extra' energy to manage its boundary. This implies that for farmers to be able to meet this bulk production, ways of making it easy to produce must be adopted.

The perceived competence level of the women farmers to negotiate for contracts was "Low" (M=2.44, SD=1.39) as shown in Table 8. Mehra and Rojas (2008) posit that it is important for small-scale farmers to be able to negotiate terms and prices with powerful buyers. Mehra and Rojas (2008) further asserted that small-scale farmers in general, and women even more so, are at a disadvantage in these negotiations because they tend to have limited experience and lower levels of education and mobility.

### 3. Conclusion and recommendation

Most women perceived resources such as seeds, fertilizers, labour to be available but not affordable. The women AIV farmers perceived irrigation technologies to be complex and credit to be inaccessible. The farmers' perception of accessibility to credit differed with marital status, educational level of the farmer and source of credit. Credit was perceived to be inaccessible by more single women than their married counterparts. The perceived competence level of the farmers to meet quality standards of high value markets was low. Kakamega County is geographically expansive consisting of 12 Sub Counties and AIVs are grown in all of them (County Government of Kakamega, 2014). Inadequate financial resources reduced the chances of contacting respondents from all the Sub Counties and this was a limitation.

The Government of Kenya should consider subsidizing the prices of most agricultural inputs like irrigation equipment to enable the women to participate in HVMs. Consequently, the government could consider cutting the red tape that hinders the operation of non-governmental organizations that seek to assist women farmers to acquire knowledge and skills and also access resources that can enable them participate in HVMs. Research institutions should research into more appropriate technology and the same disseminated to farmers to meet quality standards of high value markets affordably. Programs to assist female headed household to access credit should be formulated by the county. Further research on effective training methods that can boost the competence levels of women farmers to meet the various quality standards of HVMs is suggested.

### References

Anyiro, C.O. and Oriaku, B.N. (2011), "Access to and investment of formal micro credit by smallholder farmers in Abia State, Nigeria. A case study of Absu micro finance bank, Uturu", *Journal of Agricultural Sciences*, Vol. 6 No. 2, pp. 69-75.

- Asfaw, S., Mithöfer, D. and Waibel, H. (2008), "Food safety standards: A catalyst for the winners; a barrier for the losers? The case of GLOBALGAP in horticultural exports from Kenya", in Battisti, A.B., Macgregor, J. and Graffham, A. (Eds.), *Standard bearers horticultural exports and private standards in Africa*, International Institute for Environment and Development, London, UK, pp. 70-73.
- Atieno, R. (2001), *Formal and informal institutions' lending policies and access to credit by small-scale enterprises in Kenya: An empirical assessment*, African Economic Research Consortium, Nairobi.
- Cuyno, L.C.M., Norton, G.W. and Rola, A. (2001), "Economic analysis of environmental benefits of integrated pest management: A Phillipines case study", *Agricultural Economics*, Vol. 25 No. 1, pp. 227-33.
- Diirro, G.M. (2014), *Impact of off-farm income on agricultural technology adoption intensity and productivity: Evidence from rural maize farmers in Uganda*, IFPRI, Washington, DC.
- Diirro, G.M. (2014). *Impact of off-farm income on agricultural technology adoption intensity and productivity: Evidence from rural maize farmers in Uganda*. Washington, DC: IFPRI
- Fletschner, D. and Kenney, L. (2011), "Rural women's access to financial services: Credit, savings and insurance", Working paper No. 11-07, Agricultural Development Economics Division, FAO, Rome.
- Graffham, A., Karehu, E., and MacGregor, J. (2007). Impact of EUREPGAP on access to EU retail markets by small-scale growers of fruits and vegetables in Kenya. *Fresh Insights*, 6, 1-10.
- Horticultural Crops Development Authority (1995), *Code of conduct*, HCDA, Nairobi.
- IIED and NRI. (2008), "Costs and benefits of GLOBALGAP compliance for smallholders: Synthesised findings", in Battisti, A.B., Macgregor, J. and Graffham, A. (Eds.), *Standard bearers horticultural exports and private standards in Africa*, International Institute for Environment and Development, London, UK, pp. 66-69.
- Luvai, L. (2008), "GLOBALGAP certification in Kenya: Lessons from the Vegcare experience", in Battisti, A.B., Macgregor, J. and Graffham, A. (Eds.), *Standard bearers horticultural exports and private standards in Africa*, International Institute for Environment and Development, London, UK, pp. 74-77.
- Madakadze, R., Masarirambi, M. and Nyakudya, E. (2004), "Processing of horticultural crops in the tropics", *Quality Handling Evaluation Journal*, Vol. 3 No. 1, pp. 379-99.
- Mehra, R. and Rojas, M.H. (2008), *Women, food security and agriculture in a global marketplace- A significant shift*, International Center for Research on Women, Washington, DC.
- Muhongayire, W., Hitayezu, P., Mbatia, O.L. and Mukoya-Wangia, S.M. (2013), "Determinants of farmers' participation in formal credit markets in rural Rwanda", *The Journal of Agricultural Sciences*, Vol. 4 No. 2, pp. 87-94.
- Mwaura, S.N., Muluvi, A. S. and Mathenge, M.K. (2014), "African leafy vegetables and household wellbeing in Kenya: A disaggregation by gender", *Current Research Journal of Social Sciences*, Vol. 6 No. 4, pp. 82-94.
- Ngugi, I.K., Gitau, R. and Nyoro, J. (2006), *Access to high value markets by smallholder farmers of African indigenous vegetables in Kenya*, IIED, London, UK.
- Nlerum, F.E., Albert, C.O. and Prince-Kaye, E.S. (2012), "Access of rural women to agricultural information in the Eleme Area of Rivers State, Nigeria", *Journal of Agricultural and Food Information*, Vol. 13 No. 2, pp. 192-7.

- Obisesan, A.A. (2013), "Credit accessibility and poverty among smallholder cassava farming households in South West, Nigeria", *Greener Journal of Agricultural Sciences*, Vol. 3 No. 2, pp. 120-7.
- Okello, J.J. and Okello, R.M. (2010), "Do European Union private standards promote environmentally friendly production of fresh export vegetables in developing countries? The evidence from Kenyan green bean industry", *Environmental Development and Sustainability*, Vol. 12, pp. 341-55.
- Okonya, J.S. and Kroschel, J. (2014), "Gender differences in access and use of selected productive resources among sweet potato farmers in Uganda", *Agriculture and Food Security*, Vol. 3 No. 1, pp. 2048-50.
- Olajide, B.R. (2011), "Assessment of farmers' access to agricultural information on selected food crops in Iddo District of Oyo State, Nigeria", *Journal of Agricultural and Food Information*, Vol. 12 No. 3-4, pp. 354-63.
- Reardon, T. (2006), "The rapid rise of supermarkets and the use of private standards in their food procurement systems in developing countries", in Ruben, R., Slingerland, M. and Nijhoff, H. (Eds.), *Agro-food Chains and Networks for development*, Springer, Dordrecht, pp.79-105.
- Shepherd, A.W. (2007), *Approaches to linking producers to markets: A review of experiences to date*, FAO, Rome, Italy.
- Shitanda, D. and Wanjala, N.V. (2006), "Effect of different drying methods on the quality of jute (*Corchorus olitorius* L.)", *Drying Technology: An International Journal*, Vol. 24 No. 1, pp. 95-98.
- Sijali, I.V. and Okumu, R.A. (2002), "New irrigation technologies", in Blank, H. G., Mutero, C.M. and Murray-Rust, H. (Eds.), *The changing face of irrigation in Kenya: Opportunities for anticipating change in eastern and southern Africa*, International Water Management Institute, Colombo, pp.36-49.
- Smith, I.F. and Eyzaguirre, P. (2005), "African leafy vegetables: Their role in the World Health Organization's global fruit and vegetable initiative", *African Journal of Food Agriculture Nutrition and Development*, Vol. 7 No. 3, pp. 1-8.
- van Bastelaer, T. (2000), "Does social capital facilitate the poor's access to credit? A review of the microeconomic literature", Working paper No. 8, Social Capital Initiative, World Bank, Washington, DC.
- Wanderi, J.K. (2013), *Economic valuation of changes in soil quality: A case of global gap compliant and non-compliant farmers in Eastern and Central, Kenya*, Msc.thesis, University of Nairobi, Nairobi, Kenya.
- Weinberger, K. and Pichop, G. (2009), "Marketing of AIVs along urban and peri-urban supply chains in Sub saharan Africa", in Shackleton, C.M., Pasquini, M.W. and Drescher, A. W. (Eds.), *AIVs in Urban Agriculture*, Earthscan, Sterling, VA, pp.36-43.
- World Economic Forum [WEF] (2013), *Five challenges, one solution: Women*, Global Agenda Council on Women's Empowerment, Geneva, Switzerland.