Full Length Research Paper

Do marketing margins determine local leafy vegetables marketing in the Tamale Metropolis?

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In Northern Ghana, local leafy vegetables marketing has become an important trade in Ghana due to the increasing application of the health benefits from consuming local leafy vegetable. It was theorized that marketing margins (temporal arbitrage) may not encourage marketing agents to undertake and facilitate trade in the local leafy vegetable marketing chain. This hypothesis is investigated by using data collected from 80 traders randomly sampled from three markets in the Tamale Metropolis. The major marketing channels identified are from farmers to wholesalers through retailers to the final consumers. The sale of leafy vegetables directly from farmers to consumers and food vendors were also recorded. Despite incurring higher marketing cost, wholesalers had higher net returns (GH₵74 per 146 kg and GH₵73 per 10 kg per week in the dry and wet seasons respectively) than retailers (who had GH₵29 per 70 kg and GH₵9 per 55 kg per week respectively in the dry and wet seasons). Though the marketing of local leafy vegetables in the study area was inefficient, the benefit-cost ratio showed that, it is profitable. The authors recommend that, farmers and traders should form co-operatives to enable them bargain for prices, obtain loans and purchase storage facilities as groups. Also, fundamental problems of perishability among traders must be addressed.

Key words: Local leafy vegetables, wet season, dry season, marketing margins, net returns, marketing efficiency and Tamale Metropolis.

INTRODUCTION

The production and consumption of vegetables in Africa is an ancient activity. According to the Plant Resource and Tropical Africa (PROTA), about 397 out of the 6376 useful indigenous African plants that exist are vegetables (PROTA, 2004). Indigenous vegetables refer to plants whose leaves, fruits and/or roots are used as vegetables by rural and urban communities through custom, habit and tradition over a long time (Muhanji et al., 2011). Among these, those whose leaves are consumed as vegetables are called local leafy vegetables. Like other African countries, the production of local leafy vegetables is gradually becoming a common and commercial activity

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in Ghana especially in the northern part.

Northern Ghana is endowed with many valuable indigenous vegetables including local leafy vegetables. Common local leafy vegetables cultivated in the Tamale Metropolis are ayoyo (Chochorus or jute mallow), *Corchorus olitorius*; bra (Roselle), *Hibisctus sabbariffa*; suule (beans leaves), *Phaseolus vulgaris*, alefu (amaranth), *Amaranthus cruencus, among others*. These vegetables can be exploited for commercial purposes since they grow on marginal and less fertile lands and are well adapted to the tropical African climate than the exotic ones (Abukutsa-Onyago, 2007). Production of these local leafy vegetables contributes positively to Ghana's economy as a whole and help resolve the problem of poverty, hunger and malnutrition (Mohammed, 2011). According to Ajewole and Folayan (2008), production of local leafy vegetables generates higher profit and employment to farmers and the nation as a whole as compared to the exotic vegetables. The production, marketing and consumption of these vegetables also have potential social, economic and health benefits and as well serve as a source of livelihood and a good source of essential nutrients leading to food security (Irungu et al., 2011).

In the northern part of Ghana, both domestic and wild leafy vegetables are produced and consumed. About 40% of the vegetable farmers in the Tamale Metropolis farm all year round (Zibrilla and Salifu, 2004). Aju and Popoola (2010) mentioned in a survey carried out in Tamale that, there are about 15 local species of such local leafy vegetables. These local leafy vegetables are used in soup, stews, porridges and relish which accompany carbohydrate (Smith and Eyzaguirre, 2007).

Local leafy vegetables mainly contribute to the rural economy of Northern Ghana especially through income generation particularly to women who engage either in the cultivation, collection or sales. These vegetables are sources of essential vitamins such as vitamin A, B, and C and minerals such as iron and calcium, certain essential amino acids such as lysine (Imungi, 2002) as well as supplementary protein and calories which can eliminate deficiencies among children, pregnant women and the poor (Habwe et al., 2009). They are also used in the management of diseases such as human immuno-deficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS), diabetes, high blood pressure and other common ailments (Imungi, 2002).

Despite these importance and availability of local leafy (indigenous) vegetables, most people do not consume them as they should (Muhanji et al., 2011) as they prefer exotic vegetables. The reason may be that some people especially the high income earners consider these vegetables as food for the poor (Asian Vegetable Research and Development Centre, 2006). Also majority of these local vegetables are not consumed mainly by the youth of Africans due to their unfamiliar tastes or ignorance of how to prepare them (Orech et al., 2005;

Okeno et al, 2003; Community Technology Development Trust, 2000).

According to Faber et al. (2010), urbanization and inadequate scientific information on these vegetables have contributed to their low patronage of which knowledge associated with them has been labelled 'backward.' The distribution and marketing of indigenous vegetables especially the leafy ones is problematic due their easy perishability (Smith and Eyzaguirre, 2007). According to Aju et al. (2013), local leafy vegetables, like traditional food, have remained unrecognized and unappreciated and hence undervalued both by government and resource planners and policy makers. Generally, local leafy vegetable sub-sector is highly unorganized. Poor market access has resulted in seasonal glut with some farmers unable to sell their produce, hence leading to low high losses and spoilage of leafy vegetables among marketers. The poor road networks coupled with the scattered and small scale farms has led to increased marketing cost of the produce especially for wholesalers. These challenges affect the profit levels of marketers and make the sector not attractive to new entrants. This study seeks to determine the cost and return of marketing selected local leafy vegetables in the Tamale Metropolis by identifying marketing channels, determining marketing efficiencies and margins and the constraints to marketing local leafy vegetables.

METHODOLOGY

Sampling technique and data collection

The study was carried out in the Tamale Metropolis of Northern Ghana where four markets were purposively selected for the study. They are the Lamashegu market located in the southern part of the Metropolis, Aboabo market located in the western part of the Metropolis, the Central market located at the heart of the Metropolis and the Sakasaka market located along the main Bolgatanga road. All the markets are run on daily basis with a general market day locally referred to as 'Tamale Daah' which falls on every 6 days. These four markets were selected because they are the most popular in the Metropolis and have high proportion of marketers of local leafy vegetables.

Simple random sampling technique was used to select 80 respondents for the study of which 60 were marketers (wholesalers and retailers) and 20 were producers. The marketers were selected from the four markets in Tamale earlier mentioned (15 respondents from each market). Each market has both wholesalers and retailers. Dividing the markets into these categories was based on the marketers' trading characteristics. For instance, retailers sell local leafy vegetables directly to consumers in smaller quantities while suppliers in wholesale markets sell in bulk (wholesale basis) to retailers. Since wholesalers sell the produce to retailers who need more time to re-sell them, they normally come to the market very early in the morning to trade. They also trade within a very short period of time but retailers trade almost the whole day. Five wholesalers and ten retailers were interviewed from each of the four markets since retailers are more in number than wholesalers.

Primary data (made of both quantitative and qualitative data) generated from these respondents were used for the study and this

includes volume of local leafy vegetables marketed by producers, wholesalers and retailers in the wet and dry seasons, prices of vegetable, cost, constraints of marketing, and socio-economic characteristics of marketers in the study area. Qualitative data were obtained through detailed interviews and discussions with respondents while quantitative data were generated through the administration of a comprehensive semi-structured questionnaire to the sampled respondents. The data collection period was from March to April, 2014.

Data analysis

The quantitative and qualitative data obtained from respondents were presented using descriptive statistics such as averages, percentages and frequencies while marketing margin analysis was used to determine the profitability of local leafy vegetable production in the Tamale Metropolis. Marketing margin is the difference in price between the first seller and the final buyer (Adegeye and Dittoh, 1985). The methods used by Isibor and Ugwumba, (2014), Osondu et al., (2014), Bashir and Yakaka (2013), Maimouna and Jing (2013), Adeniji et al. (2012), Kassim (2012), Ojogho et al. (2012), Carambas (2005), Adegeye and Dittoh (1985) and Olukosi and Isitor (1990) in determining marketing margin in their various researches were adopted for this study. To estimate the marketing margins, these authors deducted the purchase prices from the selling prices. As a result, both the selling prices of wholesalers and retailers were crucial in calculating the market margins. Following Osondu et al. (2014), the purchase and selling prices were obtained by finding the average of the prices given by the respondents. The equation for estimating market margins is given as:

$$\text{Marketing margin (Gross)} = \text{Total revenue} - \text{Purchasing price of vegetables} \qquad 1$$

The total revenue was obtained by multiplying selling price by the quantity of vegetables sold. Marketing efficiency is the ratio of net marketing returns to total marketing costs either expressed as a fraction or percentage. Ozougwu (2002) indicated that marketing efficiency ratio ranges from zero to infinity. Marketing efficiency less than one (100%) shows inefficiency in marketing of local leafy vegetables. In this case, cost incurred in marketing is greater than the amount received from the marketing of the produce as returns. On the other hand, a marketing efficiency ratio that is greater than one (100%) indicates a very high efficiency in marketing the produce. With this scenario, net returns obtained from marketing of the produce are greater than the marketing cost incurred. This means that there is excess profit for marketers. In between these two points is a ratio of exactly one (that is, 100%) which demonstrates a break-even point (perfectly efficient market). This is because the marketing cost of marketing the produce is equal to the net returns obtained (Scarborough and Kydd, 1992).The marketing efficiency was computed by following Shepherd Futrel Model given as:

$$\text{Marketing efficiency} = \frac{\text{Net marketing returns}}{\text{Total marketing cost}} \qquad 2$$

Other studies such as Osondu et al. (2014) and Olukosi and Isitor (1990) estimated marketing efficiency by dividing output of marketing by input of marketing and multiplied by 100 where output of marketing was proxied as net returns from marketing and input of marketing was proxied as cost of marketing. Marketing cost comprise of all costs associated with moving a commodity (local leafy vegetable) from the point of purchase to the final consumer such as cost of transportation, storage, labour, among others

(Aidoo et al., 2012). Net returns is given in equation [3].

$$\text{Net returns} = \text{Total revenue} - \text{Total marketing cost} \qquad 3$$

From equation [4], the benefit cost ratio (BCR) is calculated by dividing the total revenue by total marketing cost. A BCR greater than one is an indication that, marketing of local leafy vegetables is profitable in the metropolis while a ratio of less than one indicates that marketing of the commodity is not profitable. Also, a BCR value of exactly one means indicates a break-even.

$$\text{Benefit cost ratio} = \frac{\text{Total revenue}}{\text{Total marketing cost}} \qquad 4$$

RESULTS AND DISCUSSIONS

Socio-demographic characteristics of the producers and marketers

As reported in Table 1, all the 60 marketers interviewed were females, while out of the 20 producers, 75% were males. This is in line with the finding of Mohammed (2011), who asserted that, more women are involved in vegetable marketing, because they perceive marketing as less stressful and easier than arable crop farming. Osondu et al. (2014) also found that the marketing of vegetables is dominated by females while Thompson and Agbugba (2013) found that agricultural marketing in Abia State, Nigeria is dominated by women. Table 1 also reveals that majority of the respondents (38%) fell within the age bracket 31 to 40 years, closely followed by those within 41 to 50 years (30%). About 89% of the respondents fell within the economically active population bracket (20 to 50 years). This result implies that the marketers of local leafy vegetables were young and energetic. As a result, if they are provided with the necessary supports and motivation, they can be more efficient and improve upon the marketing of local leafy vegetables in the study area. Comparably, Kainga, (2013) indicated that more than half (70%) of vegetable marketers were within the age of 21 to 40 years.

In terms of educational status of respondents, it is shown in Table 1 that about 66% of the respondents had no formal education whilst 34% had at least primary education. This indicates that, there is high illiteracy among marketers and producers of local leafy vegetables in the Tamale Metropolis. This has a disadvantage on the production and marketing of the produce in the study area since literacy positively influences the activities and profit level of these actors. According to the FAO (2006), high literacy among marketers is an added advantage which can lead to higher business acumen in terms of profit level. This result is in contrary with Kainga (2013), who found that about 62% of vegetable traders had secondary education.

More than half (73%) of the respondents have married. The respondents had a household size in the ranges of 5

**Table 1.** Socio-demographic characteristics of the producers and marketers.

Socio demographic characteristics	Frequency	Percentage (%)
Sex of marketers		
Males	0	0
Females	60	100
Sex of producers		
Males	15	75
Females	5	15
Age		
20 – 30	17	21
31 – 40	30	38
41 – 50	24	30
51 – 60	9	11
Educational level		
Educated	27	34
Non educated	53	66
Marital status		
Married	59	73
Single	11	14
Widowed	4	5
Divorced	6	8
Household size		
> 5	23	29
5 – 10	48	60
< 10	9	11
Marketers marketing experience (Years)		
> 5	3	5
5 – 10	13	21
11 – 15	6	10
16 – 20	17	28
< 20	21	35
Producers marketing experience (Years)		
> 5	10	50
5 – 10	5	25
11 – 15	2	10
16 – 20	0	0
< 20	3	15

Source: Field Data: May, 2014.

to 10 people which indicate a fairly large family size (Table 1). Household size plays an important role in family labour supply which is a major characteristic of small scale agriculture in Ghana. The large households could be a source of cheap and affordable labour for vegetable production and marketing.

With respect to experience in the production and marketing of local leafy vegetables, Table 1 indicates that a greater percentage (35%) of the traders have engaged in marketing for over 20 years whilst half (50%) of the
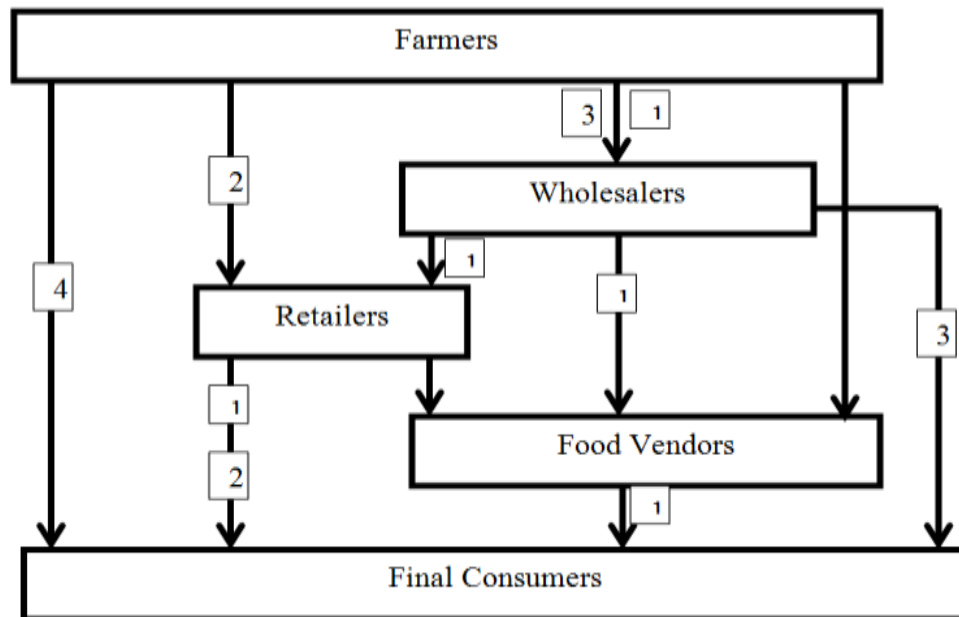
Figure 1. The marketing channel of local leafy vegetables in the study area (Source: Field data: May, 2014).

producers have been producing for less than 5 years. This implies that, majority of the respondents have gained enough experience in the business over the years which will contribute to the success and sustainability of their business. The years of marketing experience in the study area is higher compared to the findings of Onyemauwa (2010). Osondu and Ijioma (2014) pointed out that experience gained over years could increase efficiency and net returns more than level of education.

Economic and marketing characteristics of local leafy vegetable traders

About 98% of the traders had never received any form of training in vegetable handling and marketing. This suggests that, their level of knowledge in the marketing of the produce is limited. Trading of local leafy vegetables in the study area was found to be a major occupation to about 80% of the respondents. This implies that, unlike some traders who sell this produce during the peak of its harvest, these traders sell it both in the lean and major season of its production in the study area. This further indicates that, they trade in local leafy vegetables throughout the year and it serves as their major source of livelihood (income generation).

91% of the traders indicated that, they obtain capital through personal savings while the remaining is through banks and co-operatives. This has led to lower level of finance for the marketing and production of the produce in the study area which consequently affect the level of

production and quantity traders can purchase for sale. About 82% transport their local leafy vegetables to the market through motor vehicles. This is because; this form of transport is relatively cheaper and accessible in the study area. About 82% of the traders sell the produce on the local market by displaying them in baskets, rubber buckets or tying them into bunches while few (11%) sell the produce in households within the metropolis. The remaining 7% of the traders transport them to Southern Ghana for sale. The lower quantities conveyed to the southern part of the country for sale is due to lower demand for the produce in the area, high cost of transportation, poor road network, and high perishability of the produce.

Marketing channels for local leafy vegetables in the Tamale metropolis

Marketing channel for local leafy vegetables refers to the chain of participants involved in the movement of the produce from the producer to the final consumer. Four major marketing channels were identified in the study area for the distribution of the commodity (Figure 1). These channels of distribution entail series of players (individuals or firms) who undertake the activities involved in the flow of local leafy vegetables from the producer to the ultimate consumer or end user. These participants include the services of assemblers, transporters, wholesalers, retailers and others involved in moving the commodity to its final destination. The nature of the

channel (whether simple/short or complex/long) greatly affect the price of the commodity. The length and nature of the marketing channel depends on the type of commodity, traders, level of processing and storage as well as closeness of producers to consumers.

It can be observed from Figure 1 that the major participants in the channel were producers, wholesalers and retailers. In specific terms, the Figure 1 can be broken down into the following 4 marketing channels as indicated with identical numbers on the arrows:

1st channel: This channel has been depicted in the Figure 1 as 1. The farmers sell the local leafy vegetables to wholesalers who aggregate the produce from a scattered geographical area. These wholesalers sell to retailers in bulk who also sell in small quantities to the final consumers directly. The wholesalers also sell to food vendors who prepare food and sell to the final consumers.

2nd channel: It has been illustrated on the figure 1 with 2 and does not involve wholesalers. The farmers sell to retailers directly who then deliver to the final consumers. The retailers who buy vegetables directly from the farmers pay lower prices than those who buy from the wholesalers but may be subjected to high transportation cost since they have to convey the produce from the producing market to the consumer markets.

3rd channel: It has been represented with 3 and does not involve retailers. The wholesalers purchase local leafy vegetables from farmers and directly sell to the final consumers.

4th channel: This is depicted with 4 and involves neither wholesalers nor retailers. It is regarded as the shortest. Occasionally farmers sell the produce directly to the final consumers. Though producers may not prefer this channel since they sell at low prices, consumers may prefer it since they pay lower prices than to buy from wholesalers or retailers. Farmers at times sell to food vendors who prepare food and sell to final consumers.

Reasons cited by vegetable marketing participants for the choice of a channel

1. Almost all the farmers interviewed (about 95%) revealed that, they prefer to sell their produce at the farm gate to reduce the transportation cost.
2. The farmers in the study area also mainly sell to wholesalers since wholesalers purchase the produce in bulk.
3. Majority of the wholesalers interviewed (about 97%) revealed that, they buy from farm gates due to its availability and low prices. However, they incur huge cost in transporting to the market for sale.
4. Wholesalers also revealed that, they sell on the major markets due to the high demand and high prices.
5. About 98% of the retailers interviewed in the study area also prefer to purchase local leafy vegetables at the market centre from wholesalers in order to reduce cost of transportation.
6. Retailers again prefer to sell at the market place due to ready market and high prices.

Determining marketing efficiencies and margins

The marketing efficiencies and margins have been presented in Tables 2, 3 and 4 which showed that, the marketing of local leafy vegetables in the metropolis is profitable.

Pricing of local leafy vegetables and quantities sold at the various marketing channels

About 90% of the respondents revealed that, farmers set their own prices for the leafy vegetables. The remaining 10% is shared among traders and consumers. However, cost of production, prevailing market price and buyers' ability to negotiate are the main factors farmers consider before arriving at an agreed price. The local leafy vegetables are sold using traditional measuring scales (bowl, basket, rubber buckets, or tied in bunches). The study specifically used rubber bucket as a measuring scale which was converted into kilograms (kg) in order to obtain standard measurement. On the average, one rubber bucket = 10 kg.

As reported in Table 2, on the average, farmers sell 34 kg of leafy vegetable weekly in the dry season and 44 kg in the wet season. Conversely, wholesalers sell 731 kg weekly in the dry season and 509 kg in the wet season while retailers also sell 427 and 328 kg respectively in the dry and wet seasons. This indicates that, farmers produce higher quantities of leafy vegetables in the wet season than in the dry season whereas both wholesalers and retailers rather sell lower quantities in wet season due to the excess supply over demand during the wet season. During the wet season, traders (wholesalers and retailers) are not able to buy and resell all the produce farmers harvest due to the large quantities produced. This glut leads to spoilage of large quantities of leafy vegetables in the wet season since the produce is highly perishable. The lower quantity produced during the dry season is due to the cultivation of the produce under irrigation system during this period of the year which is not available to most of the farmers in the study area. Additionally, the table reveals that, wholesalers sell larger quantities than retailers in either seasons since the former purchase in large quantities from a number of farmers from whom retailers buy.

According to the study, selling price of the produce is higher in the dry season than the wet season for all the

Table 2. Prices for local leafy vegetable at various stages of the value chain.

Narration	Average price in the marketing channel (GH₵)		
	Farm gate price	Wholesale price	Retail price
Dry season			
Average weight/quantity sold per day	3.43 buckets (34kg)	14.62 buckets (146.2 kg)	7.12 buckets (70kg)
Selling price per bucket (10kg)	GH₵5.53	GH₵7.37	GH₵9.04
Number of times per week	1	5 times	6 times
Average weight/quantity sold per week	1 X 3.43 = 3.43 buckets (34kg)	5X14.62=73.1 buckets (731kg)	6X7.12= 42.72 buckets (427.2kg)
Average revenue per week	3.43X5.53=*GH₵19*	7.37X73.1=*GH₵539*	9.04X42.72= *GH₵386*
Wet season			
Average weight/quantity sold per day	4.36 buckets (43.6kg)	10.17 buckets (101.7kg)	5.46 buckets (54.6kg)
Selling price per bucket (10kg)	GH₵4.23	GH₵6.94	GH₵8.74
Number of times per week	1	5 times	6 times
Average weight/quantity sold per week	1X4.36 = 4.36 buckets (43.6kg)	5X10.17=50.85 buckets (508.5kg)	6X5.46=32.76 buckets (327.6kg)
Average revenue per week	4.23X4.36= *GH₵18*	6.94X50.85= *GH₵353*	8.74X32.76 = *GH₵286*

Source: Field Data: May, 2014. Note: At the study US$ 1= ₵2.81.

three actors due to oversupply in the wet season. Also, retailers had the highest selling price followed by wholesalers, while producers had the lowest for both seasons. For example, on the average, farm gate price per 10 kg was GH₵6 and GH₵4 in the dry and wet seasons respectively while wholesale and retail prices were respectively GH₵7 and GH₵9 in both seasons. This is due to the higher marketing cost incurred by wholesalers and retailers as reported in Table 3.

On the average, retailers buy and resell more frequently (6 times) within a week than whole-salers (5 times). Farmers on the other hand, sell the produce once a week since the number of times a farmer can harvest leafy vegetables within a given period of time is limited. This has contributed to the low quantity sold weekly by the producers compared to the traders.

Comparing the prices and quantities sold weekly discussed earlier, it is obvious from Table 2 that, traders had far higher revenues than producers while wholesalers also had higher revenues than retailers in both seasons. Specifically, farmers' weekly revenue from the sale of local leafy vegetables were GH₵19 and GH₵18 respectively for dry and wet seasons, that of wholesalers were GH₵539 and GH₵353 respec-tively for dry and wet season while retailers had GH₵386 and GH₵286 respectively for wet and dry seasons. Furthermore, revenues were higher in the dry season than the wet season due to the higher selling prices in the dry season as well as the higher quantities sold by wholesalers and retailers in the dry season.

Marketing cost of local leafy vegetables per week

The marketing costs of local leafy vegetables

incurred by farmers, wholesalers and retailers are largely influenced by the quantities they sell per week as depicted in Table 2. From the field survey, the cost components of marketing local leafy vegetables include transportation, storage, tax, and spoilage. Transportation cost basically includes amount of money paid by marketers (wholesalers and retailers) to vehicle owners for conveying the produce from the purchase point to the selling points. Since the commodity is not heavy and is easy to load, transportation cost incorporates loading and offloading cost (money paid to labourers who load the commodity into vehicles and offload them at purchase and selling points respectively). Storage cost is the amount of money spent by the actors in keeping the produce safe and fresh mainly for higher prices. Tax in usually paid by wholesalers and retailers to government officials as they sell the produce on the market. Spoilage cost refers to the estimate

Table 3. Marketing cost of local leafy vegetables per week.

Variable	Average cost in the marketing channel (GH₵) per week		
	Farmers	**Wholesalers**	**Retailers**
Dry season			
Transportation	1.3×1 = 1.3	7.02×5 = 35.1	1.5×6 = 9
Storage	–	1×5 = 5	1×6 = 6
Tax	0.2×1 = 0.2	0.43×5 = 2.15	0.43×6 = 2.58
Spoilage	2.57×1 = 2.57	3.65×5 = 18.25	4.21×6 = 25.26
Total cost	*4.07*	*60.5*	*42.84*
Purchasing price	–	5.53×73.1= 404.24	7.37×42.72 = 314.85
Total marketing cost	4	60.5+404.24 = 465	42.84+314.85 = 358
Wet season			
Transportation	1.73×1 = 1.73	7.50×5 = 37.5	1.73×6 = 10.38
Storage	–	1.03×5 = 5.15	1.60×6 = 9.6
Tax	0.2×1 = 0.2	0.43×5 = 2.15	0.43×6 = 2.58
Spoilage	2.98×1 = 2.98	4.11×5 = 20.55	4.53×6 = 27.18
Total cost	4.91	65.35	49.74
Purchasing price	–	4.23×50.85 = 215.1	6.94×32.76 = 227.35
Total marketing cost	5	65.35+215.1 = 280	49.74+227.35 = 277

Source: Field data: May, 2014. Note: At the study US$ 1= ₵2.81.

cost incurred due to deterioration of the produce during handling. This consists of the quantity of produce that go to waste during loading, transportation, offloading, and low demand.

The field survey showed that, producers' average marketing cost per week were GH₵4 and GH₵5 respectively for dry and wet seasons, those of wholesalers were GH₵465 and GH₵280 for dry and wet seasons respectively while those of retailers were GH₵358 and GH₵277 respectively for dry and wet seasons. This shows that, wholesalers and retailers incurred far higher marketing cost than producers in both seasons. It can be observed from Table 3 that, both wholesalers and retailers incurred higher marketing cost in the dry season than the wet season due to the huge difference in the purchasing price between these two seasons. The difference in wholesale purchasing price between the two seasons is GH₵189 while that of retailers is GH₵88 all in favour of the dry season. The higher marketing cost in the dry season is also due to the larger quantities these traders sell in the dry season. Apart from these, differences in the other cost components between the two seasons were not much for both actors.

Additionally, wholesalers incurred higher marketing cost than retailers in both seasons due to wholesalers' high cost of transportation. Wholesalers aggregate the produce from different farms/farmers before transporting them to the market leading to higher wholesale cost. Retailers buy at this point for resell usually on the same or a nearby market/destination. While transportation forms the greatest proportion of wholesalers marketing

cost, that of retailers was spoilage cost for both seasons. Table 3 further reveals that, both transportation and spoilage costs were higher in the wet season than the dry season. Higher transportation cost was as a result of the muddy feeder roads during the wet season leading to extra charges by vehicle owners and the long distance covered by majority of the wholesalers to purchase local leafy vegetables. These account for the high transportation cost incurred by wholesalers in conveying the produce from the production (purchase) point to the retail (selling) point. On the other hand, high spoilage cost was due to excess supply over demand during the wet season which leads to surpluses. This coupled with the poor storage facilities and high perishability of the commodity leads to huge spoilage of the excess produce. Comparably, (Osondu et al., 2014) found that trans-portation cost formed the highest proportion of marketing cost for both wholesalers and retailers of vegetables.

Both wholesalers and retailers incurred higher storage and spoilage costs in the wet season than the dry season also due to the excess supply over demand in the wet season. Farmers on the other hand, incurred very low transportation and spoilage costs in both seasons while they do not incur any storage cost at all in both seasons. The details of marketing cost have been reported in Table 3.

Marketing margins and returns of local leafy vegetables per week

These were computed from the prices and marketing cost

Table 4. Marketing margins and returns of local leafy vegetables per week (GH₵).

Narration	Wholesalers	Retailers
Dry season		
Gross marketing margin	539-404 = 135	386-315 = 71
Net returns	539-465 = *74*	386-358 = *28*
Marketing efficiency	74 / 465 = 0.16	29 / 358 = 0.08
Benefit Cost Ratio	539 / 465 = 1.16	386 / 358 = 1.08
Wet season		
Gross marketing margin	353-215 = 138	286-227 = 59
Net returns	353-280 = *73*	286-277 = *9*
Marketing efficiency	73 / 280 = 0.26	9 / 277 = 0.03
Benefit Cost Ratio	353 / 280 = 1.26	286 / 277 = 1.03

Source: Field data: May, 2014, Note: At the study US\$ 1= ₵2.81**.**

obtained in Tables 2 and 3. The gross marketing margin estimations in Table 4 reveal that while wholesalers had lower margins in the dry season (GH₵135) than the wet season (GH₵138), the reverse is true for retailers (who had GH₵71 and GH₵59 respectively in the dry and wet seasons). This may be due to the large difference in wholesale purchasing price between the two seasons (GH₵189) and the lower difference in retailer purchasing price (GH₵8) between the two seasons though they are all in favour of the dry season since estimation of marketing margins is based on purchasing price of the commodity. Also, in both seasons, wholesalers had higher gross marketing margins than retailers due to wholesalers' higher revenue per week. Comparably, Thompson and Agbugba, (2013) also reported that wholesalers of selected vegetables have high marketing margins.

Despite incurring higher marketing cost, wholesalers had higher net returns (GH₵74 and GH₵73 per week in the dry and wet seasons respectively) than retailers (who had GH₵28 and GH₵9 per week in the dry and wet seasons respectively). This is due to the higher quantities sold by wholesalers in both seasons. Also, both wholesalers and retailers had higher net returns in the dry season than the wet season. This is because; the market is always glutted with high quantities of the produce in the wet season leading to lower quantities sold weekly. Besides, prices are lower during the wet season.

From Table 3, wholesalers had marketing efficiency values of 0.16 and 0.26 in the dry and wet seasons respectively whilst retailers had 0.08 and 0.03 in the dry and wet seasons respectively. Since all these efficiency levels are less than 1, it can be deduced that, the marketing of local leafy vegetables in the study area is inefficient for both seasons (for both actors). This could be attributed to the higher marketing cost incurred by both traders relative to the net returns. Additionally, it can be observed from Table 4 that, while wholesalers were

more efficient in the wet season, retailers on the other hand, were more efficient in the dry season. Wholesalers were less efficient in the dry season due to the higher purchasing price that contributes to higher marketing cost (Table 3). Comparing efficiency levels for the two traders, it can be observed that, wholesalers had higher marketing efficiency values in both seasons than retailers. This may be due to the higher quantities of local leafy vegetables sold by wholesalers accounting for higher net returns despite incurring higher marketing cost than retailers. Also, it may be that wholesalers have a better approach for reduction in marketing cost relative to the quantities marketed.

Similarly, the benefit-cost ratio (BCR) computed in Table 4 indicates that, wholesalers had higher BCR in the wet season (1.26) than the dry season (1.16) whilst the reverse is true for retailers (who had 1.08 and 1.03 in the dry and wet seasons respectively). It can thus be deduced that, the marketing of local leafy vegetables in the study area is profitable since the BCRs obtained by both traders in both seasons are greater than 1. Similar to the marketing efficiency, it can be observed from Table 4 that, while wholesalers had higher BCR in the wet season, retailers in contrast, had higher BCR in the dry season. Also, comparing the BCRs for these two traders indicates that, wholesalers had higher ratios than retailers in both seasons. The findings are in agreement with Weinberger and Lumpkin (2007) who pointed out that, vegetable production has the potential to be highly profitable and generate income.

Constraints in marketing local leafy vegetables in the Tamale Metropolis

77% pointed out that, poor storage facilities is a major constraint that militate against the marketing of the produce in the study area (Table 5). Poor storage facilities

Table 5. Constraints in marketing local leafy vegetables.

Marketing constraint	Frequency	Percentage (%)
Poor storage	46	77
Inadequate finance	58	97
High perishability	42	70
Unstable prices	1	2
Low price	11	18
Scarcity during dry season	1	2
Bulky nature	2	3
Low demand	8	13

Source: Field data: May, 2014.

compel most of the traders to buy small quantities that can be sold within a day or few days. Since the produce is highly perishable, this leads to untimely spoiling (wilting) especially at the retailer end. Lack of shade to display the produce on the market for sale makes it wilt easily leading to lower prices and sales. In line with this, Chagomoka et al. (2013) indicated that, high perishability of indigenous vegetables is a principal challenge in the marketing and distribution of the produce.

Almost all the respondents (97%) mentioned inadequate finance as a major constraint to local leafy vegetable marketing. Inadequate finance prevents most of the producers from producing on large scale as well as traders from having enough finance to purchase the produce on large scale for sale. Comparing to the production and marketing cost, some of the respondents asserted that, the produce attract lower price leading to reduced returns. Others pointed out that, the produce has lower level of demand leading to lower sales. The findings agree with those of Lenné and Ward (2010) and Lyatuu et al. (2009) who identified a number of bottlenecks that impede the growth of the traditional vegetable sector in Eastern and Southern Africa. It is also in line with Onyemauwa (2010) who found limited supply, paucity of capital and spoilage as major problems.

CONCLUSION AND RECOMMENDATIONS

From the study findings, it can be concluded that, the major marketing channels identified were from farmers to wholesalers through retailers to the final consumers. The sale of local leafy vegetables directly from farmers to consumers and food vendors were also recorded. Though the marketing of local leafy vegetables in the study area was found to be inefficient, the benefit-cost ratio showed that, it was profitable. Though wholesalers had higher marketing cost, they recorded higher net returns than retailers in both seasons. Both traders had higher net returns in the dry season than the wet season. The major marketing constraints were found to be inadequate finance, poor storage facilities and high

perishability.

The study recommends that, non-governmental organisations (NGOs) and microfinance institutions should provide credit to farmers and traders. They should also be encouraged to form co-operatives to enable them bargain for prices, obtain loans and purchase storage facilities as a group. Putting in place good storage facilities will help maintain the availability of local leafy vegetables and enhance price stability in the study area. Extension officers are also required to educate farmers on improved storage practices to increase shelf life of produce.

RESEARCH LIMITATION

The main research limitation was the difficulty in getting standard units of measurement for the sale of local leafy vegetables since they are usually displayed on tables, kept in baskets for aeration or at times kept in a rubber or pan filled with water to keep them fresh and attractive. The actual quantity tied or loaded in sacks are very different among traders making it difficult to obtain consistent/uniform scale of measurement for the produce.

Conflict of Interests

The authors have not declared any conflict of interests.

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