

FARM-GATE PRICE MONITORING IN SELECTED IMPACT COUNTRIES

GHANA

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KEY FINDINGS

Maize was the primary crop marketed by farmers in the monitored sample, counting 85Mt and 74% of total supplies. Moreover, it was the main product selected farmers channeled through P4P-supported Farmers Organizations (FOs) between June 2013 and May 2014.

Trends of sale volumes suggest that the allocation of main commodities across marketing channels varied greatly throughout the data collection.

Price differentials seemed to drive farmers' selection of preferred marketing channels. The price elasticity of supply (PES) confirms that those farmers who had access to multiple selling points mainly chose those channels which offered higher prices.

P4P-supported contracting overall involved 20% of monitored farmers only, who benefitted from the possibility to diversify sales and to sell at higher prices than farmers who did not sell through FOs.

Maize sales through the P4P-supported FOs in the data sample particularly increased during the harvest season when prices paid to FOs were above those received through other marketing channels. Price differentials during other months were more advantageous for sales through local markets and at farm gate.

1. INTRODUCTION

Since 2013, the P4P-VAM Farm-Gate Price Data Collection pilot has established a monitoring system for prices and sales of P4P-supported Farmers' Organizations (FOs) in four impact countries (El Salvador, Ethiopia, Ghana, Tanzania) using GRASP-based mobile technology.

Primary aim of the pilot was to enhance the understanding of farmers' marketing decisions in P4P-supported countries through the integration of farm-gate prices into VAM's online price tools.

This report follows up the conclusion of the price monitoring exercise in Ghana and provides an analysis of major sales and prices trends recorded in the country from June 2013 to May 2014.

Data collection in Ghana involved 26 farmers in two areas of the country (Tamale in the Northern Region and Ashanti), who overall submitted 870 records on the agreed reporting day (i.e. Saturday).

The dataset includes weekly records of prices and sale volumes of four agricultural products (maize, beans/cowpeas, rice, and groundnuts) in different marketing channels: community markets; local markets; farm-gate; P4P-supported farmers' organizations (Box 1).

The outcomes of the analysis will be discussed in light of 4 dimensions²: *i)* marketing channel, *ii)* time, *iii)* price, *iv)* volume.

Specifically, the study aims to:

- Analyze regularity in data reporting and its impact of data availability (Section 2);
- Identify main commodities sold across different marketing channels (Section 3);
- Analyze main trends in the allocation of sale volumes by marketing channel at aggregate and individual levels (Section 4);
- Compare price levels of respective commodities and the evolution of price differentials in the period June 2013-May2014 (Section 5);
- Report on the shares of income received by monitored farmers by marketing channel (Section 6).

Box 1-Background: P4P in Ghana

Since 2010, P4P supports smallholder farmers in Ghana with the aim to address low productivity, high post-harvest losses as well as poor market infrastructure. Totally, the P4P five-year-pilot involves 1,524 farmers distributed in 26 farmers' organizations (FO) across two regions of the country: *Ashanti* and the Northern Region.

Farmers in P4P-supported FOs receive training from WFP for the improvement of production, post-harvest handling, and the marketing of their agricultural produce.

P4P purchases food directly from FOs through direct/forward contracts¹ or soft tendering. This approach endows smallholder farmers with improved market access by allowing them to participate in WFP procurement processes: 3,000 MT of food were purchased by WFP Ghana in 2010-2014.

¹ P4P direct contracts commit WFP to buy crops from FOs at harvest time; the selling price is negotiated with the FO in correspondence to prevailing wholesale market prices for high quality products. During the planting season, forward contracts commit WFP to purchase in the future specified quantities of crops from FOs at an agreed selling price.

² As highlighted during the NFR of a meeting on P4P-VAM farm-gate price monitoring in February 2012.

2. FARM GATE PRICE DATA COLLECTION IN GHANA: DATA REPORTING

The P4P-VAM data collection pilot in Ghana took place from June 2013 to May 2014 and overall involved 26 lead farmers in the two monitored areas: 16 farmers in Ashanti; 10 farmers in Tamale.

Table 1 - "Number of records" received and "Active farmers"

Month of report	# of records	# of active farmers	Participation rate (% of total # of farmers trained by region)	
			Ashanti	Tamale
June	98	25	94%	100%
July	115	26	100%	100%
August	126	26	100%	100%
September	113	25	94%	100%
October	105	23	88%	90%
November	68	19	63%	90%
December	47	13	44%	60%
January	55	14	63%	40%
February	30	9	44%	20%
March	29	6	44%	20%
April	57	15	44%	80%
May	26	13	50%	50%

For each month in the data sample, Table 1 reports the number of selected farmers who actively participated in data transmission, the amount of records submitted and participation rates in the two monitored areas.

Data transmission was irregular and decreased during the reporting period. Most farmers who contributed to data collection were not timely in sending their forms: 60% of selected farmers submitted less than 3 records per month from December 2013 onward (Table 4, Annex I). Moreover, the farmers identified in Table 2 became totally "inactive" after November 2013.

Gaps in the transmission of records restricted the quantity of data available for successive analysis and limited the possibility to apply the conclusions of this report to P4P activities in the rest of the country. Data availability reached its lowest level in January/February 2014.

Table 2- "Inactive farmers" ID

Farmer's ID	# of records received by month												Last report sent
	2013						2014						
	June	July	August	September	October	November	December	January	February	March	April	May	
Ashanti													
GH02	✓	✓	✓	✓	✓	⚠	⚠	✗	✗	✗	✗	✗	21/12/2013
GH03	✓	✓	✓	✓	✓	⚠	✗	✗	✗	✗	✗	✗	23/12/2013
GH05	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	02/11/2013
GH09	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	28/09/2013
GH10	✓	✓	✓	✓	⚠	✗	✗	✗	✗	✗	✗	✗	05/10/2013
GH12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	01/03/2014
GH13	⚠	✓	✓	✓	✓	⚠	✓	⚠	✗	✗	✗	✗	11/01/2014
GH14	✓	✓	✓	✓	⚠	✗	✗	✗	✗	✗	✗	✗	05/10/2013
Tamale													
GH24	✓	✓	✓	✓	✓	⚠	✗	✗	✗	✗	✗	✗	16/11/2013
GH26	✓	✓	✓	✓	✓	⚠	✗	✗	✗	✗	✗	✗	30/11/2013

✗ No records
 ⚠ Irregular reporting (1 to 3 records per month)
 ✓ Regular reporting (4/5 per month)

3. PRICE DIFFERENTIALS BY COMMODITY AND MARKETING CHANNEL

3.1 OVERVIEW

Between June 2013 and May 2014, prices for milled rice were considerably higher and more volatile than prices of other product, mostly driven up by to fewer farmers selling at higher prices in the local market than in other selling points.

Maize prices remained overall stable during the reporting period, following an underlying seasonal pattern in both monitored areas.

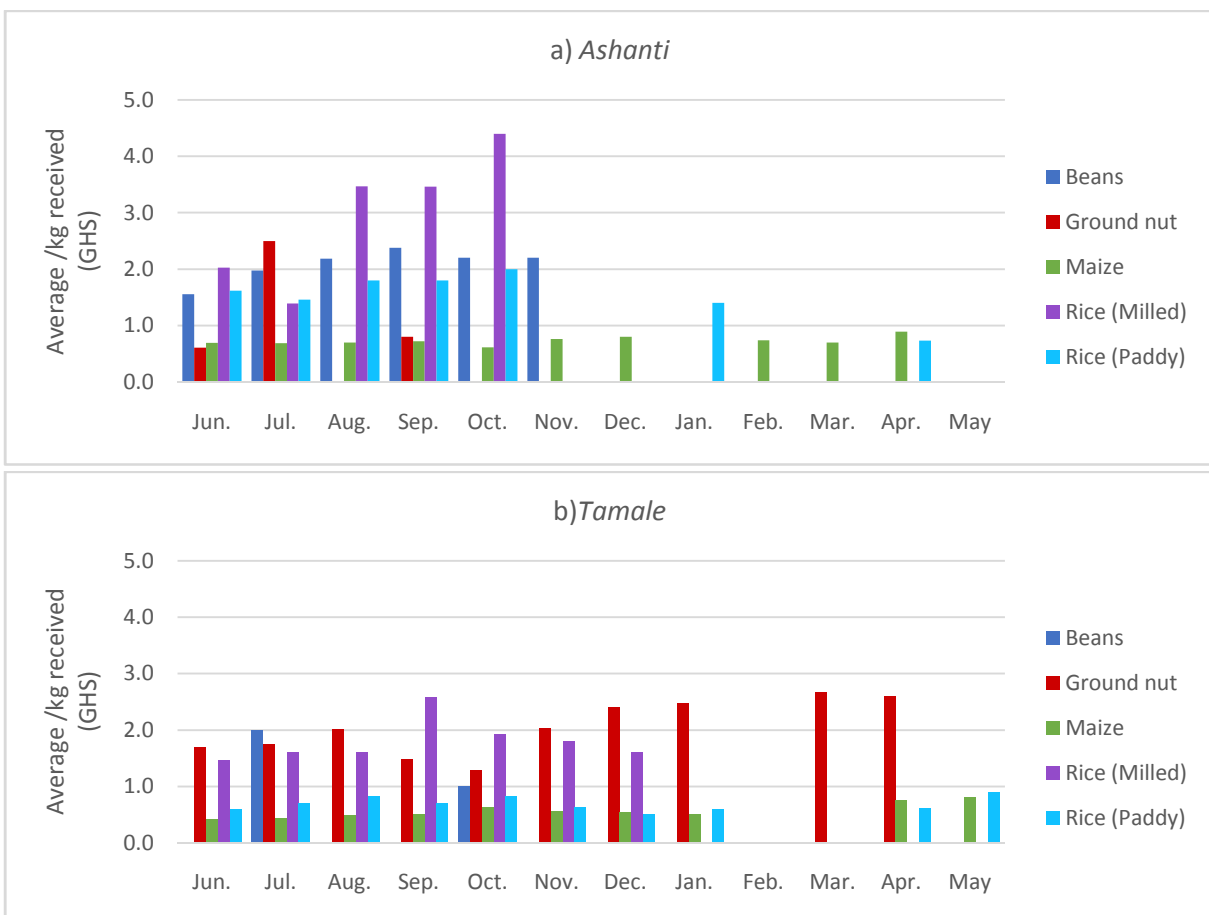
Seasonality also affected price differentials among marketing channels for maize sales. Farm gate prices were lower than at other selling points during harvesting. During the lean season, prices paid to monitored farmers by FOs were lower than prices received in the local market; they turned higher during harvest, when they allowed to sustain farmers' income despite the regular fall in market prices.

3.2 WEIGHTED AVERAGE PRICES OF MAIN COMMODITIES

Figure 1 compares the monthly weighted average of prices per kg received by monitored farmers for each product. Weighting factors for the estimation were the corresponding total volumes sold.

Specifically, panel *a* shows monthly figures of unit prices received in *Ashanti*; panel *b* refers to weighted average prices in *Tamale* (Northern region).

Figure 1—Weighted average prices per kg received by commodity (Ghanaian Cedi, GHS)



Considerable differences among average prices for milled rice and the price of other commodities are the most striking result. In *Ashanti*, prices for milled rice ranged between 1.5 GHS/kg and 4.4 GHS/kg during data collection, mostly influenced by fewer farmers selling at higher prices in the local market; other farmers received prices in line with other marketing channels. In *Tamale*, milled rice prices ranged between 1.5 GHS/kg and 2.6 GHS/kg; they were twice to four times higher than corresponding prices for paddy rice crops and more volatile than prices received for other commodities throughout data collection. The coefficient of variation³ for milled rice in *Tamale* was 54% as compared to maize (44%), ground nuts (44%), and beans (41%).

Also prices for groundnuts in *Tamale*⁴ fluctuated between 1.3 GHS/kg and 2.5 GHS/kg and particularly increased since November 2013, when they remained above the average price of all other products in the data sample.⁵

Average prices for maize remained overall stable in both monitored areas, ranging between 0.6 GHS/kg and 0.9 GHS/kg during the entire reporting period.

3.3 PRICE SEASONALITY

Analysis of price seasonality reveals that price trends for beans presented no significant seasonal pattern throughout data collection and showed little changes both during harvest and the lean season.

Seasonal effects were more pronounced for paddy rice and milled rice and more distinct in the northern than in the southern region of Ghana. In *Tamale*, the average price/kg for paddy and milled rice gradually dropped in any marketing channel from October to December, coinciding with the progression of harvesting; paddy rice prices increased in January (by 20%) and May (by 45%) in correspondence to the lean season.⁶ In contrast, the behavior of rice prices in *Ashanti* was poorly related to seasonal calendar for rice production: paddy rice prices remained stable or even increased during harvesting (September-October); similarly counter intuitively prices for rice milled increased by 27% in October.

Evidence of seasonal behavior is mixed for maize. Figure 2 compares average maize prices/kg in *Ashanti* (panel *a*) and *Tamale* (panel *b*) with the respective Grand Seasonal Indices (GSIs) that reflect price seasonality for maize in the two monitored areas.⁷ In *Ashanti*, maize prices experienced a 15% drop during harvesting in October, and increased by 24% in November and by a further 5% in December at the beginning of the lean season. In the northern region, maize prices increased by 14% in August, in line with the 17% increase of the GSI at the end of the lean season. Nevertheless, maize prices did not reflect the fall expected with the

³The coefficient of variation is estimated as the ratio of the standard deviation of a data series to the mean. In the case under analysis, the coefficient of variation provides a measure of the dispersion of unit prices from their average during the reporting period and allows to compare price volatility among commodities in the data sample.

⁴In *Ashanti*, the ground nut price was more volatile (coefficient of variation 57% as compared to 44% in *Tamale*) and reached 2.5 GHS/kg in July 2013, well above the average of the southern area (0.7 GHS/kg). In this case, the average price was influenced by a single farmer selling in the local market at higher prices than other farmers selling in any marketing channels of the region;

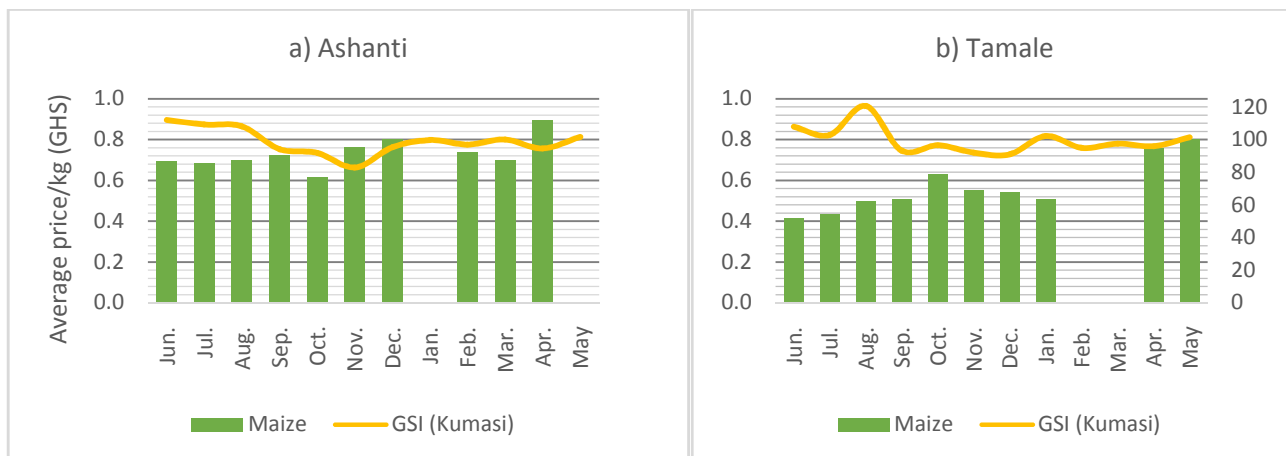
⁵ These differentials reflect the relative scarcity of this commodity, as generally confirmed by the comparison of national production for ground nut and maize in 2013: namely, nearly 2 million tons of maize were produced as compared to about 474 thousands for groundnut. Source: CountrySTAT, Food and agriculture data network;

⁶ Widespread interruption in price data transmission did not allow to establish if the price for paddy crops continued increasing (as expected) in February, March, and April, as well;

⁷ Specifically, wholesale maize prices provided by VAM from the market of *Kumasi* were used to estimate the GSI for *Ashanti*; VAM wholesale maize prices in *Tamale* were used for the estimation of the GSI for the northern region.

progression of harvesting in September. They decreased thereafter in correspondence to a decline of the GSI which signaled the arrival of the second harvest season in December-January.

Figure 2- Monthly price trends and price seasonality - Maize



3.4 MONTHLY MAIZE PRICE TRENDS AND PRICE DIFFERENTIALS AMONG MARKETING CHANNELS

Figure 3 and Figure 4 track the evolution of maize prices per kg paid on a monthly basis to selected farmers in *Ashanti* and in the northern region. Selling prices are compared to prevailing maize market prices which farmers observed in each region and submitted as additional records (red line in the graph)⁸.

At glance, maize prices in any marketing channel remained in line with prevailing market dynamics in both monitored areas. Average maize prices in *Ashanti* and *Tamale* followed an underlying seasonal pattern and overall increased from the end of the main harvest (August-October) to the beginning of the lean season in April.⁹

Price differentials among marketing channels varied greatly throughout the data collection period. In the northern region (Figure 4), farm gate prices for maize were 6% higher than local market prices in June but fell below both local and community market prices during harvest (by 17% and 8%, respectively).

⁸Based on data availability, analysis of price differentials for other commodities in the data sample is presented in Annex II;

⁹There are few exceptions. In the northern region, the price/kg received on the local market in August 2013 was 25% higher than the market price recorded by VAM for the same period. Similarly, average prices per kg received in the community market in September-October were 40% higher than the prevailing market price in *Tamale*. Nevertheless, caution is required for the interpretation of these results. In all mentioned cases, average prices per kg in the monitored sample coincide to the selling price received by a single farmer for isolated sales allocated in the local market or in the community market (corresponding to 50kg and 35kg of maize sold, respectively). For this reasons, they can hardly be regarded as representative of the whole data sample.

Figure 3- Maize weighted average price/kg vs. market price, Ashanti region

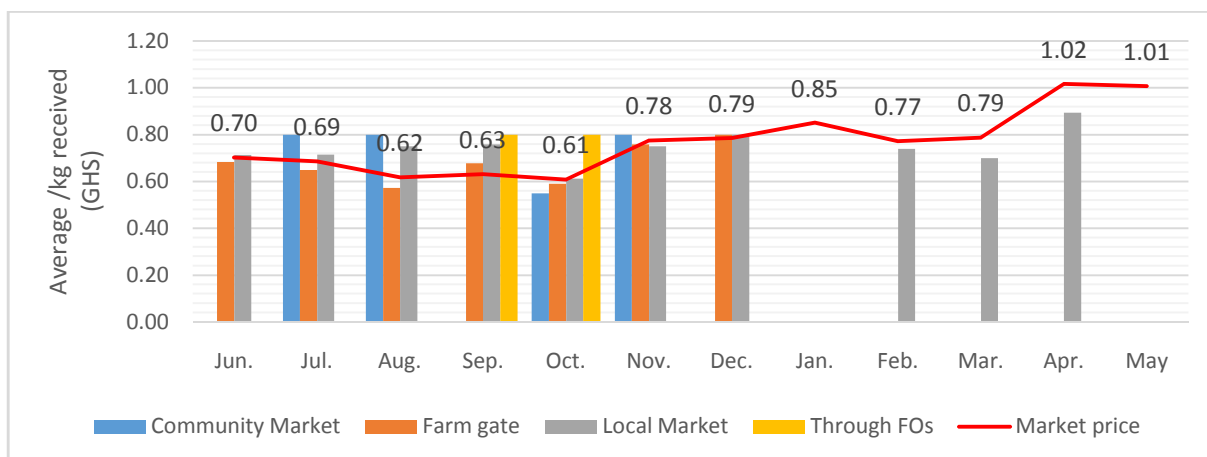
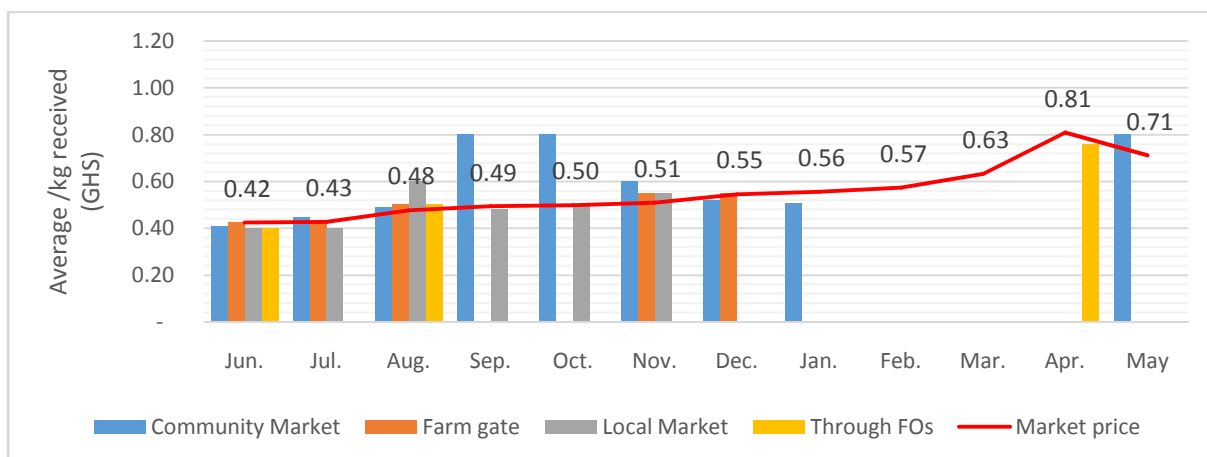


Figure 4 - Maize weighted average price/kg vs. market price, northern region

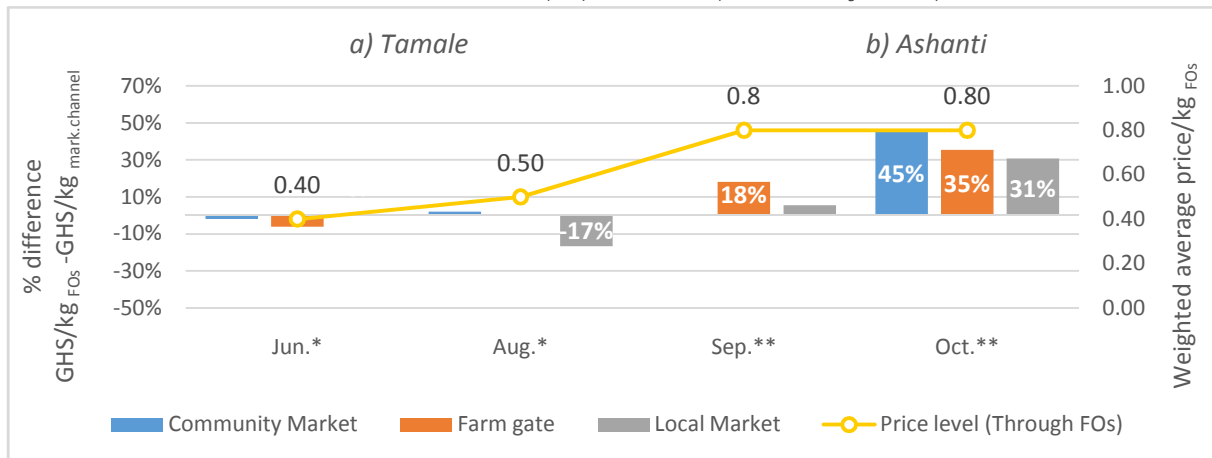


In *Ashanti* (Figure 3), monthly farm gate prices for maize kept below the prices received in other marketing channels during the entire period. Specifically, in August 2013 farm gate prices were 24% lower than local market prices and 29% lower than prices in the community market. Similarly, farm gate prices in *Ashanti* were 16% and 26% lower than FO prices received by sampled farmers in September and October 2013, respectively.

Figure 5 displays the percentage differences between FO maize prices and the prices paid to sampled farmers in the other marketing channels. Specifically, positive differences indicate that the FOs were higher than the prices recorded in other selling points. Only four months are considered, in correspondence to sales to FOs reported in the data sample¹⁰.

¹⁰Maize sales through FOs in June and August took place in the northern region only; P4P-supported sales in September and October were localized in *Ashanti*. Accordingly, price differentials in each period were estimated by comparing FOs prices to prices paid in other marketing channels in the areas where sales through the FOs effectively took place;

Figure 5- Price differentials - maize: GHS/Kg (FOs) – GHS/Kg (other marketing channels)



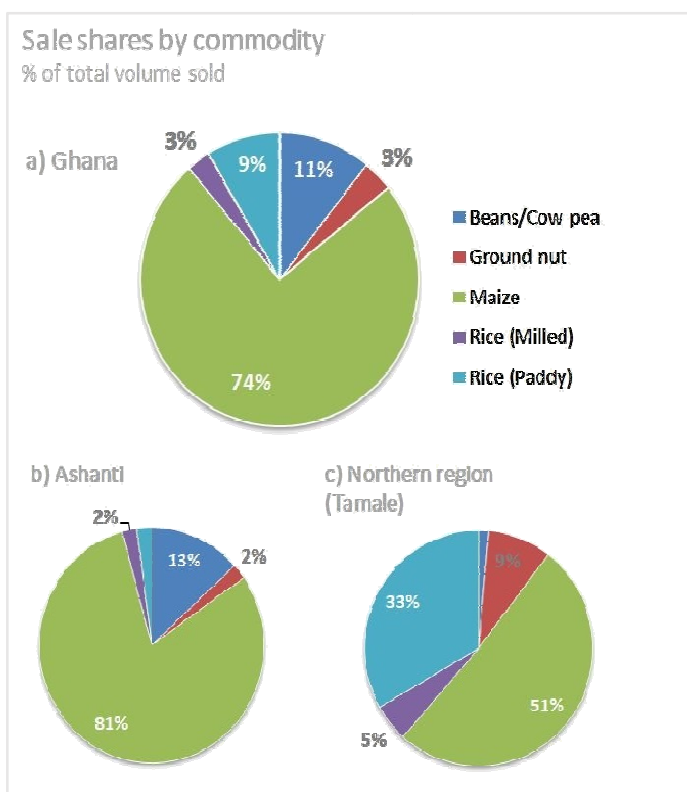
*Price differentials for maize sales through P4P-supported FOs in the northern region (comparison to price levels in Tamale);
 ** Price differentials for sales through P4P-supported FOs in Ashanti (comparison to price levels in Ashanti);

FO prices were lower than both farm gate and local market prices at the end of the lean period (June to August) while turned considerably higher during the harvest season (September-October).

4. SALE VOLUMES AND MARKETING CHANNELS

Maize stands out as the primary crop supplied by the farmers who participated in data collection: 85 MT of maize were sold between June 2013 and May 2014, corresponding to 74% of total sale volumes in the same period (Figure 6a).

Figure 6 - Sale shares of main commodities



Sale patterns were quite different across regions (Figure 6b and c). Maize was mostly supplied by farmers in Ashanti (73MT, 81% of regional total). Differently, recorded maize sales counted 12MT in the Northern Region (51% of regional total), which relied on more extensive rice production (33% of total supplies as compared to 9% in Ashanti).

Table 3 reports the allocation of total sales by marketing channel and by commodity in the monitored areas. Column 5 displays the quantities sold by selected farmers to the FOs involved in the P4P project.

Overall, only 6% of total marketed produce in the data sample was channeled through monitored FOs for possible WFP procurement. Specifically, 7.9MT of maize (4.7 MT in Ashanti; 3.2 MT in the northern region) and

0.1MT of groundnuts¹¹ were sold through P4P-supported FOs between June 2013 and May 2014. Farm-gates and local markets were the major marketing channels and absorbed more than 80% of the sales of maize and other commodities as recorded by selected farmers.

Table 3- Allocation of aggregate sale volumes by marketing channel

	Community Market	Farm Gate	Local Market	Through FOs
Ashanti				
Beans/Cow peas	1.0	4.0	6.9	-
Ground nuts	-	0.5	1.4	-
Maize	3.4	35.8	29.3	4.7
Rice (Milled)	0.2	0.5	1.3	-
Rice (Paddy)	-	0.6	1.3	-
Total	4.6	41.4	40.2	4.7
Northern Region (Tamale)				
Beans/Cow peas	-	0.0	0.3	-
Ground nuts	0.6	1.0	0.4	0.1
Maize	4.7	2.8	1.6	3.2
Rice (Milled)	0.4	0.8	0.1	-
Rice (Paddy)	3.4	3.2	1.4	-
Total	9.0	7.8	3.7	3.3
	13.7	49.2	43.9	8.0

5. AGGREGATE AND INDIVIDUAL TRENDS IN SALE VOLUMES

5.1 OVERVIEW

The analysis of aggregate and individual trends in the supply of main commodities in the data sample helps in understanding what drove farmers' selection of marketing channels during the reporting period. Broadly, the aggregate allocation of products in the sample was mostly related to the variation of price differentials among marketing channels throughout the agricultural cycle.

Maize sales through FOs peaked during harvest, when FO prices were higher than in other selling points and declined during the lean season when the local and community markets offered higher price incentives.

An underlying seasonal pattern characterized paddy rice and beans sales: local markets were the main marketing channel during the lean season, when selling prices were higher than those offered in other selling points.

A look at individual sales confirms that changes in price differentials were the main factor influencing farmers' marketing decisions, when the choice between several selling points was available to single farmers.

¹¹ The total amount of ground nut sold through monitored FOs during data reporting (0.1 MT) entirely corresponds to an isolated sale recorded by a single farmer (i.e. with ID GH20) through his/her FO in June 2013;

5.2 TRENDS IN THE AGGREGATE ALLOCATION OF SALE VOLUMES ACROSS MARKETING CHANNELS

MAIZE

The allocation of maize supplies across marketing channels varied throughout the data collection period mostly in relation to the seasonality of maize production (Box 2)¹² and price differentials in the two monitored areas.

Figure 7 plots maize sale volumes in Ghana as recorded by selected farmers between June 2013 and May 2014. Figure 8 shows the monthly distribution of maize sales in Ashanti and Tamale in the northern region. Maize sales pointed downward over the reporting period, with the most manifest decline at the farm-gate and in community markets in December 2013.¹³

Nevertheless, the farm gate stood out as the major marketing channel in the previous months. Specifically, maize sales in the data sample peaked in correspondence to the main growing and harvesting season (12MT in June and 9MT in September) when farm gates allowed for the minimization of extra transaction costs¹⁴ despite selling prices being generally lower than in other selling points.

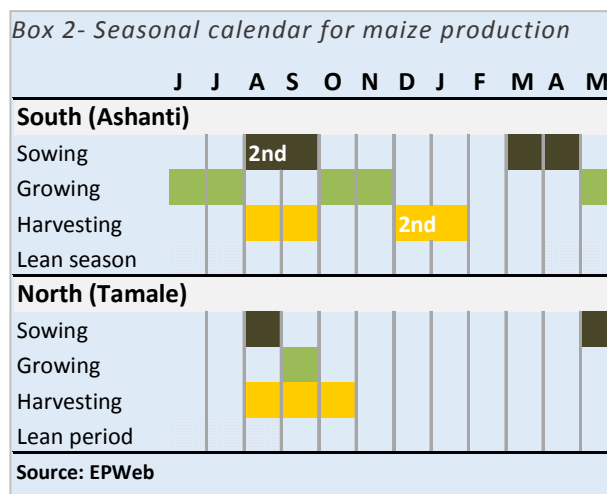
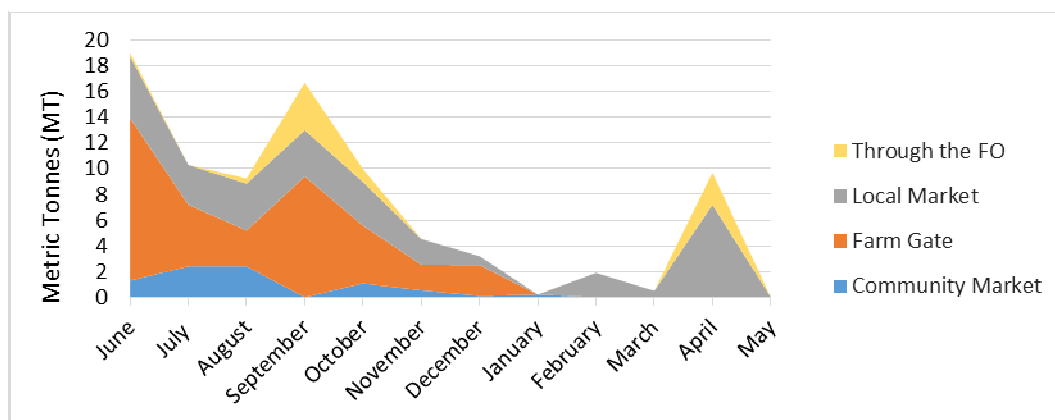


Figure 7–Trends in maize sale volumes in Ghana



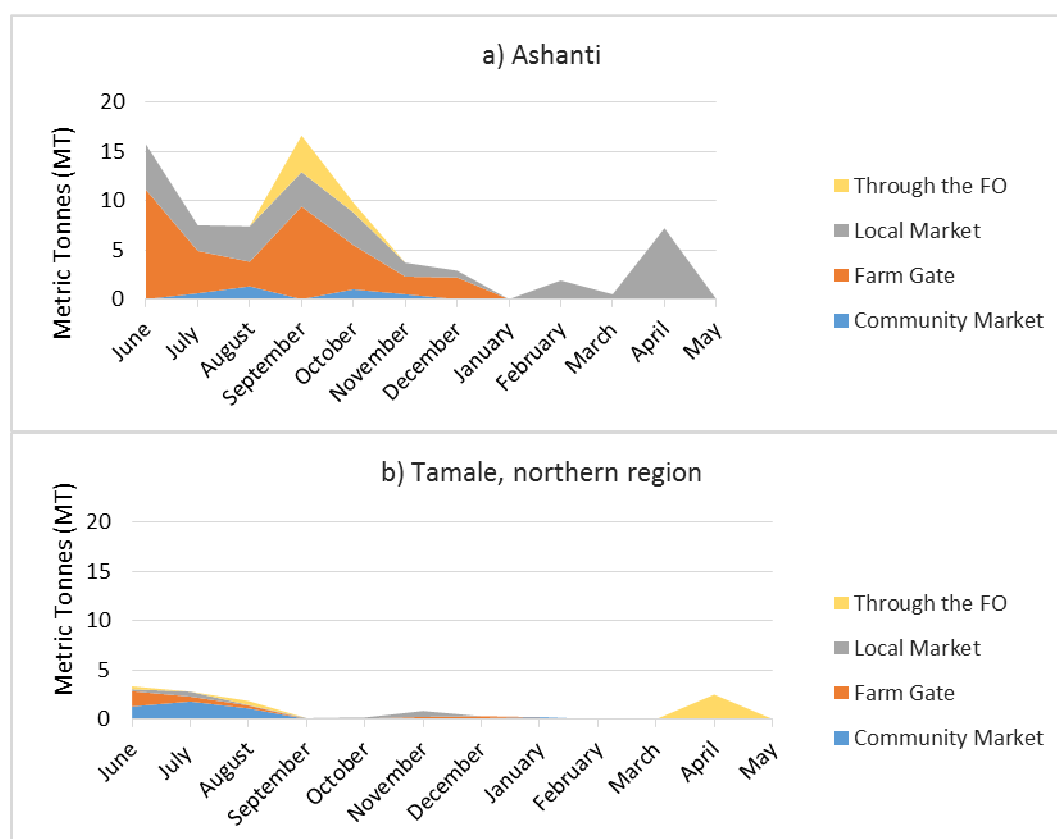
¹²Source: EPWEB, Emergency Preparedness and Response Web. Available at: <http://epweb.wfp.org/ep2/cp/?UNC=288>;

¹³No sales were recorded in the Ashanti region in January 2014, although in correspondence to the end second harvest season. Caution is required in interpreting this result. In fact, 8 of the 15 farmers (i.e. 53%) who recorded any maize sales during the reporting period interrupted data transmission from January onward.

¹⁴Transaction costs factor in all expenses for the transport, conservation, and storage of marketable products. In addition, transaction costs include the investments required to meet the quality standards for the access to specific marketing channels. Although the estimation of local transaction costs is limited by data unavailability, some inferences are still possible in relation to the evolution of transaction costs at the farm gate level. During harvest, transaction costs are generally lower at the farm gate as compared to other marketing channels thank to the proximity to producing areas which reduces costs for transport. Nevertheless, transaction costs increase thereafter when expenses increase for the replenishment and maintenance of food on-farm stocks during the lean season.

In Ashanti, the local market became the main selling point after the second harvest, in January 2014, and absorbed the supply of nearly 6MT of maize at the beginning of the lean period in April 2014 (Figure 8a).

Figure 8 - Maize sale volumes by marketing channel in Ashanti and Tamale



P4P-supported sales through FOs in the data sample were punctual in September, October, and April. Specifically, maize sales through FOs peaked in September 2013 when farmers in *Ashanti* supplied 3.5MT to FOs for possible WFP procurement. At that time, the average price paid by FOs (0.80 GHS/kg) was above those received in other marketing channels.¹⁵ It allowed those farmers who took part in contracting to sustain their income, although increased availability of crops generally pushed other prevailing prices down.

Interestingly, in the northern region, maize sales through FOs were limited during and after harvesting (Figure 8b). Monitored farmers in Tamale mostly chose community markets as their main marketing channel where they overall supplied about 3MT between July and September 2013, i.e., in the lean season. With 2.5MT sold, farmers’ organizations became the main selling point in April 2013.

¹⁵For instance, prices received through FOs were respectively 5% and 31% higher than the local market price in Ashanti in September and October 2013.

RICE

Sales of milled rice (Figure 9a) experienced a sharp decline from September 2013 until the end of the year; none of the farmers participating to data collection recorded sales after December 2013. An underlying seasonal pattern drove the allocation of paddy rice for sale across marketing channels (Figure 9b). The seasonal calendar for rice production is displayed in Box 3.

In addition, possible withholding of paddy rice stocks in the expectation of future price increases could explain the quick decline in the supply of most recently harvested paddy rice crops (October-December 2013 in Figure 9b). The same explanation underlies the successive reprise of paddy rice sales in community markets during the lean period: in January and April 2014, selected farmers chose community markets for selling 1.5MT and 0.6MT of paddy rice, respectively.

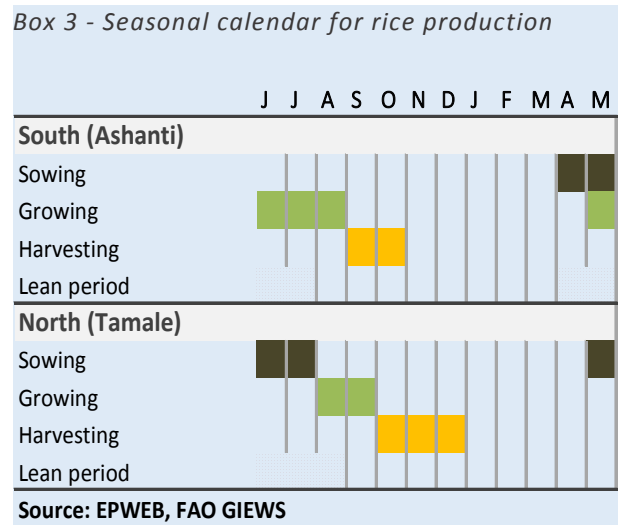
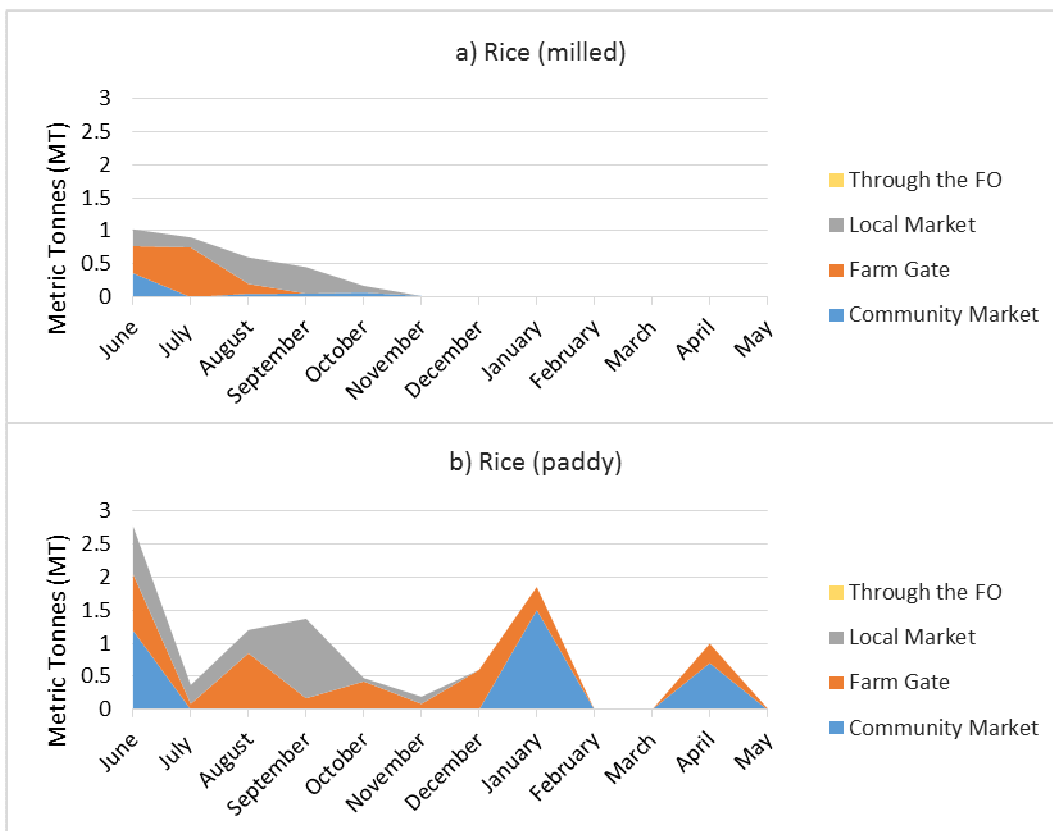


Figure 9—Paddy rice and milled rice sale volumes by marketing channel



BEANS AND GROUNDNUTS

Sales of both beans (Figure 10) and groundnuts (Figure 11) in the monitored sample showed a significant decline since September 2013 until the end of the reporting period. The local market represented the main marketing channel for both commodities. Farm gates absorbed a large proportion of total sales (0.6MT for groundnut; 1.5MT for beans) until August 2013. Specifically, nearly half of total beans sales were channeled through the local market at the peak of the lean season, in June and July 2013. In both months, the local market price for beans was higher than respective prices at the farm gate (by 45% in June and 25% in July, respectively). Sales of beans at the farm gate were higher in August, when the farm gate price increased up to 5% above average beans prices per kg at the farm gate.

Figure 10 - Beans/Cowpeas sale volumes by marketing channel

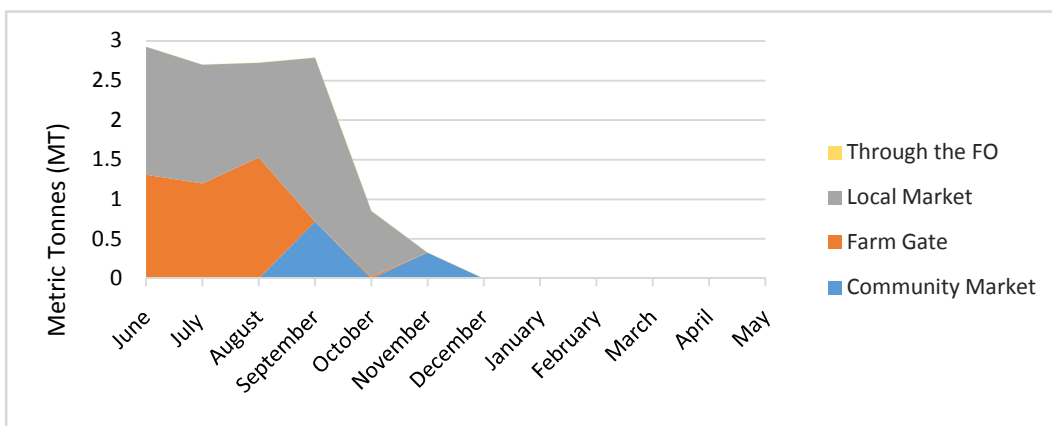
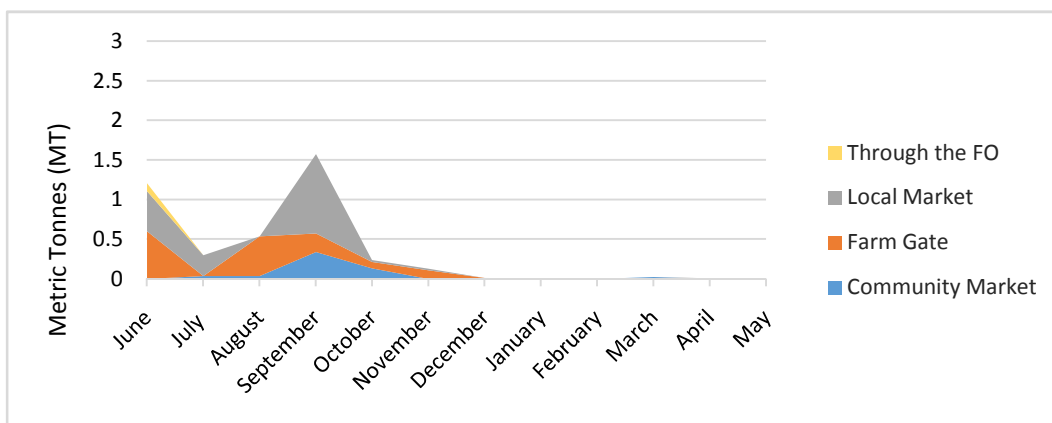


Figure 11 - Groundnuts sale volumes by marketing channel



5.3 INDIVIDUAL SALE VOLUMES

Analysis of individual sales confirms: Price differentials among selling points influence farmers' marketing decisions throughout the data reporting period. Specifically, those farmers who had access to multiple marketing channels generally allocated their produce in correspondence to higher prices.

Table 5 and Table 6 (in Annex III) report the allocation of quantities sold by each farmer in Ashanti and Tamale from June 2013 to May 2014. The majority of selected farmers (66%) relied on only one or two marketing channels (mostly farm gate and local markets) and never took part in contracting through P4P-supported FOs during data collection, despite all of them being member of the FOs.

Only 5 farmers interacted with FOs in the two regions. Farmers who sold through FOs already had access to all other marketing channels. Accordingly, they benefited from the possibility to diversify sales throughout the year and to sell at a higher price than farmers who did not sell through to FOs.

Based on data availability, Figure 12 and Figure 13 plot the trends of individual maize sales of two farmers who participated in FOs contracting in Ashanti and Tamale. Price levels seemed to guide the selection of preferred marketing strategies when several options were at hand to single farmers.

The price elasticity of individual supplies (PES) confirms this intuition.¹⁶ In the two cases considered, the PES remained above 1 and supply accommodated price variations in the local and the community market. In both cases, the only exception was the harvest season (August - September) when P4P-supported FOs offered higher prices than other marketing channels and absorbed part of total maize supplies.¹⁷

Figure 12 - Individual maize sales by marketing channel (Farmer's ID: GH10)

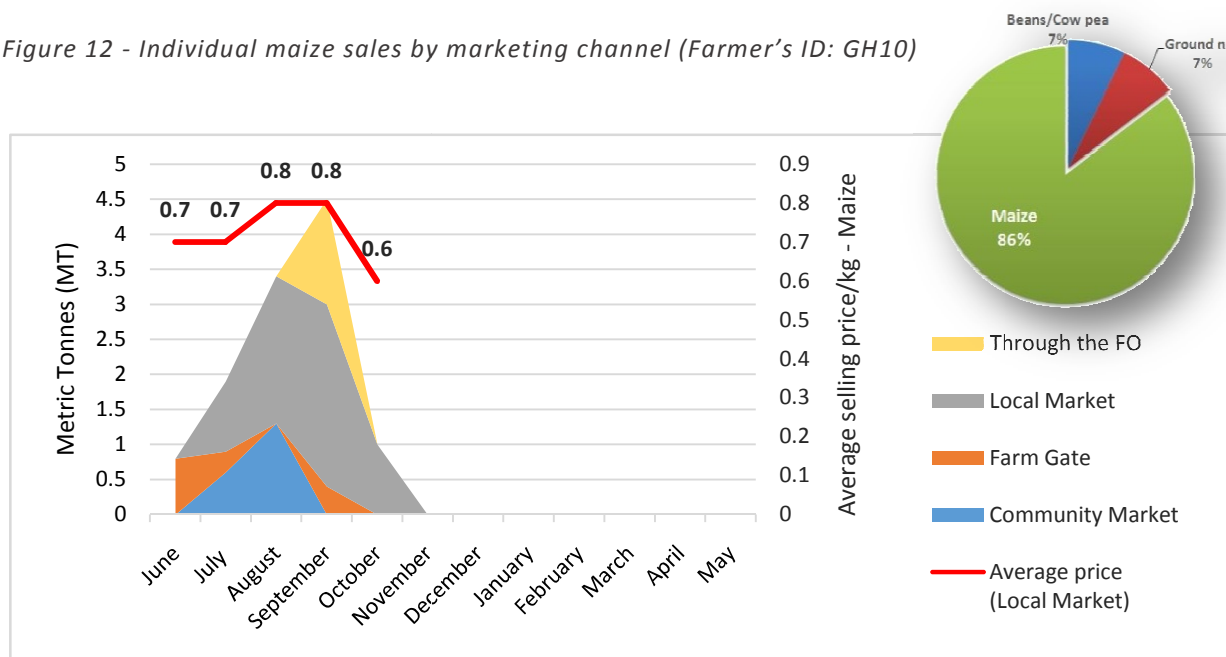


Figure 12 plots individual maize sales (86% of total farmers' sales) of farmer with ID GH10, who participated in data collection in Ashanti between June and October 2013. The local market absorbed nearly 60% of the farmer's maize supplies; the quantity of maize allocated by the farmer in this selling point appears related to the change in the price/kg received for each sale (red line in the graph). Specifically, the farmer nearly doubled the volume of maize sold in the local market between July and August in correspondence to a 14% increase in the market price/kg. Oppositely, maize sales reduced by 60% following a 25% decrease of the

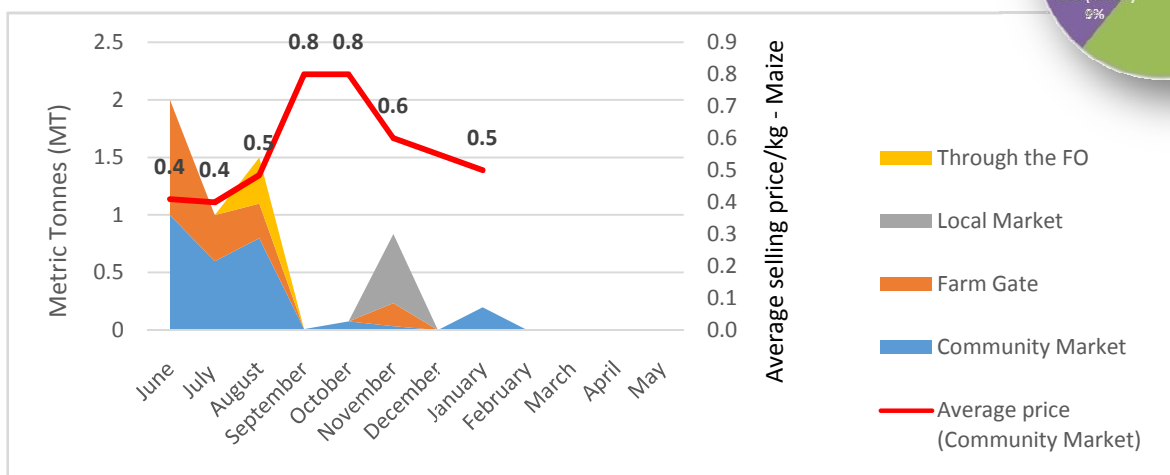
¹⁶The price elasticity of supply (PES) measures the reactivity of sale volumes to price changes. Specifically, the PES is obtained as the ratio of percentage variations in quantities supplied ($\Delta Q\%$) and selling prices ($\Delta P\%$) between two points in time: $(\Delta Q\%)/(\Delta P\%)$. Values greater than 1 indicate that supply is elastic and changes quickly in response to changing price levels.

¹⁷Discussion about price differentials will be addressed in more detail in Section 5.

maize market price/kg in September-October. The price elasticity of supply (PES) was greater than 1 both in July-August (PES=2.46) and September-October (PES=7.7).

Figure 13 plots the individual sales of farmer with ID GH21, located in Tamale. The chart compares the allocation of maize (61% of total farmer’s sales) in different marketing channels. The community market was the main marketing channel chosen by the farmer (48% of the farmer’s supplies) between June and September 2013. During that time span, the unit prices paid to the farmer in the community market kept constantly higher than the price/kg he received in the other marketing channels. The relation between variations of sale volumes and the price/kg received on the community market (red line) is more mixed in this case than in the previous one.

Figure 13 - Individual maize sales by marketing channel (Farmer’s ID: GH21)



The PES was greater than 1 in July-August (1.56) when the farmer’s supply of maize in the community market increased in response to a 60% increase in the price received. However, a fall in maize sales was recorded in September regardless of price levels. Finally, the PES turned above 1 (PES=3.40) in October-November, when the farmer’s maize sales halved in the community market following a 25% decrease in the price/kg received.

The local market became the main selling point in November 2013 in correspondence to a 10% increase in the market price/kg received by the farmer in that marketing channel.

6. INCOME RECEIVED BY MARKETING CHANNEL

The income received through different marketing channels is the product of the sales prices and the volume sold.

Figure 14- Income received by marketing channel

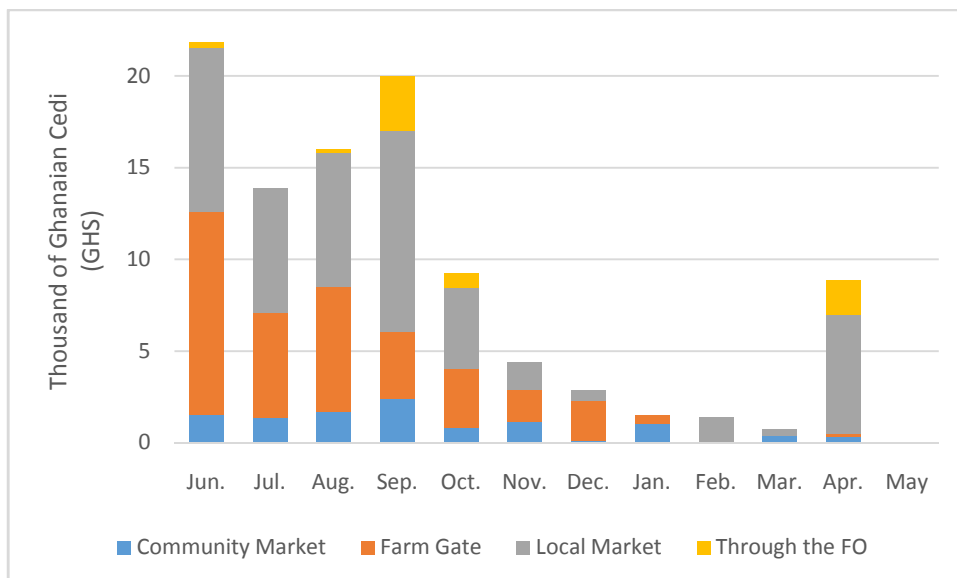


Figure 14 shows that a major part of maize income per month (60%-80%) came from sales at the farm gate during the growing season in June-August 2013. Sales through the local market provided 40% of income received during the harvest (about 11,000 GHS in September 2013) and became significant during the lean season when they provided almost the totality of income flows (February to April 2014).

On average, revenues from sales through FOs represented 12% of total income received by farmers during the reporting period. They sustained the income of 20% of farmers during harvest despite lower market prices. Farmers who could allocate their products through FOs in addition to other marketing channels benefitted from higher average income and placed themselves in the upper two quintiles of the distribution of income received.

ANNEX I – REGULARITY OF DATA REPORTING BY FARMER

Table 4- Regularity of data reporting

Table 4 displays the regularity of data reporting based on the frequency of weekly records sent per month by each farmer.

Farmer's ID	# of records received by month												# of records
	2013						2014						
	June	July	August	September	October	November	December	January	February	March	April	May	
Ashanti													
GH01	✓	✓	✓	✓	✓	⚠	✗	⚠	⚠	⚠	⚠	✗	36
GH02	✓	✓	✓	✓	✓	⚠	⚠	✗	✗	✗	✗	✗	24
GH03	⚠	✓	✓	✓	✓	⚠	✗	✗	✗	✗	✗	✗	27
GH04	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓	⚠	47
GH05	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	23
GH06	✓	✓	✓	✓	✗	✗	⚠	✓	✓	✓	✓	⚠	38
GH07	✓	✓	✓	✓	✓	⚠	⚠	⚠	✗	✓	✓	⚠	42
GH08	✗	⚠	✓	✗	✓	✓	⚠	⚠	⚠	⚠	✓	⚠	30
GH09	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	17
GH10	✓	✓	✓	✓	⚠	✗	✗	✗	✗	✗	✗	✗	20
GH11	⚠	✓	✓	✓	✓	✓	✓	✓	⚠	✗	✓	⚠	43
GH12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	41
GH13	⚠	✓	✓	✓	✓	⚠	✓	⚠	✗	✗	✗	✗	32
GH14	✓	✓	✓	✓	⚠	✗	✗	✗	✗	✗	✗	✗	20
GH15	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	⚠	52
GH16	✓	✓	✓	✓	✓	✓	✓	✓	⚠	✓	✓	⚠	49
	58	73	77	72	61	37	30	40	22	27	30	13	541
Tamale													
GH17	✓	✓	✓	✓	✓	✓	⚠	⚠	⚠	⚠	⚠	⚠	35
GH18	✓	⚠	✓	✓	✓	⚠	⚠	✓	⚠	✗	⚠	⚠	37
GH19	✓	✓	✓	✓	⚠	⚠	✗	⚠	✗	✗	⚠	⚠	28
GH20	✓	✓	✓	✓	✓	✓	⚠	✗	✗	✗	✓	⚠	34
GH21	✓	✓	✓	✓	✓	✓	✓	✓	⚠	✗	✓	⚠	45
GH22	✓	✓	✓	✓	✓	✓	✓	⚠	⚠	⚠	⚠	⚠	42
GH23	✓	✓	✓	✓	⚠	✗	✗	✗	✗	✗	⚠	⚠	25
GH24	✓	✓	✓	✓	✓	⚠	✗	✗	✗	✗	✗	✗	23
GH25	✓	✓	✓	✓	✓	✓	⚠	✗	✗	✗	✓	⚠	33
GH26	✓	✓	✓	✓	✓	⚠	✗	✗	✗	✗	✗	✗	26
	40	42	49	41	44	31	17	15	8	2	27	13	329
	98	115	126	113	105	68	47	55	30	29	57	26	870

- ✗ No records
- ⚠ Irregular reporting (1 to 3 records per month)
- ✓ Regular reporting (4/5 per month)

ANNEX II – MONTHLY PRICE DIFFERENTIALS AMONG MARKETING CHANNELS

Figure 15- Beans monthly average price/kg vs. market price, Ashanti

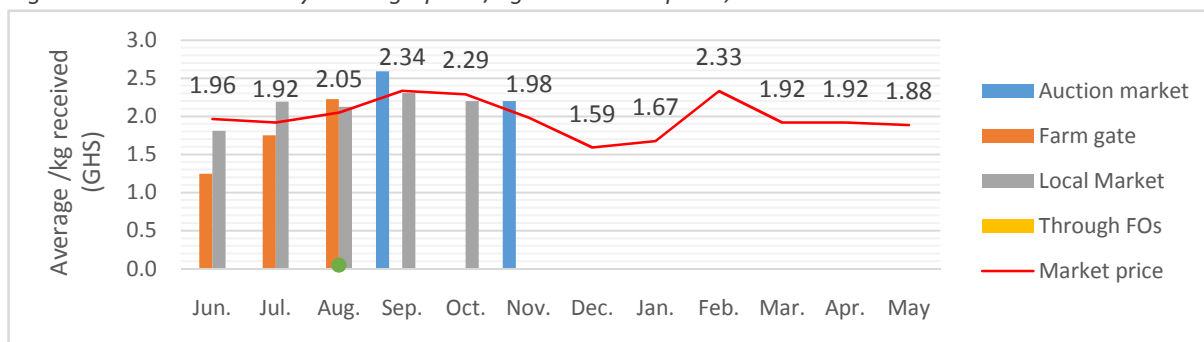


Figure 16 - Beans monthly average price/kg vs. market price, northern region

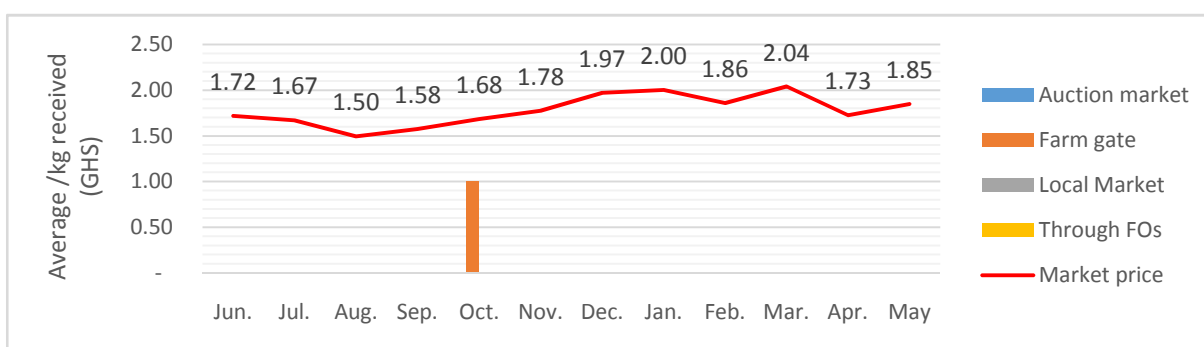


Figure 17- Rice paddy monthly average price/kg vs. market price, Ashanti

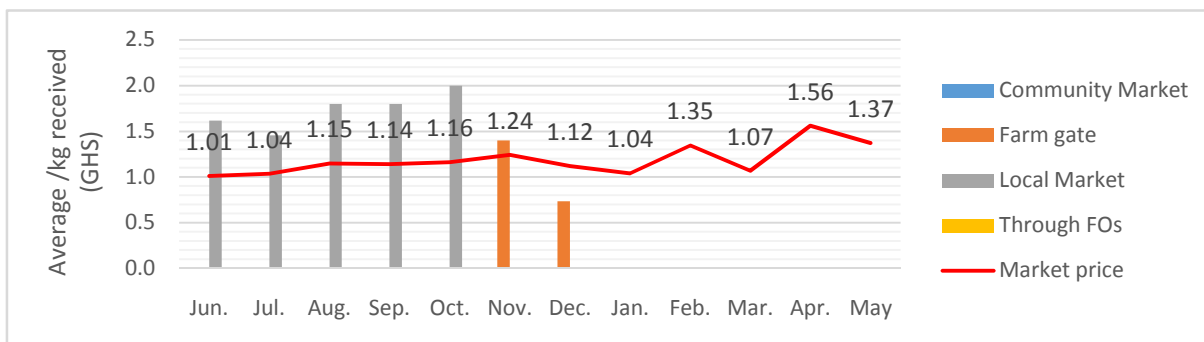


Figure 18 - Rice paddy monthly average price/kg vs. market price, northern region

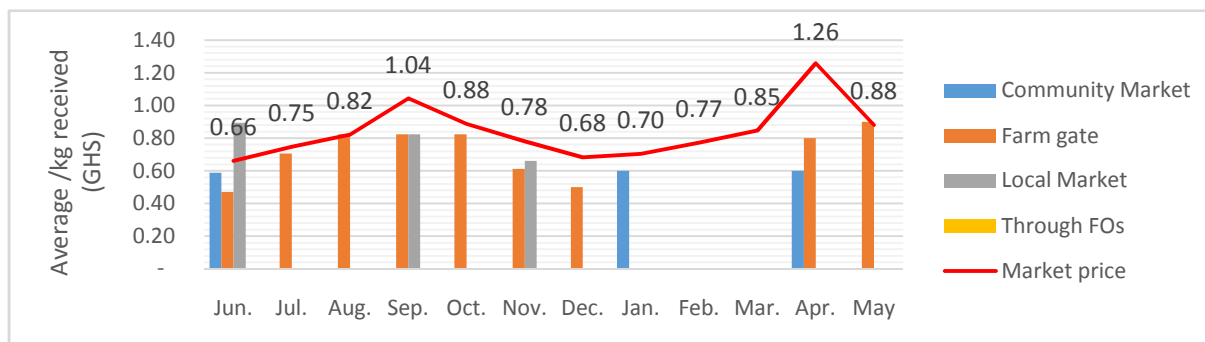


Figure 19 - Rice milled monthly average price/kg vs. market price, Ashanti

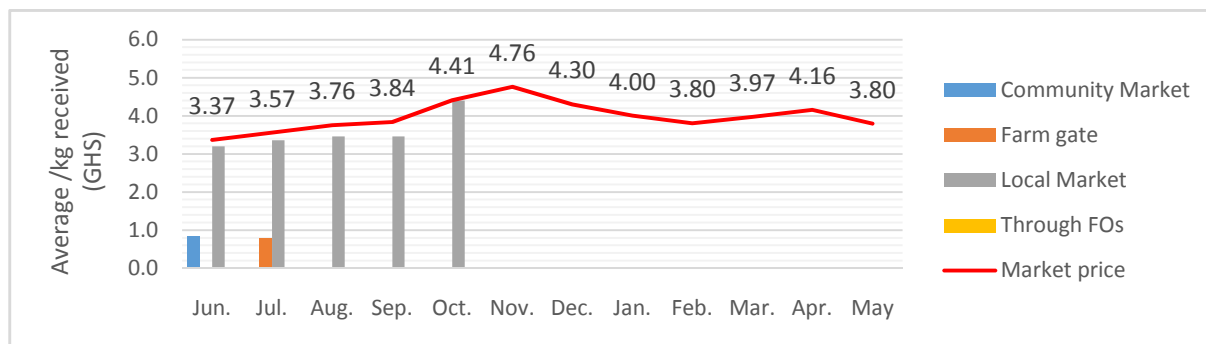
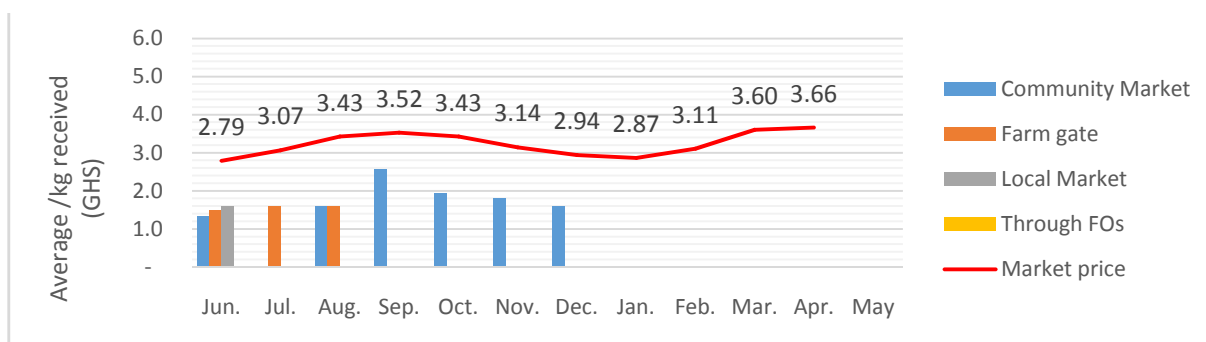


Figure 20 - Rice milled monthly average price/kg vs. market price, northern region



ANNEX III – INDIVIDUAL SALES BY COMMODITY AND MARKETING CHANNEL

Table 5 - Individual sale volumes in metric tons by commodity and marketing channel (Ashanti)

Farmers' ID / Commodity	Community Market	Farm Gate	Local Market	Through the FO	Grand Total
GH01					
Beans/Cow pea	-	1.64	-	-	1.64
Maize	-	1.90	1.00	-	2.90
Rice (Milled)	-	0.50	-	-	0.50
Total	-	4.04	1.00	-	5.04
GH02					
Beans/Cow pea	-	0.76	-	-	0.76
Maize	-	5.00	-	-	5.00
Total	-	5.00	-	-	5.00
GH03					
Maize	-	8.10	-	-	8.10
Total	-	8.10	-	-	8.10
GH04					
Beans/Cow pea	-	0.65	-	-	0.65
Maize	-	2.20	0.50	-	2.70
Total	-	2.85	0.50	-	3.35
GH05					
Beans/Cow pea	-	-	0.55	-	0.55
Maize	-	4.80	-	-	4.80
Total	-	4.80	0.55	-	5.35
GH06					
Beans/Cow pea	-	-	0.22	-	0.22
Ground nut	-	-	0.20	-	0.20
Total	-	-	0.42	-	0.42
GH07					
Beans/Cow pea	-	-	0.22	-	0.22
Maize	-	2.00	-	-	2.00
Rice (Paddy)	-	0.57	0.09	-	0.65
Total	-	2.57	0.30	-	2.87
GH08					
Beans/Cow pea	-	0.00	0.76	-	0.76
Maize	-	1.50	12.20	-	13.70
Total	-	1.50	12.96	-	14.46
GH09					
Maize	-	4.00	-	-	4.00
Total	-	4.00	-	-	4.00
GH10					
Beans/Cow pea	-	0.98	-	-	0.98
Ground nut	-	-	1.00	-	1.00
Maize	1.90	1.50	6.70	1.50	11.60
Total	1.90	2.48	7.70	1.50	13.58
GH11					
Ground nut	-	-	0.20	-	0.20
Maize	1.00	-	-	-	1.00
Total	1.00	-	0.20	-	1.20
GH12					
Beans/Cow pea	-	-	0.22	-	0.22
Maize	-	-	4.60	-	4.60
Total	-	-	4.82	-	4.82

GH13					
Beans/Cow pea	0.83	-	0.50	-	1.33
Maize	0.50	2.40	0.50	-	3.40
Total	1.33	2.40	1.00	-	4.73
GH14					
Beans/Cow pea	0.22	-	0.65	-	0.87
Maize	-	2.40	-	3.20	5.60
Total	0.22	2.40	0.65	3.20	6.47
GH15					
Beans/Cow pea	-	-	3.60	-	3.60
Maize	-	-	3.80	-	3.80
Rice (Milled)	-	-	1.25	-	1.25
Rice (Paddy)	-	-	1.25	-	1.25
Total	-	-	9.90	-	9.90
GH16					
Beans/Cow pea	-	-	0.20	-	0.20
Ground nut	-	0.50	-	-	0.50
Rice (Milled)	0.20	-	-	-	0.20
Total	0.20	0.50	0.20	-	0.90

Table 6 - Individual sale volumes in metric tons by commodity and marketing channel (Tamale)

Farmer's ID/Commodity	Community Market	Farm Gate	Local Market	Through the FO	Grand Total
GH17					
Maize	-	0.10	-	2.50	2.60
Rice (Paddy)	-	0.17	0.34	-	0.51
Total	-	0.27	0.34	2.50	3.11
GH18					
Ground nut	-	0.10	0.10	-	0.20
Rice (Paddy)	-	0.09	-	-	0.09
Total	-	0.2	0.1	-	0.3
GH19					
Ground nut	-	0.5	-	-	0.5
Maize	-	0.2	-	-	0.2
Rice (Paddy)	-	-	0.1	-	0.1
Total	-	0.7	0.1	-	0.8
GH20					
Beans/Cow pea	-	-	0.2	-	0.2
Ground nut	-	-	-	0.1	0.1
Maize	0.3	-	-	0.3	0.6
Rice (Milled)	0.01	-	-	-	0.01
Rice (Paddy)	0.68	-	-	-	0.68
Total	0.99	-	0.2	0.4	1.59
GH21					
Maize	2.7	1.9	0.6	0.4	5.6
Rice (Milled)	0.2	0.7	-	-	0.8
Rice (Paddy)	2.2	0.6	-	-	2.8
Total	5.09	3.15	0.60	0.40	9.24
GH21					
Beans/Cow pea	-	0.025	-	-	0.025
Ground nut	0.16	0.39	0.3025	-	0.85
Maize	0.34	0.5	0.85	-	1.69
Rice (Milled)	-	0.11	0.06	-	0.16
Rice (Paddy)	0.51	0.94	-	-	1.45
Total	1.01	1.96	1.21	-	4.17
GH23					
Ground nut	0.19	-	-	-	0.19
Maize	0.10	-	-	-	0.10
Rice (Milled)	0.08	-	-	-	0.08
Total	0.36	-	-	-	0.36
GH24					
Ground nut	0.25	-	-	-	0.25
Maize	0.6	-	-	-	0.6
Rice (Milled)	0.11	-	-	-	0.11
Total	0.96	-	-	-	0.96
GH25					
Ground nut	-	0.04	0.02	-	0.06
Maize	-	0.05	0.10	-	0.15
Rice (Milled)	-	0.05	-	-	0.05
Rice (Paddy)	-	0.09	0.11	-	0.20
Total	-	0.23	0.23	-	0.46
GH26					
Beans/Cow pea	-	-	0.1	-	0.1
Maize	0.6	-	-	-	0.6
Rice (Paddy)	-	1.28	0.85	-	2.13
Total	0.60	-	-	-	0.60