The Socio-Economic and Institutional Attributes of the Different Types of African Indigenous Leafy Vegetable Farmers in Nyamira County, Kenya

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Abstract : *The African Indigenous Leafy Vegetables (AILV) agricultural sub-sector in Kenya has in recent times gained considerable prominence and attention. A diverse number of studies have underpinned the role it can play in improving the economic standing of smallholders, while playing an imperative nutritional role in the diets of many consumers. Stemming from increased awareness on the rise of various lifestyle illnesses and crusaders championing for healthy eating habits, the demand of AILV, as healthier dietary alternatives, has been gradually on the rise. However, the socioeconomic and institutional factors that influence market participation are still not clear. This study therefore aimed to characterize the socio-economic attributes of AILV farmers. Data was obtained through a household survey using structured questionnaires administered to 254 respondents picked for the study through a multistage sampling procedure. Pearson Chi² and F-tests were used to describe the significant household characteristics.*
Keywords: *AILV, Autarkic, Net buyers, Net Sellers, Market Participation.*

I. Introduction

About 30,000 edible plants are found throughout the world, 7,000 of which are grown or collected as food (Natarajan, 2002). According to Smith and Eyzaguirre (2007), about 3,000 species of these plants have been commercialized with only about 20 consumed on large scale. African Indigenous Leafy Vegetables (AILV) are increasingly recognized as possible contributors of both micronutrients and bioactive compounds to the diets of populations in Africa. The African continent is rich of vegetable species including amaranths which are among the most popular leafy vegetables within the continent (Maundu et al., 2009).

The Sub Saharan Africa (SSA) region is a natural habitat to more than 45,000 species of AILV of which, about 1,000 can be eaten as green leafy or fruit vegetables that happen to be the mainstay of traditional diets (Mac-Calla, 1994). AILV subsequently play a significant role in the food security of the underprivileged in both urban and rural settings (Schippers, 2000 and Onyango, 2002a). In Kenya, about 200 indigenous plant species are used as leafy vegetables (Maundu et al., 1999); of these 200, only a few have been fully domesticated, more are semi-domesticated and majorities are collected from the wild. A study by Maundu et al. (1999) reported that the most consumed traditional leafy vegetables in Kenya include the Amaranthus species (pig weed), Vigna unguiculata (cowpea leaves), Solanum nigrum (Black nightshade), Cleome gynandra (spider plant) and Cucurbita species (pumpkin leaves).

Agriculture remains a key sector for the Kenyan economy. Its commercialization therefore necessitates improving participation of smallholders in markets, translating to improved smallholder incomes, their overall welfare, as well as their livelihoods. Hence, promoting smallholder commercialization through AILV production can be one avenue of such efforts. Here, the main argument for smallholder commercialization through AILV production is that it can allow households to increase their income directly (Okello et al., 2012).

According to the 2010-2012 Kenya Horticultural Crop Performance (KHCP) report compiled by the Horticultural Crops Development Authority (HCDA) and the United States Agency for International Development (USAID) for the Ministry of Agriculture (MoA), the preference and hence demand for AILV has been steadily on the rise due to increased awareness, among the masses, on their health and nutritional benefits. The KHCP report labelled the share of AILV on the domestic value for vegetables as 5% in 2012, although the quantity produced was 11% of all the vegetables produced during the same year.

Studies by Barrett (2009) and Kirsten (2010) alluded to market access as one of the critical factors influencing the performance of smallholder agriculture in developing countries. Access to new and better-paying markets for agricultural products is thus vital in enhancing and diversifying the livelihoods of poor subsistence or semi-subsistence farmers (Barrett, 2009). Such markets can be local (including village markets), catering for the local populations, regional markets that serve regional consumers in counties within the country or export markets. In Nyamira County, African nightshade, spider plant and giant pig weed, in that order, are the

best performing AILV. African nightshade is popular in Kisii and Nyamira counties with 53% of the 22,7991 metric tonnes (MT) marketed nationwide coming from the two counties.

Nyamira County marketed 850.75 MT of leaf amaranth with a value of Ksh. 12.87 million. It was also the leading county in the production of the giant pig weed with 81% of Kenya's total of 3,068 MT valued at Ksh. 201 million. The production of giant pig weed in Nyamira County stood at 2,500 MT with a marketed value of Ksh. 162.50 million. The figures for African nightshade stood at 5,781 MT valued at Ksh. 256.08 million; cowpeas at 1,732.26 MT valued at Ksh. 40.12 million; 88.50 MT of pumpkin leaves valued at Ksh 1.44 million; 4,526 MT of spider plant valued at Ksh. 200.51 million and pumpkin leaves stood at 88 MT worth 2.27 million. A quick summation of these figures reveals a market value of close to Ksh. 675.89 million highlighting the important contribution AILV play in the county and the potential they can have in poverty alleviation among poor households (USAID and HCDA, 2012). These figures are explicit that large volumes of AILV are marketed in the county depicting substantial market participation.

Farmers in Nyamira have ventured into production of AILV due to the high market value associated with it. This is attributable to growing consumer awareness of their nutritional and health benefits. Though farmers engage in the markets, their socioeconomic and institutional attributes that influence their participation is unclear. This study therefore aimed to characterize the socio-economic and institutional attributes of the different types of AILV farmers.

II. Materials and Methods

The target population of the study consisted of smallholder farmers in Nyamira County. The sampling unit was smallholder AILV farmers. Multi-stage sampling procedure was used to arrive at the surveyed sample of 254 AILV farmers. First, Nyamira County was purposively selected owing to a large number of smallholder AILV producers and huge volumes of the AILV traded within the county. The implication for this is that there is substantial AILV market participation. Within Nyamira County, Nyamira North Sub-county was purposively selected because it is the leading producer of AILV in the county. Therefore, the study ultimately focused in Nyamira North Sub-County, with all the wards of Itibo, Bomwagamo, Bokeira, Magwagwa and Ekerenyo producing participants for the survey. A pretested semi-structured questionnaire was administered through face to face interviews to collect primary qualitative and quantitative data.

Descriptive statistics involving the use of means, percentages, frequencies, standard deviations, Chi2 test and F tests were employed to describe the socio-economic, marketing and institutional characteristics of AILV farmers.

III. Results and Discussions

3.1 Socioeconomic characteristics of different types of AILV farmers

The different types of producers are net buyers, net sellers and autarkic. The results of the socio-economic characteristics for continuous explanatory variables are presented in Table 1. The education level of the household head was significantly different at 10% level of significance. The net sellers and autarkic household heads both had a mean of 10 years of schooling, while the net buyers had a mean of 8 years of schooling. The higher education levels among autarkic and net sellers suggested that, farmers with higher levels of education were more open to new ideas and more likely to be risk takers. They could therefore break away from farm enterprises they previously engaged in and venture into new enterprises (AILV) in pursuant of better income and livelihoods. The educational status of the household head is an important element in smallholder economic activities. Formal education has been found to enhance managerial competence and successful implementation of improved production, processing and marketing practices (Marenya and Barret, 2006). Further, Makhura et al. (2001) stated that human capital, represented by the household head's formal education, is posited to increase a household understanding of market dynamics and therefore improve decision about the amount of output sold, inter alia.

Table 1: Socioeconomic characteristics of smallholders for continuous explanatory variables (F test).

Variable	Overall Mean n = 254	Means of Market Participants by Categories			F-Test	Pr > F
		Net Buyers n = 22	Autarkic n = 17	Net Sellers n = 215		
Age	47.51 (10.88)	45.96 (9.99)	47.41 (11.96)	47.67 (10.92)	0.78	0.84
Education	9.65 (3.95)	8.46 (2.76)	9.88 (4.27)	9.76 (4.03)	1.60*	0.06
Household size	6.14 (2.04)	6.32 (1.59)	5.88 (1.65)	6.14 (2.11)	0.91	0.55
Farm size	1.98 (1.49)	2.36 (1.77)	1.52 (1.55)	1.98 (1.59)	2.33**	0.03
Income	16612.52 (29967.15)	2274.76 (2910.74)	3552.65 (3489.42)	19122.86 (31916.21)	0.87	0.76

Note: Figures in parentheses are standard deviations; **: significant at 5% level; *: significant at 10% level.

Intriguingly, Irungu (2007) reported that AILV farmers were more educated than other categories of traders, implying that the production of AILV is a field for those endowed with human capital. This might be because one has to acquire knowledge on several aspects of AILV, for instance, their nutritive value and marketing strategies, before embarking on their production. Education helps to unlock the natural talents and inherent enterprising qualities of the farmers, thus making them more skilled and more responsive to risk taking and change than the illiterate farmers (Nwaru, 2004). People with high education level are likely to analyse and interpret information than those who have less education or no education at all (Marther and Adelzadeh, 1998).

The farm size was statistically different at 5% significance level with the net buyers, autarchies and net sellers owning 2.36, 1.52 and 1.98 acres of land respectively. The net buyers had the largest hand holdings, possibly because, AILV are a relatively new venture, and so instead of digressing to production of AILV, net buyers stuck to previously produced crops such as maize and beans condemning them to be buyers of AILv. This gave the picture of risk averseness. This finding contradicted that of Machethe et al. (2008), who found that land is a critical production asset having a direct bearing on production of a marketable surplus. In supporting the finding by Machethe et al. (2008), Branson and Norvell (1983) discovered that, expanding the land under crop production increased the volume of marketable produce.

The results of the socioeconomic characteristics of smallholders for discrete explanatory variables are presented in Table 2. The dummy for whether a farmer had a title deed or not was statistically significant at 5% level. About 86.36% of net buyers did not possess title deeds while 13.64% had title deeds. For autarkic households, 88.24% did not own land, while 11.76% had title deeds. Correspondingly, 64.65% of net sellers did not own land, while 35.35% had title deeds. Ownership of title deeds was highest among net sellers and this could explain their ability to develop land (boosting production) or possibly obtain cash loans (to fund marketing operations such as meeting transportation costs), enabling them to become net sellers. The high proportion of no land ownership, by virtue of possessing title deeds, could be explained by: increasing population pressure resulting to land fragmentation, especially in hereditary systems of land sub division among siblings, leaving them with no land titles as the original deeds remain with their parents. Ownership of land influences agriculture productivity, because farmers who do not own land can be reluctant to develop and maintain the land (Randela et al., 2000). Furthermore, such farmers may have difficulty in obtaining loans for agricultural purposes because they cannot use the land as collateral.

Table 2: Socioeconomic characteristics of smallholders for discrete explanatory variables (Chi^2 test).

Variable	Description	Overall n = 254	Number of Market Participants by Categories			Pearson Chi^2	Pr
			Net Buyers n = 22	Autarkic n = 17	Net Sellers n = 215		
Gender	Male	184 (72.44)	15 (68.18)	13 (76.47)	156 (72.56)	0.340	0.844
	Female	70 (27.56)	7 (31.82)	4 (23.53)	59 (27.44)		
Land ownership	Yes	81 (31.89)	3 (13.64)	2 (11.76)	76 (35.35)	7.729**	0.021
	No	173 (68.11)	19 (86.36)	15 (88.24)	139 (64.65)		
Food sufficiency	Yes	59 (23.23)	0 (0)	2 (11.76)	57 (26.51)	9.209**	0.010
	No	195 (76.77)	22 (100)	15 (88.24)	158 (73.49)		
Non-farm income	Yes	107 (42.13)	7 (31.82)	3 (17.65)	97 (45.12)	5.926*	0.052
	No	147 (57.87)	15 (68.18)	14 (82.35)	118 (54.88)		
Transport owned	Yes	60 (23.62)	2 (9.09)	2 (11.76)	56 (26.05)	4.600	0.100
	No	194 (76.38)	20 (90.91)	15 (88.24)	159 (73.95)		

Note: Figures in parentheses are percentages; **: significant at 5% level; *: significant at 10% level.

The ability of households to meet their food needs was statistically different at 5% significance level across the market regimes. For the net buyers, 100% were not self-sufficient in terms of food production; about 88.24% of autarkic households were not self-sufficient in terms of food production, while 11.76% were able to produce enough family food. On the other hand, 26.51% of net sellers were able to produce enough family food, while 73.49% were not able to meet their family food needs. The inability of households to meet their food needs was highest for net buyers. All net buyers were not able to meet their family food needs thus had to buy AILV, explaining their participation in markets as net buyers. The study by Lukanu et al. (2004) revealed that household food availability is one among the factors that affects farmers' decision to commercially produce.

Participation in non-farm income generating activities was statistically significant at 10% level with 45.12%, 17.65% and 31.82% of net sellers, autarchies and net buyers (respectively) participating in non-farm income generating activities. Net sellers had the highest proportion of participants in non-farm income generating activities. This could explain their participation in markets as net sellers, possibly because they finance AILV production and marketing activities through off farm incomes. Rao and Qaim (2011) found that income from off farm activities could be used to finance farm investment required for farmers' participation in high value markets. Alene et al. (2008) noted that non-farm income contributes to more marketed output if it is invested in farm technology and other farm improvements.

3.2 Institutional and access characteristics of different types of AILV farmers

The results of the institutional and access characteristics of smallholders for continuous explanatory variables are presented in Table 3. The distance from smallholders' homes to farms, as well as from farms to markets were statistically different at 1% and 5% significance levels. The net sellers had the shortest distances from homes to farms at 0.51 kilometers, followed by net buyers at 1.20 kilometers and lastly, autarkic households had the longest distance at 3.40 kilometers. The distance from farms to markets was longest for net buyers (3.02km), followed by net sellers (2.70km) and then the autarkic farmers (2.21km). Net buyers had the longest distance separating them from markets. Longer distances translated to high transportation costs therefore justifying their participation in markets as net buyers, instead of incurring transportation costs of AILV to markets.

Table 3: Institutional and access characteristics for continuous explanatory variables (F test).

Variable	Overall Mean n = 254	Means of Market Participants by Categories			F-Test	Pr > F
		Net Buyers n = 22	Autarkic n = 17	Net Sellers n = 215		
Distance (Home-Farm)	1.00 (3.56)	1.20 (2.30)	3.40 (12.03)	0.51 (1.78)	2.11**	0.03
Distance (Farm-Market)	2.85 (3.90)	3.01 (1.77)	2.21 (1.70)	2.70 (4.27)	3.00***	0.00
Extension visits	3.81 (3.25)	2.91 (1.85)	3.82 (3.57)	3.90 (3.34)	1.36	0.20
Marketing experience	7.76 (7.46)	3.10 (4.22)	5.16 (3.26)	8.48 (7.79)	1.72**	0.02

Note: Figures in parentheses are standard deviations; ***: significant at 1% level; **: significant at 5% level.

The distance from the farm to point of sale was found, in a couple of studies, to be a major constraint to the intensity of market participation (Goetz, 1992; Montshwe, 2006; Bahta and Bauer, 2007; and Omiti et al., 2009). Minot (1999) showed that the choice of marketing outlet among traders is negatively related to the distance to the market site. Ogunleye and Oladeji (2007) found that a greater distance to the market increases transportation costs and marketing costs and this hampers the extent of market participation

Experience in marketing AILV was found to significantly vary across participants of the different markets regimes at 5% significant level with net buyers having an average of 3 years of market participation experience, 5 years for autarchies and 8 years for net sellers. Experience was highest among net sellers which implied that farmers with higher number of years of experience had higher participation as net sellers, possibly reflecting their ability to negotiate and achieve better terms of trade. Abay (2007) found an increase in farmers' experience resulted in the increases of tomato being supplied to the market. Further, these farmers will have stronger social networks and will have established credibility within the network (Makhura et al., 2001).

The results of the institutional characteristics of smallholders for discrete explanatory variables are presented in Table 4. The dummy for contractual marketing was statistically different at 1% significance level with 0% of net buyers under contract, 11.76% and 28.84% of autarkic and net seller (respectively) having contracts. Net sellers had their highest proportions of contracted farmers. Marketing under contract increased market participation because farmers were guaranteed a ready market, plausibly explaining the high proportion of contractual arrangements for net sellers. Habwe et al. (2008) recognized the importance of technical support such as market linkages, where contracted farmers of AILV are linked to city supermarkets, informal markets and individual vendors, food processing and preparation joints for sustainable utilization of AILV.

Access to credit was significantly different at 1% significance level with 59.07% of net sellers having access to credit, while 41.18% and 18.18% of autarkic and net buyers having access to credit as well. The proportion of farmers who had access to credit was highest among net sellers. This could explain their ability to invest in production enhancing technologies, hence producing surpluses for markets, as well as funding marketing activities such as searching for information and transporting produce. Mutai et al. (2013) postulated that access to credit gives the farmer more cash resources hence it has an effect on their marketing activities. Immink and Alarcon (1993) and Lerman (2004) support the finding of the current study by arguing for agricultural credit as it plays a vital role in the process of smallholder commercialization. Credit facilitates the introduction of innovative technologies and ensures input and output marketing arrangements (Reddy, 1998).

Access to market information was statistically significant at 5% level, with autarkic households having the highest proportion (58.82%) of those with access to market information. The proportion of those with market information among net sellers was 54.88% and 27.27% among net buyers. Autarkic and net seller households had higher proportions of farmers who had access to market information compared to net buyers. Access to market information was postulated to reduce the costs of searching for market information as well as addressing the problems of moral hazard and adverse selection. This in turn motivated farmers to move away from lower positions of market participation (net buyers) to higher market positions of autarchies and net buyers, in order to engage profitably in marketing. Studies by Enete and Igbokwe (2009) and Omiti et al. (2009) underscored the importance of price and market information in luring smallholders to participate in markets.

Table 4: Institutional characteristics for discrete dummy variables (Chi^2 test).

Variable	Description	Overall n = 254	Number of Market Participants by Categories			Pearson Chi^2	Pr
			Net Buyers n = 22	Autarkic n = 17	Net Sellers n = 215		
Group membership	Yes	231 (90.94)	21 (95.45)	16 (94.12)	194 (90.23)	0.884	0.643
	No	23 (9.06)	1 (4.55)	1 (5.88)	21 (9.77)		
Contract marketing	Yes	64 (25.20)	0 (0)	2 (11.76)	62 (28.84)	10.550***	0.005
	No	190 (74.80)	22 (100)	15 (88.24)	153 (71.16)		
Credit access	Yes	138 (54.33)	4 (18.18)	7 (41.18)	127 (59.07)	14.718***	0.001
	No	116 (45.67)	18 (81.82)	10 (58.82)	88 (40.93)		
Market information	Yes	134 (52.76)	6 (27.27)	10 (58.82)	118 (54.88)	6.374**	0.041
	No	120 (47.24)	16 (72.73)	7 (41.18)	97 (45.12)		

Note: Figures in parentheses are percentages; ***: significant at 1% level; **: significant at 5% level.

IV.   Conclusion

It is not enough that farmers merely participated in markets, rather they should be able to participate in markets profitably as net sellers. Identifying the socioeconomic and institutional attributes of each group (net buyers, autarkic and net sellers) is important to determine the specific challenges and requirements that are unique for each group. Therefore proper targeting and screening of farmers is necessary. Here, equipping extension workers with the ability to address the specific needs of each group is recommended.

Acknowledgements

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