



THE IMPACT OF VEGETABLE FARMING ON THE LIVELIHOOD OF SMALL-SCALE FARMERS IN KOINADUGU DISTRICT NORTHERN SIERRA LEONE

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ABSTRACT

A well-planned vegetable productivity is not only very lucrative but can also alleviate poverty and potent food self-security approach. It can also lead to self-reliance and overall sustainable rural development. This study investigated the impact of vegetable farming on the livelihood of farmers in Koinadugu district, northern Sierra Leone. A descriptive cross-sectional research design was adopted with the aim of for the study. Data was collected using triangulation of quantitative and qualitative methods. Both secondary and primary data were used in this study. A highly structured questionnaire consisting of four sub-sections (based on the objectives of the study) was administered to 180 (170 farmers and 10 extension agents) participants in two chiefdoms in the district. It was found that most of the farmers were in the mid-ages (36-45 years) (37.0%), and most of them were married (54.4%) with medium family sizes (6-10 members) (49.4%) and most acquired land through inheritance (87.2%). Their annual farm incomes ranged between Le.2, 000,000 and Le. 5,000,000. It further showed that transportation by road has increased vegetable marketing (62.8%) and their annual income (56.1%). It also reduced the frequent accidents experienced by farmers (97.2%), while the rate of abandoning farms (83.3%) has greatly reduced. In conclusion though the industry is lucrative, many have not realized any profit from it because of unavailability of a functional market, efficient and reliable means of transporting fresh, leafy, vegetables. As a result, Household food security too has not been achieved in this district. Farmers in addition have not acquired any nutrition education. It is therefore recommended that the farmers be engage in some form adult functional education to help them improve vegetable farming activities. The transportation system should be improved so that fresh vegetables products can easily reach the markets. This would in reduce post harvest losses experience in the District.

KEY WORDS: Vegetables, Livelihoods, Farm Productivity, Household Food Security.

INTRODUCTION

Vegetables may be described as those plants, which are consumed in relatively small quantities as a side dish with the staple food. The term 'vegetable' can also be used to designate the tender edible shoots, leaves, fruits and roots of plants that are eaten whole or part raw or cooked as a supplement to starchy foods and meats (Williams *et al.*, 1991). Sinha *et al.* (2010) precisely defined it as any plant part consumed for food that is not a fruit or seed, but including mature fruits that are eaten as part of a main meal. The authors further stated that Vegetables have been part of the human diet from time immemorial. They are important components of daily diets in many parts of the world and important sources of income, especially in urban and peri urban areas. In fact, some of them are not only staple foods but also accessory foodstuffs, adding variety to meals with their unique flavours and as nutrients necessary for health. Some vegetables are perennials, while others are annuals and biennials, usually harvested within a year after sowing or planting. The value of vegetables as an important article of daily human diet has come to be recognized all over the world in recent years (Sharma *et al.*, 1976). For instance, in 2010, China was the largest vegetable producing nation with over half of the world's production (Sinha *et al.*, 2010). The authors

further stated that India, the United States, Turkey, Iran and Egypt were the next largest producers.

Vegetables are also central to most nutrition, food security and poverty reduction programs around the world (James *et al.*, 2010). They provide a cheap source of proteins, vitamins and other elements essential for human health and wellbeing. However, in most of West African countries, the economic opportunities offered by vegetables are often undermined by production and trade constraints. Extension workers, farmer groups and local community organizations, are working towards helping farmers to increase their yields in sustainable ways that create wealth and reduce the risks to productivity. Yet, in West Africa, vegetables are not commonly grown in the rain fed upland ecologies and in lowland ecologies such as bolilands, riverine grasslands and inland valley swamps. The agro-ecosystems in these various ecologies offer great opportunities for commercial production of vegetables in West Africa (Levasseur *et al.*, 2007). Vegetable and vegetable products form an essential part of the food in most African countries. Therefore, increased food production is essential for sustaining improved production and nutritional standard of people. Increasing production of vegetables would also help solve food the problem (Sharma *et al.*, 1976).

In Sierra Leone, vegetables are grown in every part of the country, mostly grown by female farmers who interplant them with other crops and used for home consumption. However, for commercial vegetable production, Gloucester, Leicester, and Regent in the West Area in Freetown, and Koinadugu district in the northern part of Sierra Leone are the most renowned areas. The climate situation of Koinadugu District in the northern region of Sierra Leone makes it suitable for vegetable cultivation. Hence, most of the farmers in that district are vegetable farmers and grow different types and varieties of vegetables. Those most commonly grown in, and sold from Koinadugu District, include tomato, onion, shallots, okra, eggplant, local spinach, Indian or Gambian spinach, sweet and chilli pepper, hot pepper, cabbage, lettuce, cucumber and carrot. Most of these vegetables are perishable and therefore demand comprehensive planning for movement, Storage, processing and distribution and for commercial vegetable industry to thrive largely depend on allied enterprises like storage, processing, marketing, maintenance and service enterprises.

Most vegetable products from Koinadugu District - fruity, leafy, roots, etc. are mainly transported in large baskets, boxes, bags, and other containers by women to markets in Makeni and Freetown every day. Whether business has alleviated poverty among its farmers or improved their standard of living in Koinadugu District requires investigation. Yet, necessary data that would show the impact of vegetable farming on the standard of living, household food security and economic security in Koinadugu District is scanty. Also, Food security remains a major problem in the district, with agriculture largely limited to subsistence level farming and lacking the necessary expertise that could improve cultivation practices. It is also a nationwide belief that there is little assistance to individual vegetable or group of vegetable farmers to attain their stated objectives during a period or over a period of time. It is hoped that results of this study would forecast what the food security situation in the district is, the main problems vegetable farmers encounter and how these would be minimized in order to attain self-food security. The government and NGOs and the international organizations may find such data useful for planning and organizing farmers for improved and sustainable vegetable production. The objective of the study were to identify and analyze the socio-economic

characteristics of vegetable farmers in Koinadugu District, examine the effect of transportation of vegetables produce by road on farmers' farm income, examine the livelihood status of vegetable farmers in Koinadugu District and analyze the perception of farmers and extension agents on vegetable production in Koinadugu District.

METHODOLOGY

Research Design

A descriptive cross-sectional research design was employed in the study with an aim of describing the impact of vegetable farming on the livelihood of farmers in Koinadugu District in northern Sierra Leone.

Study Area

The study was conducted in Koinadugu District in the Northern Region of Sierra Leone. Koinadugu District is 346 km north of Freetown located 9° 30'N 11° 30'W. It has a total land area of 12,121 km² (4,680 sq mi) with population of 265,765 (SSL, 2004). Koinadugu District is bordered to the west by Bombali District, to the south-east by Tonkolili District, to the south by Kono District. It is bordered to the north-east by the Republic of Guinea. The district consists of eleven chiefdoms- Diang, Nieni, Sengbe, Sulima, Wara-Wara Bafodea, Mongo, Dembelia Sikunia, Kasunko, Folasaba, Wara-Wara Yagala and Neya chiefdoms. The study was actually carried out in two out of the eleven chiefdoms- Sengbeh and Wara-Wara Yagala. Koinadugu district has numerous Mountains including the Wara-Wara Mountains, and few forests lands. The climate is cooler throughout the year making it suitable for vegetable production. It has low rainfall and is humid throughout the year. The district also contains a lot of inland valley swamps, riverine and bolilands making the district suitable for rice production and fish farming as well as gold mining and Agriculture are the main occupations of the District. The main crops grown in this district are rice, groundnut, vegetables, etc. The major ethnic groups in the District are the Fulas (who predominate in the district's largest town of Kabala), Kuranko (who predominate in the Chiefdoms), Mandigo and Limba and Yalunka (predominant in Musaia and Falaba areas bordering the republic of Guinea (Conakry)) respectively. Islam dominates the religious and cultural practices in the district. Most schools in the district have Islamic religious affiliation.

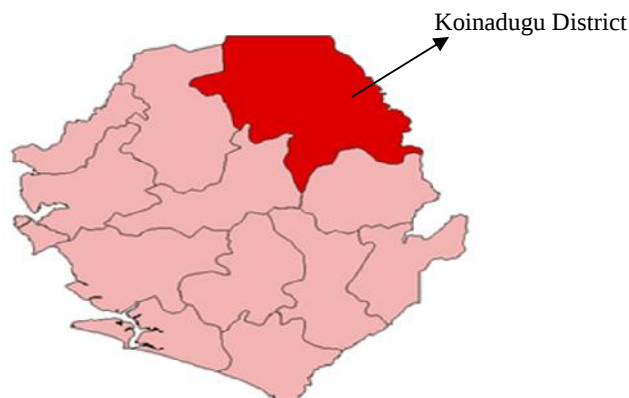


FIGURE 1: Map of Sierra Leone Showing Koinadugu District

Study Population

The target population of the study consisted of all vegetable farmers in the Koinadugu District.

Sampling Technique and sample size

The sample frame of the study was a list of farmers engaged in the production of vegetables in the selected chiefdoms - In order to control frame and selection errors, an up –to-date list of vegetable farmers was sought from the Ministry of Agriculture, Forestry and Food Security in Kabala, the Head Quarter Town of Koinadugu District and Extension Officers in the selected Chiefdoms. The sample consisted of 180 vegetable growers, and sellers, and extension agents. The sampling procedure was a combination of purposive, stratified and simple random sampling techniques. The sampling aimed at selecting eligible persons with equal probability. Samples were selected from 10 communities in Sengbeh and 14 communities in Wara-Wara Yangala Chiefdoms. The first step in the multi-stage sampling technique was a purposive selection of Koinadugu district out of the five districts in the North. This district was selected based on several reasons. Firstly the district is well renowned for vegetable farming. Secondly, most of the women in this district are engaged in marketing agricultural produces, especially vegetables. Thirdly, the farmers in this district have not only been in vegetable farming for a long period, but also in contact with extension workers. The second stage involved a purposive selection of two chiefdoms. The two Chiefdoms selected are the areas where vegetable farming predominates in the district. The third stage comprised of the selecting of 28 (14 from each of chiefdom) vegetable producing communities from each of the Chiefdoms – Senge Chiefdom -Malaforia (5), Ismaia Village (2), Nyafraundor (9), Sengbeh Bendugu (5), Kompala (5), Gbenekoro(4), Kondeya (4), Koinadugu village (2), Bambuukoro 1 (10), Bambukuro 2 (10), Sokoralla (5), Dankawalie (4), Sengbehleroh (10), and Yirrafalia (10); and Wara Wara Yagala Chiefdom–Yataya (5), Senekedugu (10), Heremakono (10), Bendukura (10), Bockaria (7), Kamasoria (7), Affia (5), Bilimaia (4), Kathanta (5), Igaia (4), Gbawuria (3), Kamanemeh (3), Kayakor (5), and Kathawuya (5). The fourth stage was a purposive selection of individual farmers to be considered as participants in the study. The fifth stage involved the selection of extension agents using simple random sampling technique. The lists of all vegetable producing communities, farmers, and extension workers in each of the two chiefdoms were provided by the Ministry of Agriculture, Forestry and Food Security (MAFFS), Extension Officers, and NGOs working in each of the chiefdoms. The Individual farmers were selected using simple random sampling technique. All the names of vegetable farmers provided by MAFFS, Extension Officers, and NGOs were assigned numbers, and these numbers were written on pieces of papers which were folded and placed in black plastic bags in each of the chiefdoms. A little child aged five years was allowed to pick up a piece of wrapped paper repeatedly until the 75 farmers per community were selected. Lastly, five extension workers were selected from each of the chiefdoms giving a total of 10 extension workers. The number of vegetable farmers selected from each community in the two chiefdoms was determined by the

size of the chiefdom and number of communities engaged in vegetable production there. This gave a total Sample size of 180 participants.

Instrument for Data Collection

A structured questionnaire consisting of both open and close-ended questions was administered to sampled farmers through the use of face to face personal interviews. The questionnaire consisted of four sections based on the purpose and objectives of the study. Section **A** sought information on the socio-demographic characteristics of the vegetable farmers; section **B** collected data on the effect of transportation of the vegetable produce on road on farmers' farm income. Interview and discussions were conducted with the transporters and farmers respectively in order to find out their own opinion about the conditions of the roads to each settlement sampled. Section **C** solicited for information on the livelihood status of the vegetable farmers, while section **D** solicited information on the perception of the farmers and extension officers on vegetable production in Koinadugu District. The questionnaire consisted of several categories of questions. The responses of sections B of the questionnaire had a six –point response options of: HI = Highly Increased, MI= Moderately Increased, HD=Highly Decreased MD = Moderately Decreased, NE = No effect and I don't know (IDK) with responding values of 6, 5, 4,3, 2, and 1; while those for section three were categorized using five point scales: Excellent =1, Very good= 2, Good=3, Fair=4, and poor =5. The responses for section four were categorized using four point Likert Like-type scales: Highly agree=1 Agree =2 highly Disagree=3, Disagree =4 for section 4(a), and responses for 4(b) were categorized using Very true = 4, true =3, Fairly true =2 and Not true =1. The mean scores were used for analysis.

The instrument for data collection was subjected to pre-test in Diang Chiefdom, which was not part of the sample, while validity and reliability tests were carried out. Validity test included face validity and content validity.

i. Face validity: In validating the instrument, face and construct methods were used. 20 items were constructed; these were presented to a panel of five experts. The panel included extension Education Officers, Market Experts, Agricultural Economists, Food and Nutritionists and Food value chain Expert and other related fields. The face validity of the instrument was measured. The experts confirmed that the items contained items that would solicit the intended response on impact of vegetable production. Also, the experts reviewed the items of clarity and ensured all that could confuse respondents and research assistants were removed. The construct validity was ensured by correlating the score of test administration of the instrument with that of another one with high level of construct using Pearson Product Movement Correlation. A correlation of the test scores of the two instruments on the 20 vegetable farmers gave a correlation coefficient of 0.77. This was significant at $p < 0.05$. This indicated that the instrument clearly measures appropriately the same construct measured with other instrument. Only vegetable farmers who would not constitute part of the final study were used in this construct.

ii. Reliability of the instrument: To determine the internal consistency of the instrument, a single test was given at a single setting. The odd numbers in the test came from one

alternate of the test and even numbers from the other alternate form. Two scores were obtained from each test; one set from the odd, and the other from the even numbered items. Using Pearson Correlation the two sets of scores provided a measure of reliability of each half of the test. Spearman- Brown Formula was then used to get the reliability of length of the test. The internal consistency was 0.82 at (0.05) level of significance.

Data Collection

The data for this study was collected between 20th and 30th June 2015. Both primary and secondary data were collected. Secondary data were information from the literature, official documents, library materials, internet, and textbooks. Primary data was solicited through administration of questionnaire, direct observation, focus group discussion, and key informant interviews. Prior to the fieldwork, researchers made several visits to the study area to: i) acquaint themselves with the farmers and the situation on the ground. ii) To have an informed consent of the vegetable farmers and also inform the community people about the purpose of the study. Before the start of the field exercise, three research assistants, who were very familiar with the culture of the study area and who well understood and spoke the language of the farmers, were trained on how to administer the questionnaire. Each research assistant was given a field notebook, pencil, pen, and eraser. They were also instructed to write down any information and observation made that will be very essential for the accuracy of the study. Sixty questionnaires were entrusted to each of the research assistants. These were coded and assistant researchers were asked to write the name of the community, and the respondents on each questionnaire. Interviews lasted between 45-50 minutes. In addition to interviews, direct observations were made during the administration of questionnaires. Focus group discussions too were held with key stakeholders including local leaders, extension officers, marketers, transporters, youth leaders, women leaders, etc. Two focus group discussions and key informant interviews were held in three communities to collect qualitative information for the study and to verify responses from questionnaires. Each author supervised one assistant researcher and collected all completed questionnaires everyday. At the end of the data collection, all the questionnaires were put together and checked for uncompleted or not properly completed forms. During data collection, informed verbal consent was directly asked from respondents before interview.

Data analysis

All data collected from the study area as in the questionnaire, focus group discussion, in-depth interviews and observation reports were verified, coded and then analysed in an ongoing process. Quantitative data was processed, coded and analyzed using Statistical Package for Social Sciences (SPSS) program version 20. The results were presented by the use of descriptive statistics such as means and frequencies. Qualitative data were transcribed and subsequently the themes and sub-themes derived. The themes and sub-themes were then presented as they emerged.

RESULTS & DISCUSSION

1. Socioeconomic characteristics of vegetable farmers

The socio-economic characteristic of the vegetable farmers in the Koinadugu is presented in Table. The table revealed that 37.8% of the farmers are middle aged and fall within (36-35 years) age bracket, while 30.0% of them are young in the age group (15- 35years). This finding is in line with the findings of Singh (2003), Nachinuthu (2002 and Gadgil *et al.* (2005) who reported that a large proportion of the farmers in their reports were middle aged. Quranic education (52.2%) was the highest level of education attained in the district with 38.9% of the farmers attaining primary levels of education. This implies that the level of education of the farmers is very low in the district. This findings is supported by Singh (2003 and Gadgil *et al.*, 2005, who stated that in their study area that majority of the participant-farmers were illiterates. This implies that educational status is an important personal trait for adoption of scientific agriculture. According to Bethoko and Oladele (2013), literate farmers are likely to adopt new innovations than illiterate farmers, hence their productivity increases and they get greater farms' return. Slightly over half of the farmers were also married (54.4%), while 31.1% of them were divorced. This implies that marriage is a very important institution in the rural area. This finding subscribe to the finding of Moriba, *et al.* (2011) and Sesay, 2007) who stated that rural farmers in their study areas were married. Further still, the table showed that most of the vegetable farmers acquire land for through inheritance (87.2%) and lease (11.7%). None of the vegetable farmers purchased land for cultivation in Koinadugu District. This implies that farmer's farm size is determined by what plot of land allocated to him or her per growing season. This finding is supported by Sesay (2007) who found that land is inheritance is the most popular land acquisition method in Kambia District. The table further indicated that a large proportion of the vegetable farmers cultivate less than 1Ha (506%), while 43.9% of the cultivated small farm sizes (1–2Ha). According to Bothoko and Oladele (2013), farm size has no effect on greater returns because small farms can produce far more per hectare than large farms, confirming Ayodele (2005) finding. The table further revealed that the family sizes of the vegetable farmers were between 6-10 members (49.4%) and 11-20 members (31.7%). Usually, farmers with small family sizes spent less than those with high numbers of family members. The study also showed that 48.9% of the farmers earn less than Le. 2, 000,000 per farm per annual, while 47.8 % of them earn between 2,000,000–5,000,000. These results subscribe to the findings of Ngegba (2008), who stated that farmers in Bo District in Sierra Leone earn less than farmers who earn high annual farm incomes would likely adopt improve technologies than those who earn less income per year.

2. The effect of Transportation by Road on Vegetable

The effect of transportation by road on vegetable farmers in Koinadugu District is presented in Table 2. The table revealed that 56.1% of the farmers claimed transportation of vegetables by road increased demand for vegetables products. This finding does not ascribe to Adeleke *et al.* (2010) findings that road transport systems are the most serious infrastructural bottleneck facing agricultural development. It also moderately increase easy vegetable

the marketing (62.8%) of these products, impacting a positive effect on the earning capacity of the farmers. The table further indicated that transporting vegetable products by road highly decreased low prices of vegetables (97.8%), the rate of loss of farmers' lives through accidents (97.2%), frequency of farmers leaving their farms unattended to (83.3%), total loss of farm product (61.1%), and rotting of vegetable products (50.0%). Still, loss of food value of leafy vegetable (54.4%) moderately decreased in farming communities, resulting to increase

farm income. According to Baloyi (2010), marketing constraints constitute the greatest barrier for small-scale farmers when it comes to access high value markets. Access to markets is an essential requirement for the poor in rural areas. It may also be easy to access markets, but retaining one's position in the market is more difficult and participation of small-scale farmers in high-value markets is unsatisfactory (Baloyi, 2010), and the perishable nature of vegetables necessitate effective marketing channels (Xaba & Masuku, 2012).

TABLE 1: Socioeconomic Characteristics of Vegetable Farmers

Variables/Categories	Frequency
Age	
Young (15 -35 years)	55(30.6%)
Middle (36 – 50 Years)	68(37.8%)
Ageing (51- 65 years)	53(29.4%)
Old (Above 65 years)	4(2.2%)
Educational Level	
Primary	70(38.9%)
Secondary	11(6.1%)
Technical Vocation	5(2.8%)
Teachers Training College	-(-)
University	-(-)
Quranic Education	94(52.2%)
Marital Status	
Single	14(7.8%)
Married	98(54.4%)
Divorced	56(31.1%)
Widow/widower	12(6.7%)
Land Acquisition	
Gift	2(1.1%)
Inheritance	157(87.2%)
Lease	21(11.7%)
Purchase	-(-)
Farm Size	
<1ha (marginal)	91(50.6%)
1- 2 ha (Small)	79(43.9%)
2.1 – 5ha (Semi- Medium)	10(5.6%)
6-10 ha (Medium)	-(-)
Family Size	
0-5 members (Small)	34(18.9%)
6-10 members (medium)	89(49.4%)
11-20 members (large)	57(31.7%)
Annual Farm Income	
< Le 2,0000,000 (Small)	88(48.9%)
2,000,000–5,000,0000 (medium)	86(47.8%)
> 5,000,000 (Large)	6(3.3%)

TABLE 2: The Effect of Transportation by Road on Vegetable farmers' farm income

Effects	Level of Effect on Farm income					
	HI	MI	HD	MD	NE	Can't Tell
Rotting of vegetables	-(-)	-(-)	90(50.0%)	85(45.2%)	2(1.1%)	3(1.7%)
Leafy vegetables loss food value	-(-)	-(-)	80(44.4%)	98(54.4%)	-(-)	2(1.1%)
Total loss of vegetable products	-(-)	-(-)	110(61.1%)	69(38.3%)	1(0.6%)	-(-)
Farms frequently left unattended to	-(-)	-(-)	150(83.3%)	30(16.7%)	-(-)	-(-)
Loss of lives through accidents	-(-)	-(-)	175(97.2%)	5(2.8%)	-(-)	-(-)
Low prices of vegetable products	-(-)	-(-)	176(97.8%)	4(2.2%)	-(-)	--(-)
Easy marketing of vegetable products	67(37.2%)	113(62.8%)	-(-)	-(-)	-(-)	-(-)
Increase demand for vegetables	101(56.1%)	89(49.4%)	-(-)	-(-)	-(-)	-(-)

HI = Highly Increased MI= Moderately Increased HD = Highly Decreased MD = Moderately Decreased NE = No effect

3. Livelihood Status of vegetable farmers in Koinadugu District

The livelihood status of vegetable farmers in Koinadugu District is presented in Table 3. The table indicated that the livelihood status of the farmers in term of community security (48.4%) is excellent, while farm productivity (73.3%) and communication (63.3%), and drinking water (36.1%), are very good. Access to farm input (44.4%), processing of farm products (43.3%), and household food security (48.3%) were expressed as good. This finding is in accordance with what Ayodele (2005) also found in his

study. Also, the housing condition (80.0%), farm saving (77.8%), children's education status (70.0%), access to financial institutions (66.7%), health situation of the farmers (55.5%), and accumulation of household wealth (54.4%) were ascribe fair statuses. According to Adeleke *et al.*, (2010) road systems are the most serious infrastructural bottleneck facing agricultural development. The table further showed that availability of labour (88.8%) and transportation system (80.6%) within the district is very poor.

TABLE 3: Livelihood Status of vegetable farmers in Koinadugu District

Categories/ variables	Level of Livelihood Status				
	Excellent	Very good	Good	Fair	Very Poor
Education of the children	-(-)	-(-)	25(13.9%)	126(70.0%)	29(16.1%)
Health situation of farmers	-(-)	-(-)	58(32.2%)	100(55.6%)	24(13.3%)
Household food security status	-(-)	-(-)	87(48.3%)	72(40.0%)	29(16.1%)
Housing conditions	-(-)	-(-)	-(-)	145(80.6%)	35(19.4%)
Transportation system	-(-)	-(-)	10(5.6%)	25(13.9%)	145(80.6%)
Drinking water	-(-)	65(36.1%)	35(19.4%)	60(33.3%)	20(11.1%)
Communication	-(-)	123(68.3%)	54(30.0%)	3(1.7%)	-(-)
Farm productivity	29(16.1%)	132(73.3%)	40(22.2%)	-(-)	-(-)
Processing of farm produce	49(27.2%)	39(21.7%)	78(43.3%)	14(7.8%)	-(-)
Preservation farm produce	36(20.0%)	23(12.8%)	67(37.2%)	40(22.2%)	14(7.8%)
Farm financing	12(6.7%)	25(13.9%)	50(27.8%)	90(50.0%)	3(1.7%)
Farm savings	10(5.5%)	2(1.1%)	20(11.1%)	140(77.8%)	8(4.4%)
Community security	89(49.4%)	69(38.3%)	22(12.2%)	-(-)	-(-)
Access to financial institutions	2(1.1%)	5(2.8%)	7(3.9%)	120(66.7%)	46(25.6%)
Membership of farming groups	8(4.4%)	9(5.0%)	19(10.6%)	134(74.4%)	10(5.5%)
Accumulation of household assets	10(5.5%)	24(13.3%)	34(18.9%)	98(54.4%)	14(7.8%)
Availability of farm labour	1(0.6%)	13(7.2%)	3(1.7%)	6(3.3%)	159(88.3%)
Availability and access to farm inputs	56(31.1%)	34(18.9%)	80(44.4%)	5(2.8%)	5(2.8%)

4: Perception of farmers and Extension agents on vegetable production in Koinadugu District

Table 4(a) contained the perception of farmers and extension agents on vegetable farming in Koinadugu. It revealed that farmers highly perceived that most vegetables need chemical treatments (94.1%); vegetable farming is very profitable (92.4%), difficult for transporting tender vegetable products (88.2%), insufficient markets in the district for selling vegetables (80.0%), vegetable farming is a tedious task (73.3%), and vegetable farming has made some farmers self-reliant (50.0%). This finding is in accordance with O'Brien *et al.* (2004) vegetable cultivation is generally part of a diversification strategy; (Mundlak *et al.*, 2004; Weinberger and Lumpkin, 2007). Thus, the resulting changes to farming systems and local markets may not become larger until the scale of the activity supports greater specialization. The table further showed that the farmers that labour is costly and unavailable within the district (70.0%), most vegetables perish while transporting them to markets and the vegetable producing farmers do not consume vegetables (51.2% each), and some vegetable

seeds cannot be stored for a long period (46.5%). However, the farmers highly disagreed that vegetable farming has created job opportunities in the communities (71.8%), reduced poverty within the community (65.3%), and improved household food security within certain homes (64.7%). This finding subscribed to Obuobie (2006).

From the table 4(b), extension agents confirmed (very true) that vegetable farmers need basic training in bookkeeping (90.0%), that the different farmer groups are ineffectively functional and there is prospect in the vegetable industry (80.0% each), vegetable farming creates wealth, and is highly done in the by the women (each scoring 70.0% each), most vegetables farming is lucrative (60.0%), requires some technical training (50.0%), vegetable farming were well established and produced some environmental hazards (40.0%, each). It was truly expressed that vegetable producing communities were very remote communities (40.0%). It was also fairly true that vegetable farming in Koinadugu District was well established (40.0%).

TABLE 4a: Perception of farmers on vegetable farming

Perception of vegetable farmers	Responses (N=170)			
	Highly agree	Agree	Highly Disagree	disagree
Insufficient markets in the district for selling vegetables	136(80.0%)	34(20.0%)	- (-)	-(-)
Vegetable farming is very profitable to the farmers	157(92.4%)	13(7.6%)	-(-)	-(-)
Vegetable farming has made farmers self-reliant	85(50.0%)	75(44.1%)	10(5.9%)	-(-)
Vegetable farming is very tedious in this district	132(73.3%)	52(30.6%)	-(-)	-(-)
Labour is costly and unavailable in the district	56(32.9%)	120(70.6%)	-(-)	4(2.4%)
It has created job opportunities in the community	2(1.2%)	46(27.1%)	122(71.8%)	10(5.9%)
It has reduced poverty within the community	10(5.9%)	25(14.7%)	111(65.3%)	34(20.0%)
It has improved food security within certain homes	2(1.2%)	32(18.8%)	110(64.7%)	36(21.2%)
Most vegetables perish while transporting them to markets	78(45.9%)	87(51.2%)	-(-)	5(2.9%)
The tender vegetable products are difficult to transport	150(88.2%)	15(8.8%)	-(-)	5(2.9%)
Most vegetables need chemical treatment	160(94.1%)	10(5.9%)	-(-)	-(-)
Some vegetable seeds cannot store for a long period	78(45.9%)	79(46.5%)	13(7.6%)	14(8.2%)
Farmers hardly consume vegetable products in the district	67(39.4%)	87(51.2%)	7(4.1%)	9(5.3%)

TABLE 4b: Perception of Extension Agents on vegetable farming

Perception of Extension Agents	Responses (N=10)			
	Very true	True	Fairly True	Not True
Vegetable farming is a lucrative job	6(60.0%)	3(30.0%)	1(10.0%)	-(-)
It requires some technical training	5(50.0%)	3(30.0%)	2(20.0%)	-(-)
If seriously treated, vegetables create wealth	7(70.0%)	3(30.0%)	-(-)	-(-)
It produces some environmental hazards	4(40.0%)	3(30.0%)	3(30.0%)	1(10.0%)
Vegetable farming in Koinadugu is well established	3(30.0%)	2(20.0%)	4(40.0%)	1(10.0%)
Vegetable farming is highly done by women in Koinadugu District	7(70.0%)	2(20.0%)	1(10.0%)	-(-)
Most vegetable farmers do not network with others farmers	4(40.0%)	3(30.0%)	2(20.0%)	1(10.0%)
The vegetable farmers need basic training in bookkeeping	9(90.0%)	1(10.0%)	-(-)	-(-)
The vegetable producing communities are very remote	3(30.0%)	4(40.0%)	1(10.0%)	2(20.0%)
The different farmer groups are ineffectively functional	8(80.0%)	1(10.0%)	1(10.0%)	-(-)
The farmers are not registering with the village saving schemes	5(50.0%)	3(30.0%)	2(20.0%)	-(-)
Some farmers are now adopting the improved technologies	4(40.0%)	2(20.0%)	3(30.0%)	1(10.0%)
There is great prospect in the vegetable farming industry here	8(80.0%)	2(20.0%)	-(-)	-(-)

CONCLUSION & RECOMMENDATIONS

From the discussion, it was concluded that because of the low education level and large family size, with the kind of land acquisition method, it is not possible to embark on large scale commercial vegetable production in Koinadugu District. The small farm sizes and low level of annual income realized from farms do not encourage adoption of improved technologies. Though the industry is lucrative, it seemed to be non-profitable to the farmers in the Koinadugu due to unavailability of a functional market, efficient and reliable means of transporting fresh leafy vegetables. Household food security too has not been achieved in this district because farmers have not acquired any nutrition education.

It is therefore recommended that the farmers be engage in some form adult functional education that can help them improve vegetable farming activities. The transportation system should be improved so that fresh vegetables products can easily reach the markets. This will in turn reduce the post harvest losses that farmers experience in the District. The farmers should organize themselves into active and efficient, effectively functioning groups that could help the marketing of the vegetable produce. This would surely improve their status and standard of living. Farmers should also be trained in basic farm management practices such as bookkeeping, food storage, preservation and processing. It would greatly reduce the post harvest losses experienced in the vegetable industry in the district.

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