Assessing the performance of the grain legume marketing system in northern Ghana

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ABSTRACT
The main objective of this study was to examine costs, returns and efficiency levels associated with the activities of key players in the grain legume marketing chain in northern Ghana. A total of 140 market participants comprising 93 retailers, 39 wholesalers and eight (8) assemblers/aggregators were selected from major and satellite markets in the three Northern Regions of Ghana through a multi-stage sampling approach. Data for the study was obtained through personal interviews with the use of structured questionnaire. In addition to descriptive statistics, gross marketing margin, net margin and marketing efficiency analyses were performed using field data. The study identified a long chain of greater than four different channels/pathways through which grain legumes moved from farm gate to final consumers. Marketing of grain legumes in the study Districts was found to be profitable, as only 18% of gross marketing margin was spent as marketing costs, with the remaining amount retained as net marketing margin. The study further showed that net marketing margins were not equitably distributed among different trading partners along the marketing chain. Generally, net marketing margin for assemblers/aggregators was far higher than that received by wholesalers and retailers. Marketing activities by all traders in the grain legume value chain were performed efficiently, with efficiency ratios far in excess of 100%. Trading in groundnut was far more profitable than trading in cowpea and soyabean. The main constraints identified by grain legume traders were limited access to credit, high cost of transportation, poor road network and inadequate storage facilities.

*Keywords***:** *Grain legumes, Marketing margins, Marketing efficiency, Ghana*

1.   INTRODUCTION
Background
Food marketing is a very important but rather neglected aspect of agricultural development. In a developing country like Ghana, more emphasis is usually placed on policies to increase food production with little or no emphasis on how to efficiently distribute the food produced in a manner that will drive productivity at the farm level (Aidoo et al, 2012). Marketing of agricultural produce in most African countries has not yet achieved the necessary degree of competitiveness and transparency to ensure fair market prices for small-scale farmers, processors and consumers

(Peterson, 2004). Food marketing by farmers and traders, mostly in the immediate post-harvest period, usually involves a lot of costs and in Ghana these costs are so high that lowering the costs through efficient marketing system may be as important as increasing agricultural production. Market inefficiencies cause a net drag on the system leading to high prices and lack of growth. Now, there is increasing recognition among development agencies and governments that, if agricultural produce markets were efficient, the bargaining position of farmers with intermediate traders would be strengthened, farm incomes would increase and less produce would go to waste. In addition, more efficient markets would help to lower transaction costs, increase the volume of trade, lower food prices and offer greater food security, leading to greater benefits for the economy as a whole (FAO, 2003).

Marketing margin is usually used to refer to the difference between consumer and producer prices of an equivalent quantity and quality of a commodity (Tomek and Robinson, 1990). It may also describe price differences at different points along the marketing chain. It is the price charged for providing a mix of marketing services such as assembling, transportation, handling, packaging and storage - plus profit. Under competitive market conditions the margin will be the outcome of demand and supply of marketing services and they would equal the minimum cost of service provision plus 'normal profit'. Here, normal profit is the least payment the market player is willing to accept for performing the entrepreneurial functions of risk taking and management (Smith et al., 1999). However, under oligopsonistic conditions, collusive pricing behavior that weakens the position of the farmer also exists. The causal relationship means that equity issues can be resolved through improvement in market structures.

Marketing margins are a major determinant of efficiency in resource allocation in production, distribution and consumption (Lutz and Tilburg, 1997). It helps in the assessment of the efficiency of price formation and transmission through the distribution system. Some have argued that lowering the marketing margin is the most efficient and sustainable short-term means of solving the dilemma between producers' desire for higher prices and consumers' for lower food prices. However, unless the market is competitive, lowering marketing cost might not benefit producers or consumers. Similarly, unless consumers' preferences are responded to, lowering gross margin will not benefit them. Therefore, improving production or operational efficiency without improving exchange efficiency prevents the potential benefits from being enjoyed by producers and consumers (Lutz and Tilburg, 1997). It is the middlemen (traders and processors) linking producers to consumers who will maximize their returns.

Village and urban markets constitute important segment of the Ghanaian food industry. Marketing charges link prices in these markets and consumers are the prime movers of the whole food marketing process. Farmers are naturally inclined to think that any current marketing system is costly in relation to the services provided and that traders (middlemen) absorb a greater proportion of final prices paid by consumers. Though this assertion could be true, farmers have no choice or are quite reluctant to take the risk involved in marketing to increase their participation in the sharing of the marketing margin along the chain.

Objectives of the study

The main objectives addressed in the study were:

- To identify different marketing channels through which grain legumes move from the farm gate to the final consumer,
- To determine the marketing costs incurred and returns associated with grain legume marketing in northern Ghana,
- To assess the level of marketing efficiency at each stage of the grain legume marketing chain, and
- To identify the critical constraints facing traders of grain legumes in northern Ghana.

2. METHODOLOGY

Sampling and Data Collection

A total of 140 market participants comprising 93 retailers (66%), 39 wholesalers (28%) and eight (8) assemblers/aggregators were selected from major and satellite markets in the three Northern Regions of Ghana through a multi-stage sampling approach. Whereas markets were selected through a simple random sampling approach, respondents were stratified based on trader type and type of commodity handled. Some of the markets selected include Abaobo market-Tamale and Karaga market in the Northern Region, Bolga, Bawku and Navrongo Markets in Upper East Region; and Wa and Nadowli markets in the Upper West Region of Ghana. A total of 35 traders were selected from Northern Region, 70 from Upper East Region and the remaining 35 were selected from Upper West Region. Traders of specific grain legumes in the selected markets were selected through convenience/accidental sampling whereby traders who were available in the market and were willing to participate in the interviews were selected. Data for the study was obtained through personal interviews with the use of standardized structured questionnaire. The interviews were conducted in local languages by trained Research Assistants with supervision from experienced Researchers.

Analytical procedure

The data collected was analyzed using descriptive and inferential statistics. The descriptive analysis comprised the use of frequency distribution tables, percentages, arithmetic mean and standard deviation. Marketing costs and returns were obtained through gross margin analysis. The expression below was used to estimate Gross Margin for the various grain legume traders along the value chain.

Gross Margin = Total Revenue – Total Variable Cost

According to Kohls (1985), marketing margin equals the difference between what the consumer pays and the farm gate price per unit of the food produce. Based on this formula and on the assumption that wholesalers buy directly from farmers while retailers buy directly from wholesalers, it then follows that wholesalers' margin equals wholesalers' selling price per unit minus farmers' selling price per unit. Also, retailers' margin equals retailers' selling price per unit minus wholesalers' selling price per unit. The net margin accruing to the wholesaler or the retailer is the difference between the gross marketing margin and the marketing costs. Marketing cost is the sum of transport cost, storage cost, labour cost and other costs associated with moving the commodity from the point of purchase to the customer or final consumer.

Marketing efficiency was calculated using the formula proposed by Olukosi and Isitor (1990) which is specified as:

Marketing efficiency = [Value added by marketing activities /Marketing costs] x 100%   or

Marketing efficiency = [Net Marketing Margin /Marketing costs] x 100%

Constraints faced by traders were analyzed using a five-point likert scale defined from most severe or very critical to least severe or critical.

3. RESULTS/FINDINGS
Characteristics of grain legume traders
Table 1 summarizes the characteristics of respondents. Majority (98%) of respondents were females who were married and of northern Ghana extraction. About 66% of

traders interviewed were retailers. From the table, 47% of traders were dealing with cowpea as the main commodity whereas 31% were trading in soyabean. Less than 30% of the traders interviewed belonged to trader associations in their respective markets. Majority of respondents did not appear to have food security challenges at the household level as only 36% reported of their inability to feed their households throughout the year.

Table 1. Characteristics of grain legume traders in northern Ghana

Variable	Frequency (N=140)	Percent
Trader Type:		
Wholesaler	39	27.9
Retailer	93	66.4
Assembler/Aggregator	8	5.7
Main Grain Legume sold:		
Soyabean	43	30.7
Cowpea	66	47.1
Ground nut	27	19.3
Bambara groundnut	4	2.9
Gender:		
Female	137	97.9
Male	3	2.1
Marital Status:		
Married	127	90.7
Single	13	9.3
Religion:		
Christianity	43	30.7
Islam	89	63.6
Traditionalist	8	5.7
Ethnic Affiliation:		
Akan	1	0.7
Northerner	139	99.3
Membership of Trader Association:		
Yes	36	25.7
No	104	74.3
Ability to feed household throughout the year:		
Yes	89	63.6
No	51	36.4

Source: Field survey, 2013.

Table 2 shows that a typical grain legume trader was about 42 years old with less than two years of formal education. Average household size was found to be eight (8) people out of which three (3) were under 18 years. Annual income of households of

traders in grain legumes was estimated at GHC1,974.53 (US$1,012.58) which translates to GHC246.82 (US$126.57) per capita per annum. The estimated number of wholesalers and retailers in the markets surveyed was thirty (30) on average. The

average distance between the source/supply market and destination market was found to range from a low of 1.3Km in Upper West Region to a high of 32.64Km in Upper East Region, with the mean distance being 22.1Km. A typical grain legume trader was found to go for grains from the source/supply market five times for sale in the destination market in a typical month and handles a total of 893.36Kg of grain legume per week at total cost of GHC1,109.12. Whereas wholesalers travelled about six (6) times a month for stocks, retailers and assemblers travelled only four times per month.

Table 2. Descriptive statistics of respondents

Variable	Mean	Std. Deviation
Age (years)	41.7500	8.16743
Number of years of schooling	1.2446	1.07536
Household size	7.52	4.179
Household members under 18 years	2.9929	1.82901
Annual income of the household	1974.5324	1542.43123
Distance from supply market to destination market (Km)	22.1201	12.66137
Number of grain legume traders in market	30.28	24.335
Number of trips by traders per month	4.7029	4.09987
Savings per year by trader (GHC)	618.2193	321.6682

Source: Estimated from field data, 2013.

Grain legume marketing channels
Figure 1 depicts the various channels through which grain legumes move from the farm gate to the final consumer. In all, about eight different channels or product pathways were identified. Wholesalers were found to be very important players in the value chain, helping with distribution of grain legumes within and outside the producing districts.

Marketing costs, margins and efficiency analysis
Table 3 provides the results of costs, margins and efficiency analyses according to trader type. Generally, volumes of grain legumes handled on weekly basis by wholesalers (2059.63Kg) were far higher than that handled by assemblers (1335.85Kg) and retailers (390.39Kg). The study showed that grain legume traders were able to sell at least 74% of their weekly stocks. Marketing of grain legumes in the study Districts was profitable, as the analysis in the table shows that only 18% of the gross marketing margin was spent on marketing cost with the remaining amount retained as net marketing margin.

Generally, net marketing margin for assemblers/aggregators was about 152% and 204% higher than that received by wholesalers and retailers respectively. It may be evident from Table 3 that marketing activities of assemblers/aggregators, wholesalers and retailers of grain legumes were performed efficiently, with efficiency ratios far in excess of 100%. It can be inferred that net marketing margins are not equitably distributed among different trading partners in the grain legume marketing chain. Even though wholesalers' share of total marketing costs along the chain was about 60%, they received only 23% of the net margin accrued from the sales of grain legumes. On the other hand, assemblers/aggregators who paid only 26% of the marketing costs along the chain obtained as high as 59% of the net marketing margin.

Table 4 summarizes the costs, margin and marketing efficiency analysis by type of grain legume sold by traders. Though trading in all the grain legumes was found to be very profitable, results in the Table shows that trading in groundnut is far more

profitable in northern Ghana than trading in cowpea and soyabean. The net marketing margin obtained on a kilogram of groundnut handled by traders was estimated at GHC0.36 compared with GHC0.25 for cowpea and GHC0.11 for soyabean.
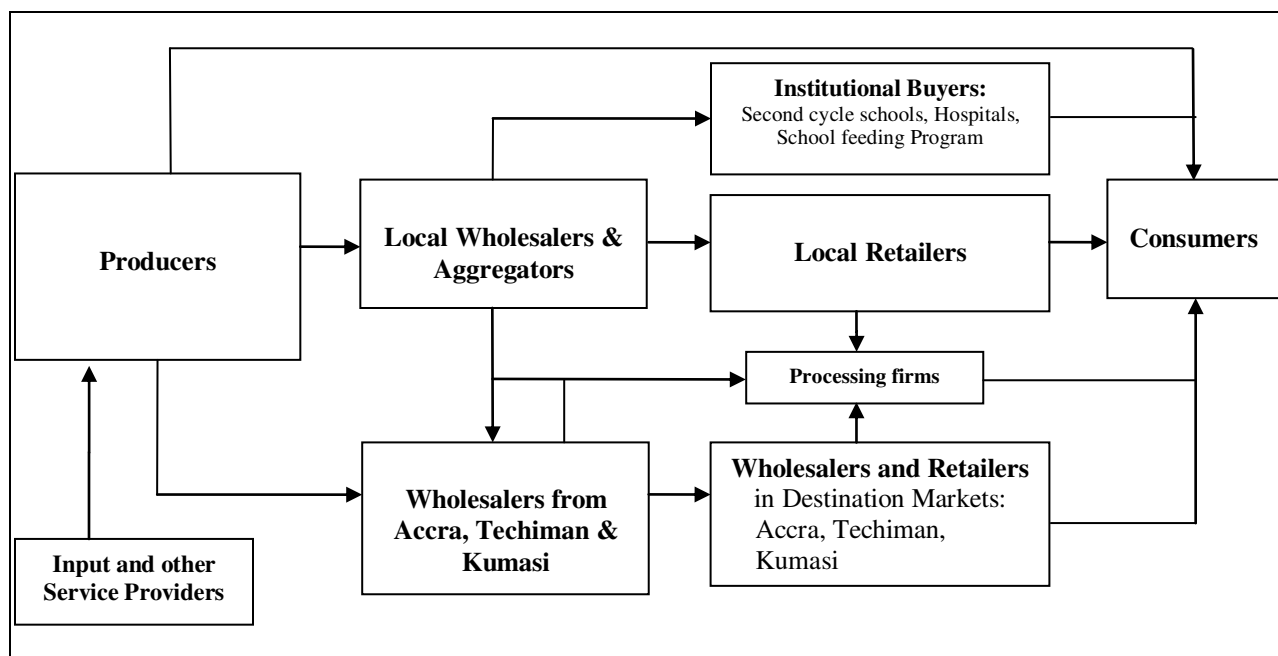

Fig. 1: Grain legume marketing Channels for Northern Ghana
Source: Researchers' construct based on Field Data, 2013.

Constraints faced by traders of grain legumes

Table 5 provides the rankings of the main constraints faced by grain legume traders in northern Ghana. The scale for the ranking ranged from very severe (1) to least severe (5). When all traders were put together, the most critical constraints were found to be limited access to credit, high transportation cost, poor nature of roads leading to producing centers and inadequate storage facilities. For soyabean traders, inadequate storage facility was ranked as the most critical constraint followed by limited access to credit. However, cowpea and groundnut traders ranked limited access to credit followed by transportation challenges (high cost and bad road network). The fact that cowpea and groundnut traders did not consider storage facility as a major constraint suggests that there may be ready market for these commodities compared to soyabean. The later has limited usage at the household level and larger volumes are supplied to processing firms in southern Ghana for industrial use. This partly explains why storage facilities may be very critical for the soyabean trading business.

4.   CONCLUSION

This study has traced different grain legume pathways from farm gate to the final consumer and shown that there are marketing chains of greater than four different channels through which soyabean, cowpea and groundnut are distributed and traded. Wholesaling and retailing of these grain legumes in the three northern regions of Ghana are very profitable, as they generated positive net marketing margins.

Table 3. Marketing costs, margins and efficiency for grain legume traders

Item	Wholesaler	Retailer	Assembler	All traders
Quantity purchased of grain legumes (Kg)	*2059.625*	*390.385*	*1335.833*	*893.366*
Average Cost price per unit (GHC)	*1.474*	*1.397*	*2.207*	*1.445*
A. Cost of produce per week (GHC)	3036.299	545.524	2947.783	1291.182
Selling price per unit (GHC)	*1.811*	*1.679*	*2.942*	*1.758*
B. Revenue from sale per week GHC)	3730.187	655.496	3929.621	1570.181
C. GMM per week (B-A)	693.888	109.972	981.838	279.000
Marketing costs per week (GHC):				
Transportation	*64.818*	*8.480*	*38.890*	*25.174*
Loading & offloading	*25.516*	*3.065*	*1.500*	*9.265*
Market toll	*12.083*	*1.442*	*0.333*	*4.343*
Storage cost	*3.578*	*2.692*	*7.500*	*3.104*
Value of Losses	*15.660*	*4.676*	*0.000*	*7.321*
D. Total Marketing costs per week	121.655	20.355	48.223	49.206
Marking cost as % of gross margin	*18%*	*19%*	*5%*	*18%*
E. NMM per week (C-D)	572.232	89.616	933.614	229.792
F. Marketing efficiency [(E/D)*100%]	470%	440%	1936%	467%
GMM per KG (GHC)	*0.337*	*0.282*	*0.735*	*0.312*
MC per Kg	*0.059*	*0.052*	*0.036*	*0.055*
NMM per Kg	*0.278*	*0.230*	*0.699*	*0.257*

Source: Estimated from Field data, 2013.

Table 4. Marketing costs, margins and efficiency associated with specific grain legumes in northern Ghana

Item	Soyabean	Cowpea	Groundnut	All grain legumes
Quantity purchased (Kg)	*865.774*	*794.633*	*1310.760*	*893.366*
Cost price per unit (GHC)	*0.826*	*1.606*	*2.072*	*1.445*
A. Cost of produce per week (GHC)	715.302	1275.943	2715.895	1291.182
Selling price per unit	*0.999*	*1.931*	*2.468*	*1.758*
B. Revenue from sale per week (GHC)	865.687	1534.040	3234.562	1570.181
C. GMM (B-A) per week	150.385	258.097	518.668	278.998
Marketing costs:				
T&T	*24.085*	*31.300*	*16.471*	*25.174*
Loading & offloading	*8.725*	*11.869*	*5.826*	*9.265*
Market toll	*5.070*	*4.778*	*2.675*	*4.343*
Storage cost per month	*18.740*	*9.660*	*9.778*	*12.416*
Storage cost per week	*4.685*	*2.415*	*2.444*	*3.104*
Value of Losses per week	*5.273*	*7.479*	*10.664*	*7.321*
Contribution to market queen	*6.583*	*2.833*	*12.000*	*5.269*
D. Total Marketing cost per week	54.422	60.674	50.081	54.475
Marketing cost as % of gross margin	*36%*	*24%*	*10%*	*20%*
E. NMM per week (C-D)	95.963	197.423	468.587	224.523
F. Marketing efficiency [(E/D)*100%]	176%	325%	936%	412%
GMM per KG	*0.174*	*0.325*	*0.396*	*0.312*
MC per Kg	*0.063*	*0.076*	*0.038*	*0.061*
NMM per Kg	*0.111*	*0.248*	*0.357*	*0.251*

Source: Estimated from Field data, 2013.

Table 5. Constraints faced by grain legume traders in northern Ghana

Main commodity sold		Inadequate storage facility	Poor road network	Limited access to credit	Seasonality in demand	High cost of transportation
Soybean	*Mean rank*	2.0000	2.5000	2.1471	3.1176	2.2727
	Std. Dev.	1.07309	1.28511	1.23417	1.12181	1.32930
Cowpea	*Mean rank*	3.4746	3.2373	2.4915	3.0169	2.9831
	Std. Dev.	1.34364	1.59026	1.45475	1.35814	1.35814
Groundnut	*Mean rank*	2.8095	2.2381	1.7619	2.8571	2.7000
	Std. Dev.	1.32737	1.51343	0.88909	1.15264	1.38031
Bambara	*Mean rank*	4.0000	3.7500	1.5000	3.5000	3.5000
	Std. Dev.	0.81650	1.50000	1.00000	1.00000	1.29099
Total	*Mean rank*	2.9492	2.8644	2.2288	3.0339	2.7500
	Std. Devi.	1.40723	1.54098	1.31663	1.23988	1.37604

Source: Estimated from Field Data, 2013.

However, net marketing margins are not equitably distributed among the key players in the marketing chain. Constraints such as limited access to credit, high cost of transportation, bad nature of roads linking marketing centers to producing centers and inadequate storage facilities were found to impede the optimal performance of the grain legume marketing system. Central and local government structures in the three northern regions should take concrete steps to address these key constraints in order to further enhance the performance of the grain legume marketing system in the area.

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