



Ghana's National Buffer Stock Company: School Feeding Linkages

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Abstract

This report is part of PCDs technical assistance programme on grain reserves.

The purpose of this report is two-fold. One is to provide an initial assessment of agriculture/food policy instruments, NAFCO operations, relevant agriculture markets and the school feeding linkage. And the second purpose is to set out the findings of the technical needs assessment conducted with NAFCO.

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LIST OF ABBREVIATIONS

1. NAFCO- National Food Buffer Stock Company
2. MoFA-Ministry of Food and Agriculture
3. GSFP-Ghana School Feeding Programme
4. SIRD-Statistics Research and Information Directorate
5. GFMC- Ghana Food Marketing Corporation
6. GLDB- Grains and Legumes Development Board
7. GFDC- Ghana Food Distribution Corporation
8. RMU-Rice Milling Unit
9. FASDEP- Food and Agriculture Sector Development Policy
10. LBC- Licensed Buying Company
11. IFPRI-International Food Policy Research Institute

INTRODUCTION

This report is part of PCDs technical assistance programme on grain reserves.

The purpose of this report is two-fold. One is to provide an initial assessment of agriculture/food policy instruments, NAFCO operations, relevant agriculture markets and the school feeding linkage. And the second purpose is to set out the findings of the technical needs assessment conducted with NAFCO.

The paper is divided into five chapters. Chapter-1 briefly analyses markets and production for maize and rice followed by a historical policy overview of market interventions in Ghana in chapter-2. In chapter-3 we analyze the different components of NAFCO operations and in chapter-4 the school feeding linkage is examined in some detail. The final chapter describes the findings of the technical needs assessment.

The findings of this report will hopefully provide a useful basis for developing the detailed technical assistance work plan and research agenda with NAFCO and other partners.

METHODOLOGY

This paper applies policy analysis approaches with some basic quantitative analysis.

The paper employs two interrelated analytical frameworks to understand the content of grain reserve policies and processes and the school feeding interaction. The first framework looks at the agriculture-NAFCO interface in terms of commodity markets and production and the second framework is the NAFCO-school feeding engagement and the costs and benefits for caterers and NAFCO. The overall synthesis underpins the local agriculture and school feeding narrative.

The qualitative and quantitative data was collected over the course of three country missions. The qualitative data is based on a series of consultations, interviews and FGDs with representatives of all principal stakeholders. This includes NAFCO, GSFP, MoFA, LBCs, grains council, millers association, traders association and relevant international agencies. The quantitative data is secondary and obtained principally from SIRD (MoFA) in Accra and FAO database.

This report also builds on PCDs country briefing notes and an earlier report on school feeding and grain reserves (PCD/UCB, 2013).

A detailed literature review was conducted for the policy history chapter and key documents were reviewed for other chapters as appropriate.

SCOPE AND LIMITATIONS

The scope of this paper is limited to providing an overview of the current situation to inform the development of a detailed work plan and research portfolio.

The overall analysis especially around pricing and costs is preliminary and based on limited secondary data and market analysis. The aim here is to provide a basic insight into some of the key issues and set the agenda for further analysis as part of the work plan.

Detailed research will be undertaken in the course of work plan implementation.

RESEARCH AGENDA

An RCT is being undertaken by PCD and partners on different procurement models for school feeding in Ghana. This would generate useful first hand evidence and data.

Some general areas for further research for maize/rice include spatial price spreads, market access costs, seasonality, market arrival patterns, on-farm storage, private costs of storage etc.

NAFCO analysis would need to include a mapping of procurement and storage points, costs of transport and stockholding etc.

CHAPTER 1: AGRICULTURE MARKET OVERVIEW

This section provides a short brief on Ghana's agro-ecology and cropping calendar followed by an overview of the key production and pricing characteristics for Maize and Rice, the two major cereal crops for Ghana. These cereals have been selected because they constitute the bulk of NAFCO commodity portfolio and the NAFCO-GSFP linkage.

AGRO-ECOLOGICAL ZONES

There are 5 main agro-ecological zones defined on the basis of climate, reflected by the natural vegetation and influenced by the soils. These are Rain Forest, Deciduous Forest, Transitional Zone, Coastal Savanna and Northern Savanna (Guinea and Sudan Savanna). The table below shows the growing period for the different agro-ecological zones.

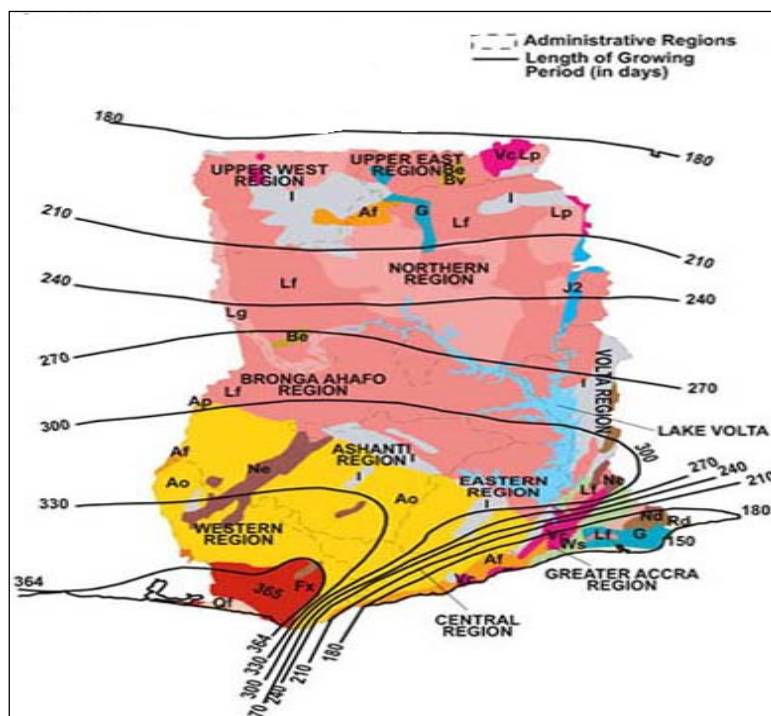
TABLE 1: Rainfall Distribution by Agro-ecological zones

AGRO-ECOLOGICAL ZONE	MEAN ANNUAL RAIN (MM)	GROWING PERIOD (DAYS)	
		MAJOR SEASON	MINOR SEASON
Rain Forest	2,200	150 – 160	100
Deciduous Forest	1,500	150 - 160	90
Transitional	1,300	200 - 220	60
Coastal	800	100 – 110	50
<u>Northern Savanna:</u>			
Guinea Savanna	1,100	180 - 200	*
Sudan Savanna	1,000	150 - 160	*

Source: Meteorological Services Department, Accra c.f. SIRD

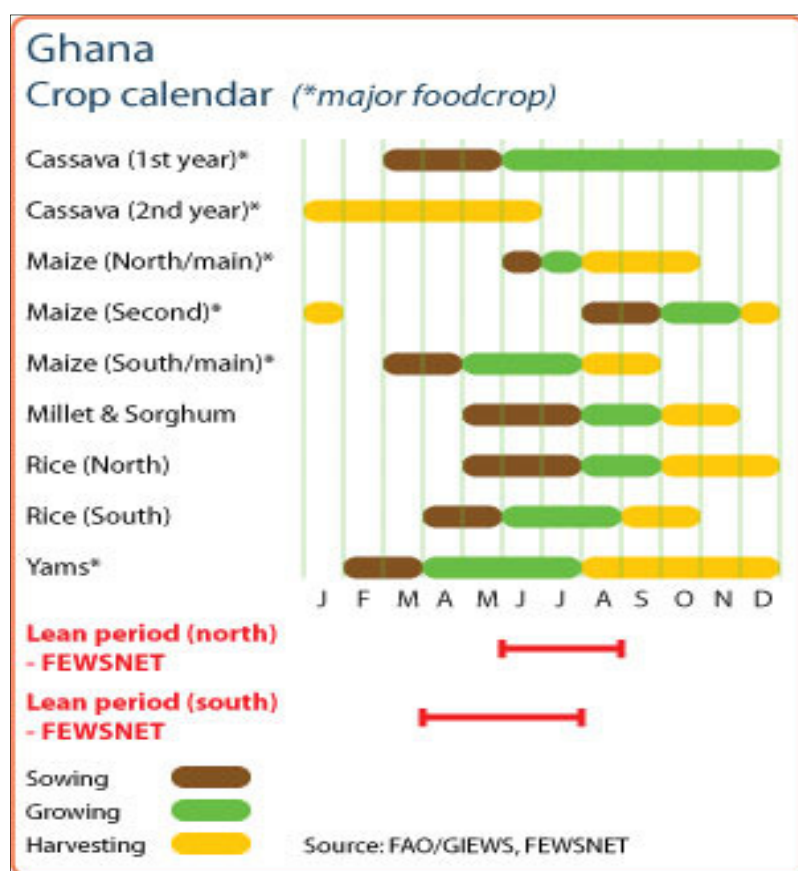
**Rainfall distribution is bimodal in the Forest, Transitional and Coastal Zones, giving a major and minor growing season; elsewhere (Guinea Savanna and Sudan Savanna), the unimodal distribution gives a single growing season.*

The map on the right illustrates the growing period in different administrative divisions (FAO, 2005).



CROP CALENDAR

The crop calendar shows the sowing, growing and harvesting timelines for cassava, maize, rice and yams over a calendar year. The harvest period for the main maize crop is between August and October and for the principal rice crop is between October and December. For a detailed cropping calendar as per agro-ecological zones, please refer to Annex B.



MAIZE

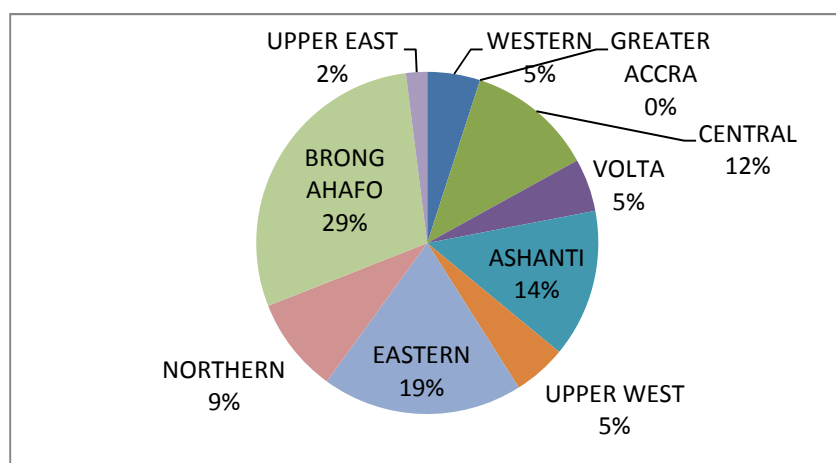
Maize is the most important cereal crop, accounting for 55 percent of total grain production. In terms of value of production over the period 2005-2010, maize accounted for 3.3 percent of total agricultural production value (FAOSTAT).

Around 70 per cent of maize (white) is grown by smallholder farms¹. The production is concentrated in three regions of Ghana which account for over 60% of total maize production, Brong Ahafo being the largest producer accounting for 29% of national production. Graph-A shows the distribution of maize production by region. Ghana is mostly self sufficient in white maize which is used for human consumption and is a net importer of yellow maize (See food balance sheet in Annex A).

Maize imports are subject to regular policy interventions by the Government, including an import duty of 20 percent (temporarily removed in 2008 and reinstated during the course of 2009) as well as other taxes and levies (MAFAP).

¹ Ghana produces mainly white maize while the imported maize is yellow maize used mainly as poultry feed

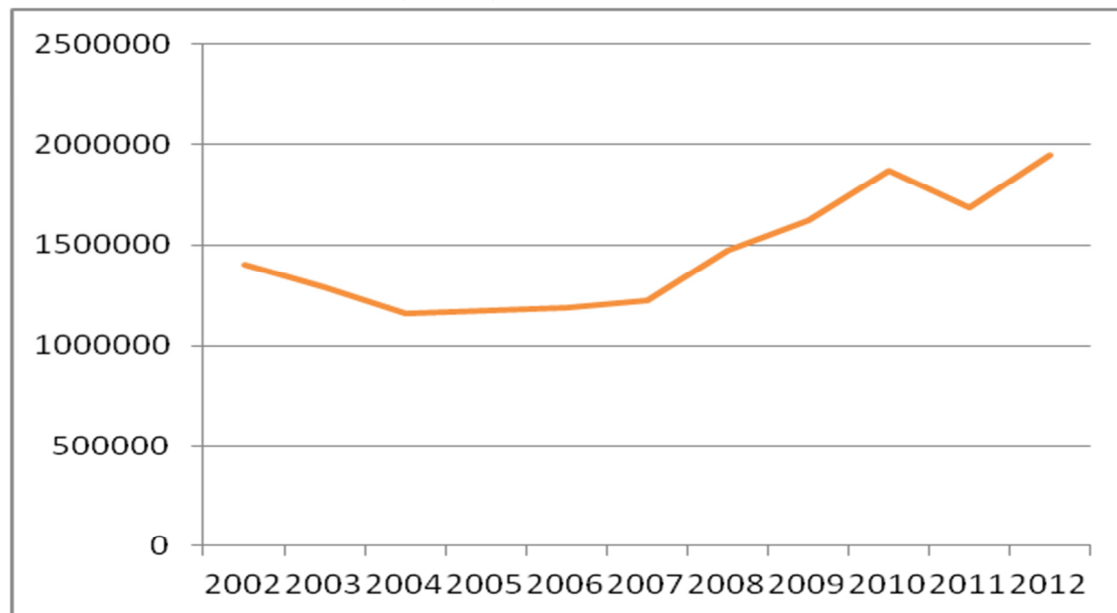
GRAPH-A: Distribution of production of maize in Ghana by region over the period 2006-2010

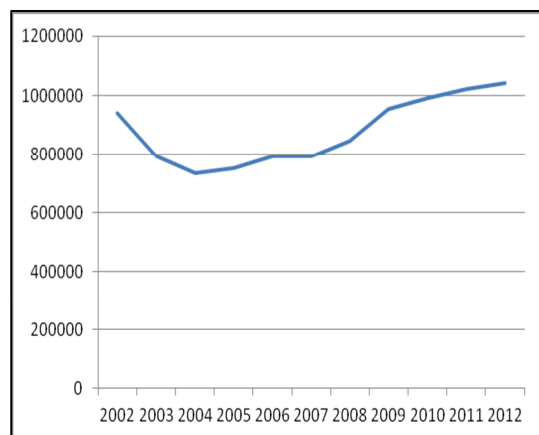
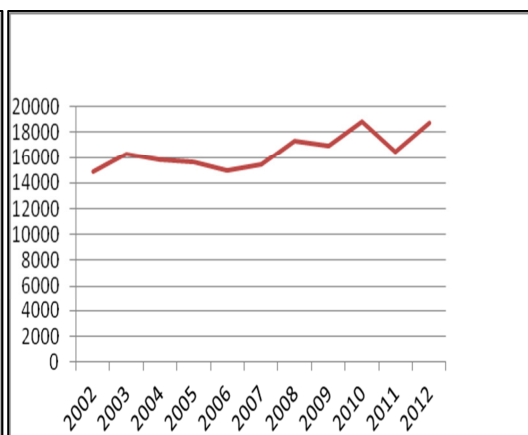


Source: Ministry of Food and Agriculture, Statistics, Research and Information Directorate (SIRD, 2013)

Total maize production increased from 550000 tonnes in 1990 to over 1900000 tonnes in 2012. As can be seen in the graph below, production dropped significantly around 2002 and remained stagnant till 2007 but has gradually trended upwards since then. Productivity remained approximately constant over this period but the production decline appears to follow a curve similar to area harvested. Both yield and area have on average improved since 2008 leading to an overall increase in production.

GRAPH B: MAIZE PRODUCTION (tonnes)

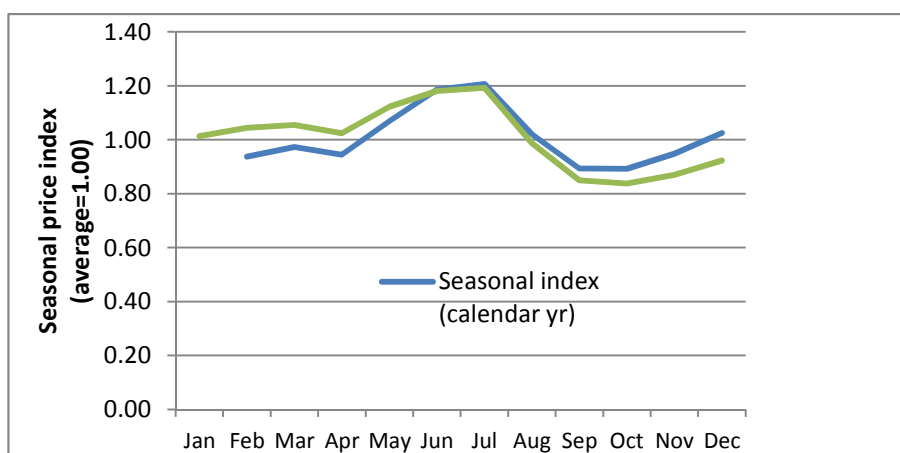


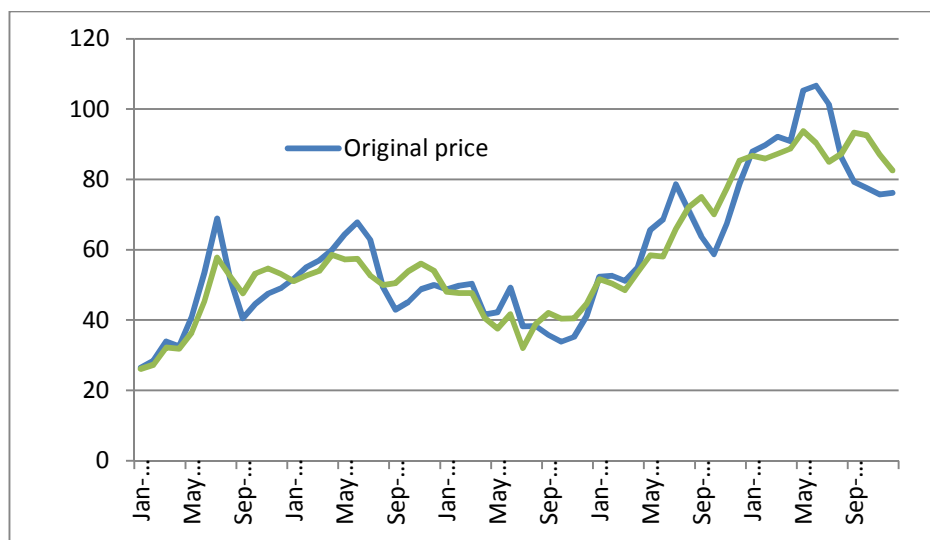
GRAPH-C: MAIZE AREA HARVESTED (ha)**GRAPH-D: MAIZE YIELD (hg/ha)**

PRICE-SEASONALITY

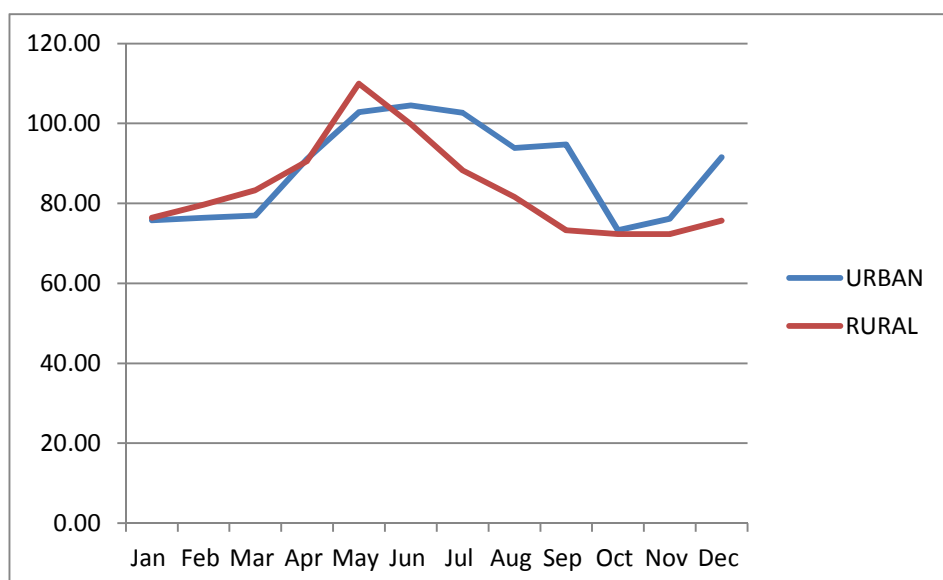
The first graph plots two seasonal indexes, based on calendar year and moving average. The seasonal pattern does not appear to follow a clear usual U shaped trend over a calendar year. Prices climb in the first half of the year and peak in the June-July period. Prices then fall to the lowest point in August-October period and then rise again through November and December. Graph G shows that the price rise in November-December can be attributed to urban markets. This could be explained by diminishing post-harvest stocks in urban markets (limited public and private storage capacity is known to be a critical constraint in most markets in Ghana) as the harvest period for the main crop ends in September in the South and October in the North.

The second graph (F) shows the original price (blue line) and the price with seasonality removed (green line). The fact that the green line is volatile would in theory indicate that seasonality is not the main explanation for the variation in this price.

GRAPH-E: SEASONAL PRICE INDEX**GRAPH-F: SEASONAL PRICE INDEX**



GRAPH-G: RETAIL PRICE TRENDS AVERAGED (2008-2012) FOR KEY URBAN AND RURAL MARKETS



RICE

Rice is considered to be the second most important grain food staple in Ghana, next to maize (MoFA, 2013). It is also the first imported cereal in the country accounting for 58 percent of cereal imports (CARD, 2010) accounting for 5 percent of total agricultural imports in Ghana over the period 2005-2009. Per capita consumption of rice (*Oryza spp. L.*) in Ghana increased from 17.5 kg per annum between 1999 and 2001 to 22.6 kg per annum between 2002 and 2004. By 2011, it had reached 38 kg per annum and projected to reach 63 kg per annum by 2015 (USAID,2012).

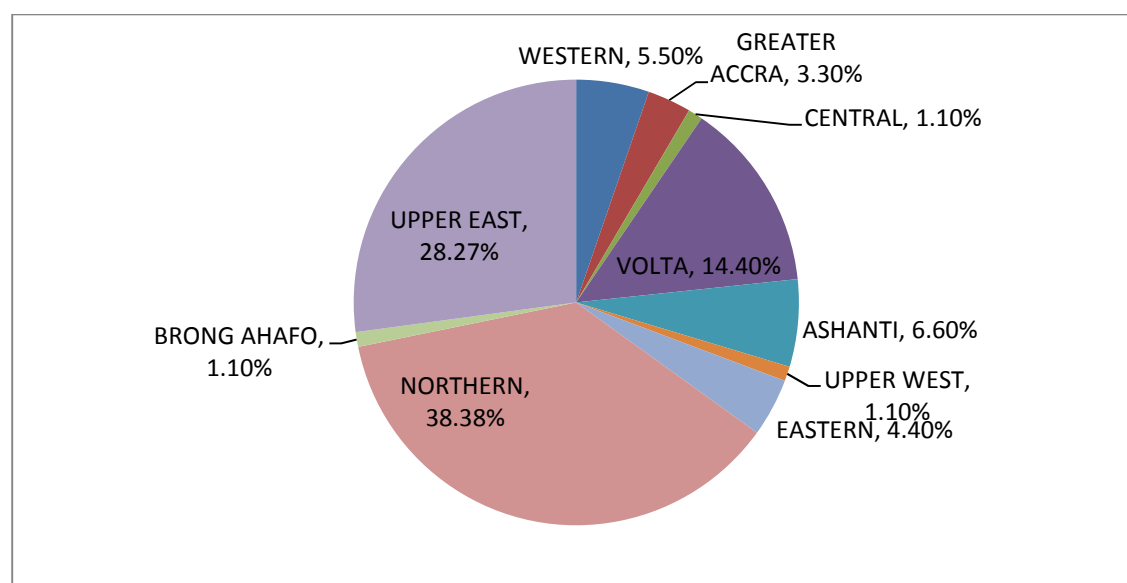
Although figures from different sources vary, the production and trade data suggests that about 70% of rice consumed in Ghana is imported. Ghana thus has two parallel rice markets in play i.e. local and imported rice markets. Various studies show that Ghanaian consumers have a higher preference for

imported rice because of its perceived higher cooking and sensory characteristics and quality (Diako et al., 2011; Tomlins et al., 2005 c.f. USAID,2012).

PRODUCTION

While rice is grown in all ten regions of Ghana, production is very concentrated: the top-three regions (Northern, Upper East and Volta) accounted for nearly 80% of total national output and 73% of total production area in 2010 as can be seen in the graph below.

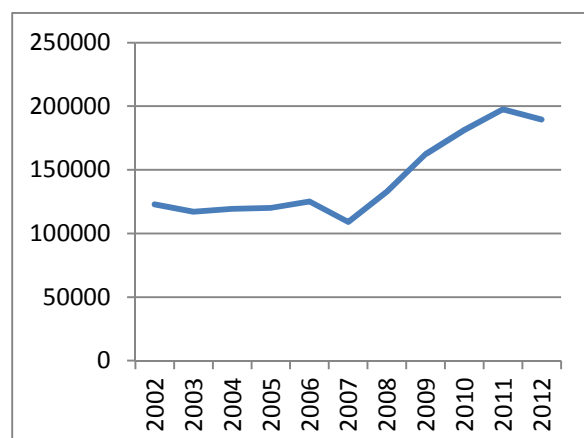
GRAPH-H: Rice production per region in Ghana (percentages, 2010)



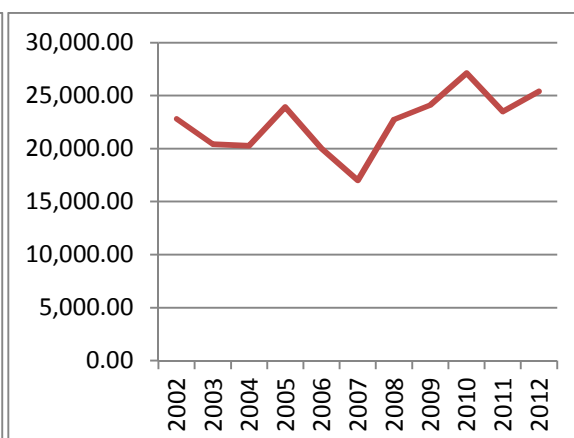
MOFA, SRID (2013)

As can be seen from the graphs below, rice paddy production sharply dropped in 2007 to 185340 tonnes from 280000 tonnes in 2002,, a significant drop in yield and area harvested can also be observed in this period. Production has steadily improved since 2007 and stood at 481134 tonnes in 2012. The average milling recovery rate is according the SIRD is 69% although the qualitative data suggests that this figure is on the higher side.

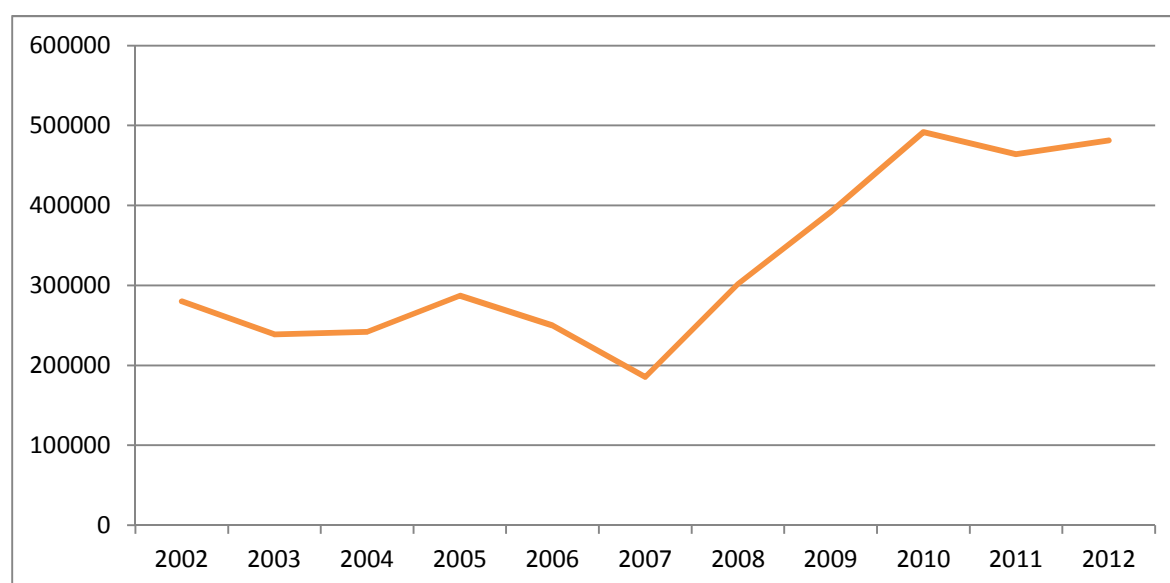
GRAPH -I: AREA HARVESTED (ha)



GRAPH-J: YIELD (hg/ha)



GRAPH –K: PRODUCTION (tonnes)

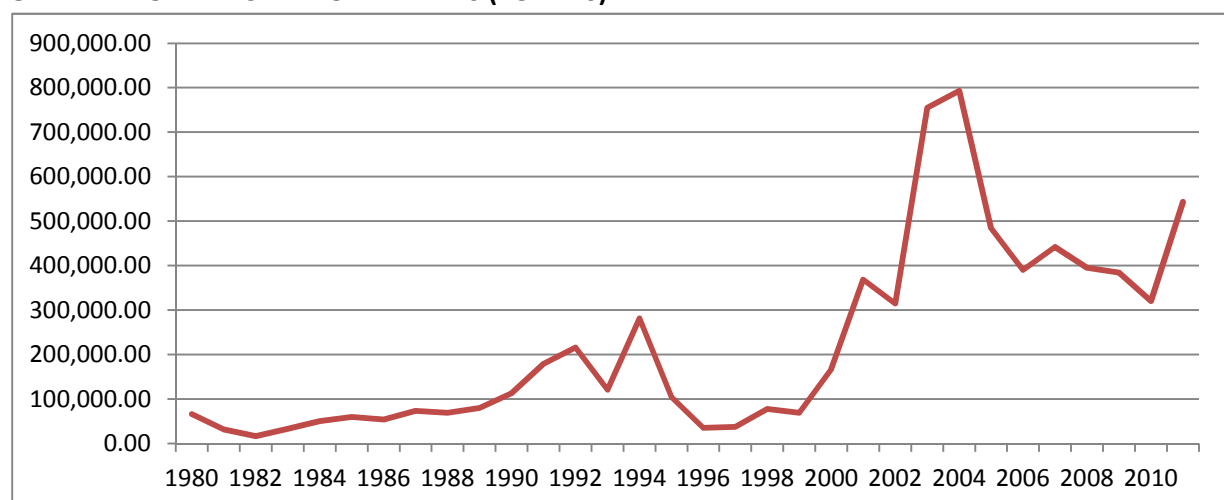


IMPORTS

Despite the observed growth in production from 2007, Ghana has been importing significant quantities of rice to address quality and quantity differences between local production and demand. The rice import volume in 2011 was 543,446 tonnes which was substantially more than the 442,064 tonnes in 2007.

In terms of import penetration the ratio is reported to have increased between 2000 and 2003, peaking at about 486% but it has been declining since the mid 2000s, reaching 174% in 2009 (USAID, 4). Although rice imports appear to be in decline year to year (except 2007) since 2004, there has been a sharp increase of approximately 70% between 2010 and 2011.

GRAPH-L: TOTAL RICE IMPORT TRENDS (TONNES)

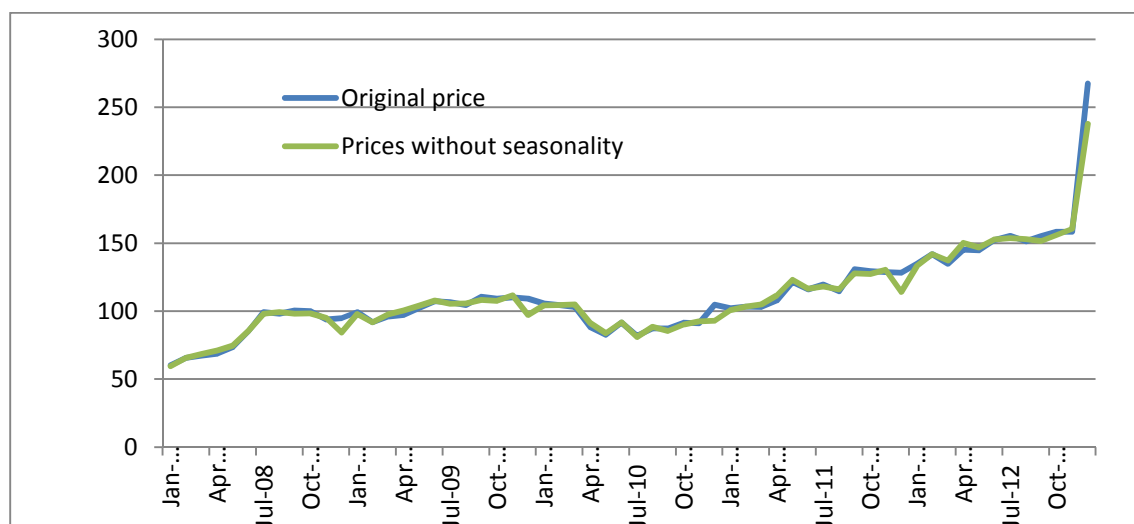
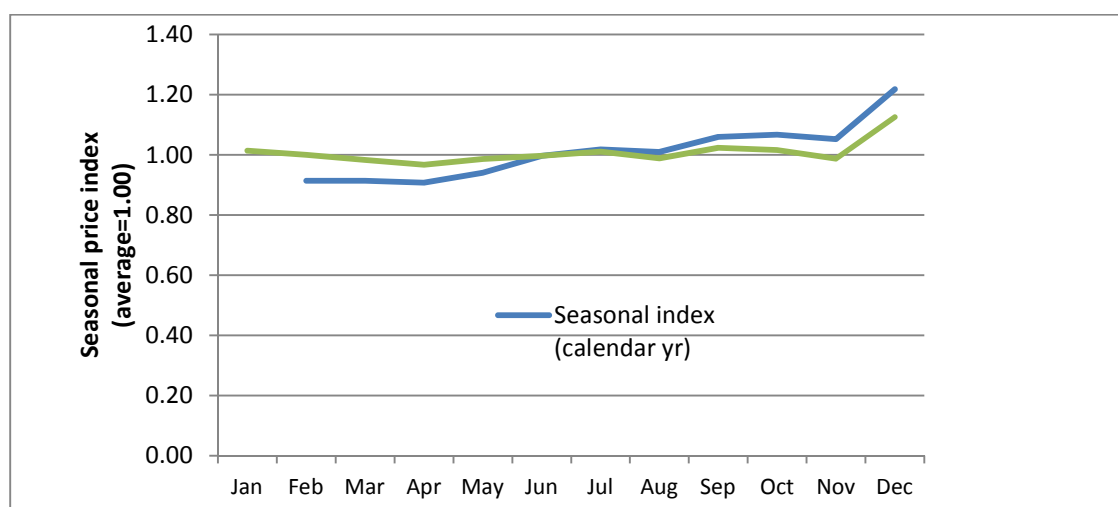


PRICES-SEASONALITY

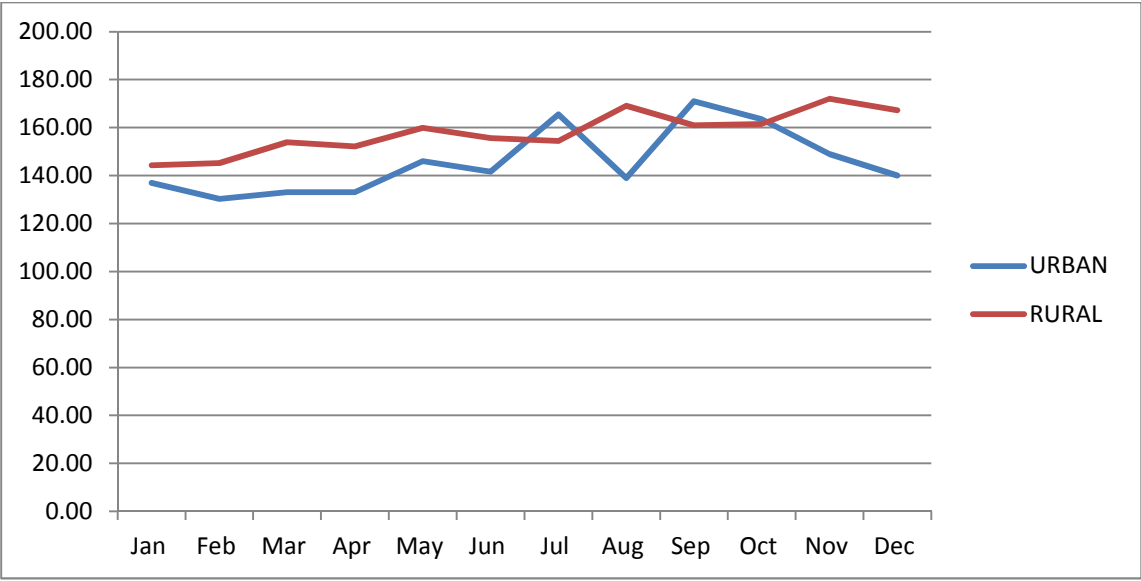
The first graph plots two seasonal indexes, based on calendar year and moving average. The seasonal pattern does not appear to follow a clear seasonal trend over a calendar year. Prices appear to fall marginally in April and remain approximately stagnant till mid October and rise again, peaking in December.

The second graph shows the original price (blue line) and the price with seasonality removed (green line). The fact that the green line is volatile would in theory indicate that seasonality is not the main explanation for the variation in this price.

GRAPH-M: SEASONAL PRICE INDEX



GRAPH-N: RETAIL PRICE TRENDS AVERAGED (2008-2012) FOR KEY URBAN AND RURAL MARKETS



CHAPTER 2: A BRIEF HISTORY OF AGRICULTURE MARKET INTERVENTIONS IN GHANA-UNDERSTANDING THE POLICY CONTINUUM

The state in Ghana has been historically involved in agricultural production and marketing through an array of public trading and marketing institutions and policy instruments. Agriculture policy has also been very closely shaped by the changing post independence political economy. A detailed description can be found in Stryker et al (1990) and World Bank agriculture sector review reports. For the purposes of this paper it would suffice to briefly examine the evolution of agriculture policy and identify key institutions involved in procurement and marketing of cereals.

The agriculture/food policy during 1951-1966 under the Convention Peoples Party (CPP) was increasingly driven by large-scale state led mechanized agriculture (Aryeetey, 2004). Consequently the government's programmes paid scarce attention to the welfare of private small holder farmers. Institutionally the Agriculture Development Corporation (ADC), was mandated with the task of promoting large scale mechanized agriculture. The ADC was soon liquidated in 1962 with heavy deficits and in the same year state farm corporations were set up to implement a similar mandate.

The end of the CPP government saw a policy shift which was marked by a high level of state intervention in private agricultural production and marketing focussing on boosting production through individual farmers. The period from 1966 is marked by a series of state led marketing and pricing interventions through different public sector agencies. One key common objective of all these institutions was producer support through guaranteed pricing and public procurement.

The first of these was the Ghana Food Marketing Corporation (GFMC) established in 1966 by an act of parliament with the mandate to buy, distribute and sell food stuffs throughout Ghana and to organize the export of foodstuffs for which no local market was available (WTO, 1968).

Another public organization called the Grains and Legumes Development Board (GLDB) was established a few years later in 1970 under the Ministry of Food and Agriculture (MoFA). GLDB was engaged in buying and selling maize, rice and palm oil to stabilize prices in the 1970s. It is operational today although its present mandate does not include trade and marketing.

GFMC ceased to exist in 1971 when the Ghana Food Distribution Corporation (GFDC) was formed by an act of parliament under the Ghana Food (distribution) Corporation Instrument, 1971. All assets and liabilities of GFMC were transferred to GFDC as per the said instrument.

The initial stated purpose of GFDC was only to market perishable goods and organize grocery shops but in 1975 it absorbed the marketing division of GLDB and its primary function moved to buying selected food crops (maize and rice) at guaranteed minimum prices from farmers for sale in urban areas at government approved prices (Puplampu, 1999).

Besides the GFDC another contemporaneous agency intervening in the rice market was the Rice Mills Unit (RMU) which implemented the floor pricing policy by buying paddy at fixed prices and selling milled rice at fixed whole sale prices.

The grain marketing activities of GFDC/GLDB were mainly focussed on supporting maize through guaranteed pricing but in case of a surplus when the market prices fell, there were reportedly not

enough resources to defend the floor price. For example in 1974/75 there was a substantial maize surplus but GFDC/GLDB failed to defend the stated floor price (Stryker, 1990). Similarly the RMU (see Ama, 1975 for details of RMU operations) was also not able to support the paddy floor price in the event of a production surplus (Stryker, 1990).

GFDC reportedly had minimal impact on the market due to the lack of storage facilities in farming communities, difficulties in transporting farm produce to urban centres and defaulting on payment to farmers. The failure of the principal food marketing institution i.e. GFDC to purchase all the grains offered by farmers made the government's price support policies ineffective (Frimpong, 2013). GFDC was dissolved in 1987 (Brooks et al, 2007) on account of growing losses and the structural adjustment reforms. By 1990 the government eliminated all guaranteed minimum pricing paid to farmers for food crops such as maize and rice.

It is interesting to note that although GFDC was dissolved in 1987, price stabilization and food reserves were articulated as a policy objective in the new agricultural policy document for the 86-88 biennial in the 'Ghana Agricultural Policy: Action Plan and Strategies 1986-88.' Key objectives included in this initiative were: self-sufficiency in cereals, starchy staples and animal protein food, with priority for maize, rice and cassava in the short term; maintenance of adequate buffer stocks for price stabilization and food security during shortfalls.

It was only in 2010 that guaranteed pricing and food reserves were re-introduced with the incorporation of the National Food Buffer Stock Company (NAFCO) in 2010.

CURRENT POLICY FRAMEWORK

As a response to concerns over the level of food imports, poor marketing and the long term sustainability of national food security, the government developed a 'Food and Agriculture Sector Development Policy' (FASDEP) in 2002 outlining the long term objectives and strategies in food and agriculture. However FASDEP failed to achieve its objectives for a variety of reasons as outlined in the introduction to FASDEP-II. FASDEP-II was published in 2007 as a revised policy document incorporating the lessons learnt from implementation of FASDEP I. FASDEP-II emphasizes national food security as one of the main agriculture and food sector objectives in line with the national development framework (FASDEP, 2007).

It is important to note that FASDEP-II includes price stabilization for the main staple food commodities (cassava, yam, maize, sorghum, millet, rice) as an explicit policy objective and buffer/strategic stock is identified as the implementing mechanism (FASDEP, 2007).

In 2010 MoFA published the Medium Term Agriculture Sector Investment Plan or METASIP which is the investment plan to implement the medium term (2011-2015) programmes of FASDEP-II. This document published a few months after NAFCO was established lays down key outputs in relation to NAFCO. Outputs under METASIP include building NAFCO capacity with two objectives: - (1) Establish a 6-month supply of food strategic stocks (maize, sorghum, gari etc.) and (2) Use market and price information for managing the stocks and price stabilization.

The latest Ghana Poverty Reduction Strategy; GPRS II (2006-2009), recognizes agriculture as the driver for growth and recommended strategies include maintenance of food reserves. In introducing

Pillar 1, the vision is stated thus: “The objective of GPRS II is said to be to achieve accelerated growth through modernized agriculture, led by a vibrant and competitive private sector.....”

One of the policies stated in GPRS-II is ‘Institute mechanisms to manage external shocks’ and the recommended strategy is ‘Maintain stable reserves’ (Source: Appendix 1IC: Good Governance and Civic Responsibility, in Policy Matrix, Appendix II of GPRS II)

CHAPTER 3: THE NATIONAL FOOD BUFFER STOCK COMPANY (NAFCO)

MANDATE AND OBJECTIVES

Ghana operates a food reserve/buffer stock agency known as the National Food Buffer Stock Company (NAFCO) under the Ministry of Food and Agriculture. NAFCO was primarily established as an output support instrument to compliment the governments agriculture modernization programme which led to potential increase in farm output. The stated objectives of the company are described below:-

1. Stabilize Food Grain Supply and Price
2. Create Employment
3. Ensure Emergency Food Reserve
4. Ensure Macro-economic Stability
5. Act as a Foreign Exchange Earner
6. Promote the Consumption of Locally Grown Produce
7. Boost Agro-Processing Factories

The overall mandate of NAFCO is similar to that of a typical national buffer stock agency which in theory seeks to restrict price volatility between a band bounded by a floor price and a ceiling price through procurement, storage and stock release. Buffer stock system is implemented in many low/mid income countries under different models but in essence it can be defined as a set of policies aimed at food price and supply stabilization through instruments of stock management (Stockbridge, 2009, 14).

The different primary objectives enumerated above require the buffer stock agency to make a variety of regulatory interventions. The ease and feasibility of these objectives and the level of associated risks depends on the nature and extent of these interventions. The table below identifies the nature of intervention and indicates the potential associated risk. The table only includes primary objectives to avoid duplication.

TABLE-2: RISK ASSESSMENT OF OBJECTIVES

OBJECTIVE	NATURE OF INTERVENTION	ASSOCIATED RISK
Price stabilization	Market Intervention	High
Promote local produce consumption	Guaranteed pricing and procurement	High
Emergency Reserve	Food security	Low
Boost Agro-Processing Factories	Supply chain/market development	Low

INSTITUTIONAL STRUCTURE

The institutional structure of NAFCO is different from its predecessors in that it is not a statutory body but incorporated as a company with a CEO and a board of directors. It is wholly owned by the Government of Ghana and is under the administrative control of the Ministry of Agriculture. Whilst it an independent company as a legal personality, it implements government policy and to that extent

is an instrument of the state. For instance the guaranteed minimum price at which NAFCO has to purchase from the market is determined by the agriculture pricing commission and not by NAFCO.

The operational relationship of NAFCO with MoFA and other government departments is not entirely clear.

PROCUREMENT MODALITY

NAFCO uses a third party procurement modality wherein procurement is carried out by small/medium trading enterprises known as Licensed Buying Companies or LBCs. These LBCs are required to buy cereals from the farmers on behalf of NAFCO at prices set by NAFCO as determined by the agriculture prices commission. A margin in the form of a commission is added per bag to the farm gate prices to arrive at the price to be paid to the LBC. The commission takes into account cost of transport, sacks, other incidentals and a profit margin.

Theoretically, since the procurement price is a 'guaranteed minimum price', NAFCO would be obligated to purchase any amount of commodity offered at that price. However since there are no deposit centers where farmers can bring their produce for sale and the procurement modality relies on the agency of traders/aggregators, the beneficiaries of the off-take would depend on the traders purchasing practices.

PROCUREMENT AGENTS: LICENSED BUYING COMPANIES

Currently NAFCO has entered into a contract with 75 trading companies. The terms of the contract include parameters on quality, amount to be delivered, delivery time, payment schedule etc. LBCs usually purchase from farmer groups and deliver to the NAFCO regional depot. Payment from NAFCO is made in arrears. It is important to note that LBCs are independent proprietorships and the business from NAFCO can constitute a significant part of the inventory turnover depending on the size of the LBC.

LBCs have very limited storage capacity and the storage infrastructure for hire in the open market is also limited. One of the LBCs interviewed in Tamale could store a maximum of 2000 bags of paddy in a rented warehouse, the maximum storage duration for a single inventory being around 2 months. The condition of most of these warehouses is reported to be average with significant food safety challenges in case of prolonged storage.

Storage infrastructure is a critical constraint for LBCs, another medium LBC interviewed in Tamale has a storage capacity of 5000 mt against a stated requirement of 25000 mt.

Challenges

Although traders are happy with the LBC concept and the assured business which NAFCO brings, some of the key issues as reported are highlighted below.

One of the major issues is the inability of NAFCO to off-take agreed amount of stocks from LBCs due to lack of storage availability. This is further compounded during periods of excess production as has been the case in 2013. Lack of trading capacity in the private sector is a very

serious market constraint and creates a glut in surplus areas, placing higher demand on NAFCO to mop up excess produce.

A second reported issue is the delayed payment to LBCs. Thirdly there is reportedly a lack of communication from NAFCO which affects the ability of LBCs to plan their business.

At the farm interface level, the current process does not ensure that LBCs respect the minimum farm gate prices set by NAFCO and LBCs reach smallholder farmers in remote areas.

COMMODITY PORTFOLIO

The commodity portfolio consists of three commodities i.e. maize, rice and soya bean. Maize and rice constitute the bulk of operations.

STORAGE INFRASTRUCTURE

Storage infrastructure in the form of warehouses and silos is reportedly very limited. Most of the storage facilities being used date back to GDPC days.

The current storage capacity is 34000 mt which accounts for approximately 1.39% of total national cereal production. The actual operational storage capacity is substantially less at 17000 mt

STOCK MANAGEMENT

In theory NAFCO maintains two kinds of stocks, operational stocks and emergency government stocks. Operational stocks are the stocks used to run and operate the company, and the emergency government stocks, are stocks held for the government for use in emergency situations. In practice however, there is no such stock differentiation. There are no instructions from the government on the amount of emergency stocks to be maintained.

In 2011, 16000 bags were purchased from block farms and 1, 15,000 bags were purchased from LBCs. The target quantities for 2012 for maize were 15000 Mt of white maize and 15,000 Mt of yellow maize; 15000 Mt of paddy rice; 1000 Mt of soya.

Although there are specific stock targets, the limited storage capacity would not allow NAFCO to fulfill the stock targets. Furthermore since NAFCO administers the Guaranteed Minimum Price, it would be required to lift grains to defend the floor price notwithstanding its stock targets. The excess stock would subsequently need to be rationalized through appropriate stock release modalities.

STOCK RELEASE

Stock release in countries where buffer stocks feed a public distribution system is a fairly continuous process as stocks rapidly move into the supply chain of the public distribution system. In any event stocks need to be rotated / released systematically and promptly either through export or the domestic market. NAFCO does not appear to have a clear policy on stock release and rotation besides the GSFP linkage discussed later in this paper.

SMALL HOLDER ENGAGEMENT

Although NAFCO reports that it engages with small farmers, there is no explicit policy or mechanism mandating small farmer procurement. As described earlier, NAFCO procurement is through a contractual arrangement with LBCs, the terms of this contract do not include specific provisions on small holder procurement. LBCs report that being local traders they are well equipped to mop up produce moving from farm to farm and pick up even a small quantity of a few bags or less.

The table below shows the level of market participation for maize and rice for different farm sizes.

Maize (together with Cassava) is present in majority of household portfolios. For farms of up to two hectares, maize is also one the most important crops. Its importance for food security for the smallholders is also evident from the shares of commercialized product by holding size and crop.

Market participation for rice especially for very small farms of less than 1 ha, is comparatively lower as can be seen in the table below. However for farms between 1-3 hectares a significant portion of households commercialize some amount of rice. This would suggest that NAFCO operations in terms of the commodity could have a substantial impact of small holder farm households.

TABLE C: MARKET PARTICIPATION* FOR SELECTED CROP PRODUCERS (FAO, 2013)

HOLDING SIZE	MAIZE	RICE
<0.5 ha	53%	26%
0.5-1.0 ha	55%	39%
1-2 ha	56%	43%
2-3 ha	58%	52%
3-4 ha	58%	65%
4-5 ha	63%	62%
> 5 ha	59%	62%
all	57%	54%

* Share of producing households who market some proportion of their production

Source: IFPRI-GSSP on data from Ghana Statistical Service, 2007 c.f. MAFAP

PRICING

The farm gate price or the Guaranteed Minimum Price for NAFCO procurement is determined by a 'post harvest committee' under MoFA. The committee reportedly takes into consideration the production cost to the farmer plus a 10% profit margin. The details of the methodology adopted by the committee were not available for examination.

NAFCO administers a pan-territorial and pan-seasonal floor price as determined by the government appointed committee and it does not operate a ceiling price. The aggregate impact of NAFCO pricing on the market would be negligible given the low amount of procurement as a percentage of national production (IFPRI,2011).

FLOOR PRICE ANALYSIS

The pan-territorial NAFCO floor price for paddy rice in 2011 was 40 GHC/bag and 50 GHC/bag for paddy rice and maize respectively. The following tables compare the floor price with the cost of

production and the open market farmgate price. Although the open farmgate prices would differ significantly across agro-ecological zones, a national average market price is used for the present analysis due to unavailability of required data. Data on the amount of NAFCO procurement in the different zones would enable a more comprehensive and accurate analysis on floor price administration and price differentials.

Some of the tentative findings from this analysis are:-

1. The return on investment based on the floor price varies significantly across agro-ecological zones and on average is higher for maize as compared to paddy rice.
2. In the case of maize the profit margin is way in excess of the stipulated 10% for all zones except northern savanna, averaging over 46% for the remaining three zones. Return on investment is close to the 10% stipulation for paddy rice in all the zones except for upland rice.
3. The floor price is well below the average open market price for both paddy rice (32.67%) and maize (17.92%).

TABLE-D: FLOOR PRICE RETURN ON INVESTMENT AND OPEN MARKET PRICE COMPARISON

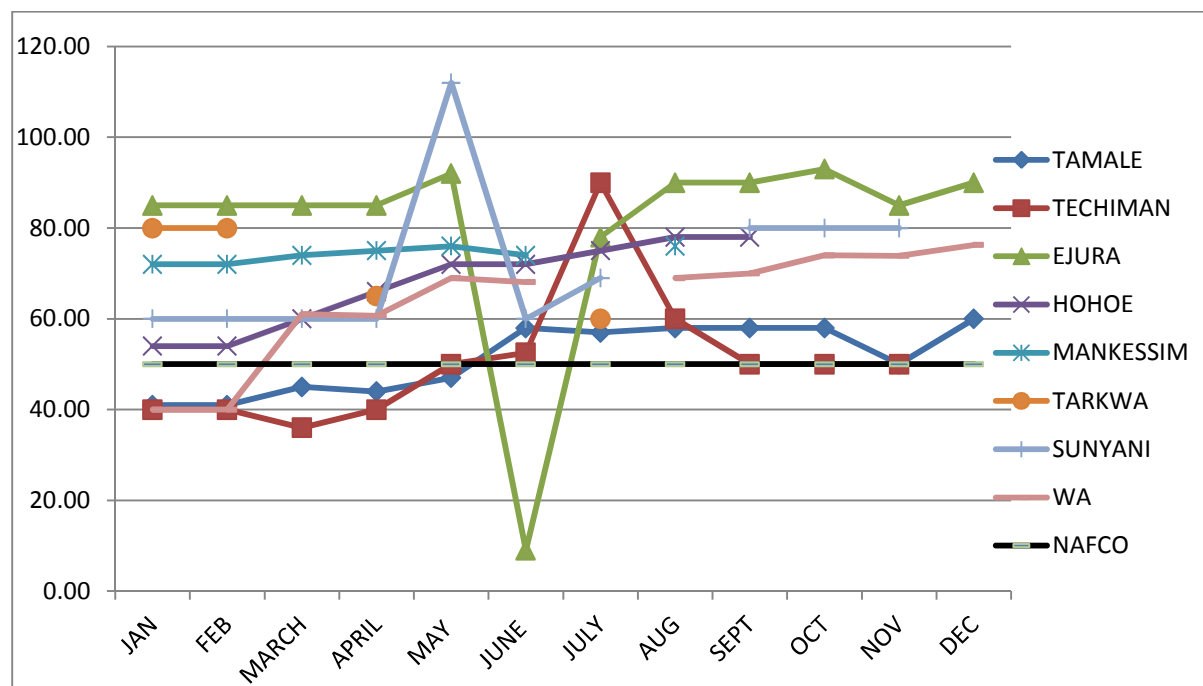
Variety	Agro-Ecological zone	Yield/acre (84 kg bags)	Cost per bag ²	NAFCO farm gate price (return on investment)	Open market farm gate price
RICE					
Irrigated rice	Coastal Savanna	30	37.06	40 (7.93%)	59.41
Upland	Northern Savanna	15	29.42	40 (35.96%)	
Valley Bottom Rice	Forest	25	36.80	40 (10.80%)	
MAIZE					
Traditional	Northern Savanna	3	55.25	50 (-9.50%)	60.92
Improved	Coastal Savanna	13	35.22	50 (41.96%)	
Traditional	Transitional	7	33.09	50 (51.10%)	
Improved	Forest	15	33.97	50 (47.18%)	

The graphs below compare annual (2012) farm gate prices trends across Ghana. It shows the price differences across the markets over a 12 month period. The straight black plotted line is the pan-seasonal NAFCO administered floor price. This is very preliminary analysis to give a sense of different farm gate price trends in relation to the NAFCO price. A detailed analysis and mapping with data on market arrivals, NAFCO procurement points, farm gate price points etc will be conducted as part of pricing research.

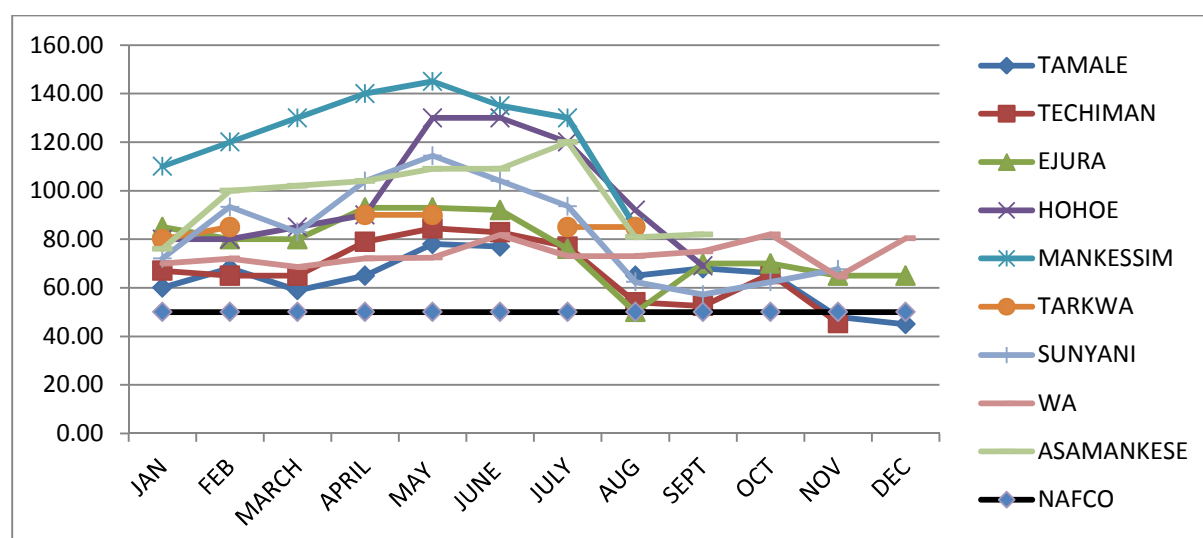
² This is based on 2010 crop budget adjusted for inflation.

As the graph below shows, open market farm gate prices are above NAFCO price for all paddy rice markets from July through December. The floor price as expected comes into play during the post harvest period of January – May in rice producing region of Tamale and the major market of Techiman.

GRAPH-O: 2012 FARMGATE PRICE TREND FOR PADDY RICE



GRAPH-P: 2012 FARMGATE PRICE TREND FOR MAIZE (data uncertain) nafco- 130/100 kg



CHAPTER 4: SCHOOL FEEDING AND RESERVE

GHANA SCHOOL FEEDING PROGRAMME AND NAFCO

In December 2011, NAFCO and GSFP signed a Memorandum of Understanding (MOU) for supply of local rice from NAFCO stocks to the school feeding programme.

Below is a summary of the MOU's main aspects.

General Clauses and statements

- MOU can be terminated at any time, by either party, with 60 days written notice
- NAFCO has capacity to supply maize and rice to any part of the country
- NAFCO is able to supply at very competitive prices below prevailing market prices for similar quality of produce
- NAFCO is able to supply at very short notice.

Responsibilities of GSFP

- Receive and pay for commodities under agreement
- Provide NAFCO with locations to which supplies should be delivered
- Arrange delivery and off-loading at specified locations
- Responsible for all commodities once delivery is made

Responsibilities of NAFCO

- Loading and off-loading costs
- Trucking/haulage arrangements to point of delivery
- Act in timely manner
- Ensure quality standards for human consumption

Pricing

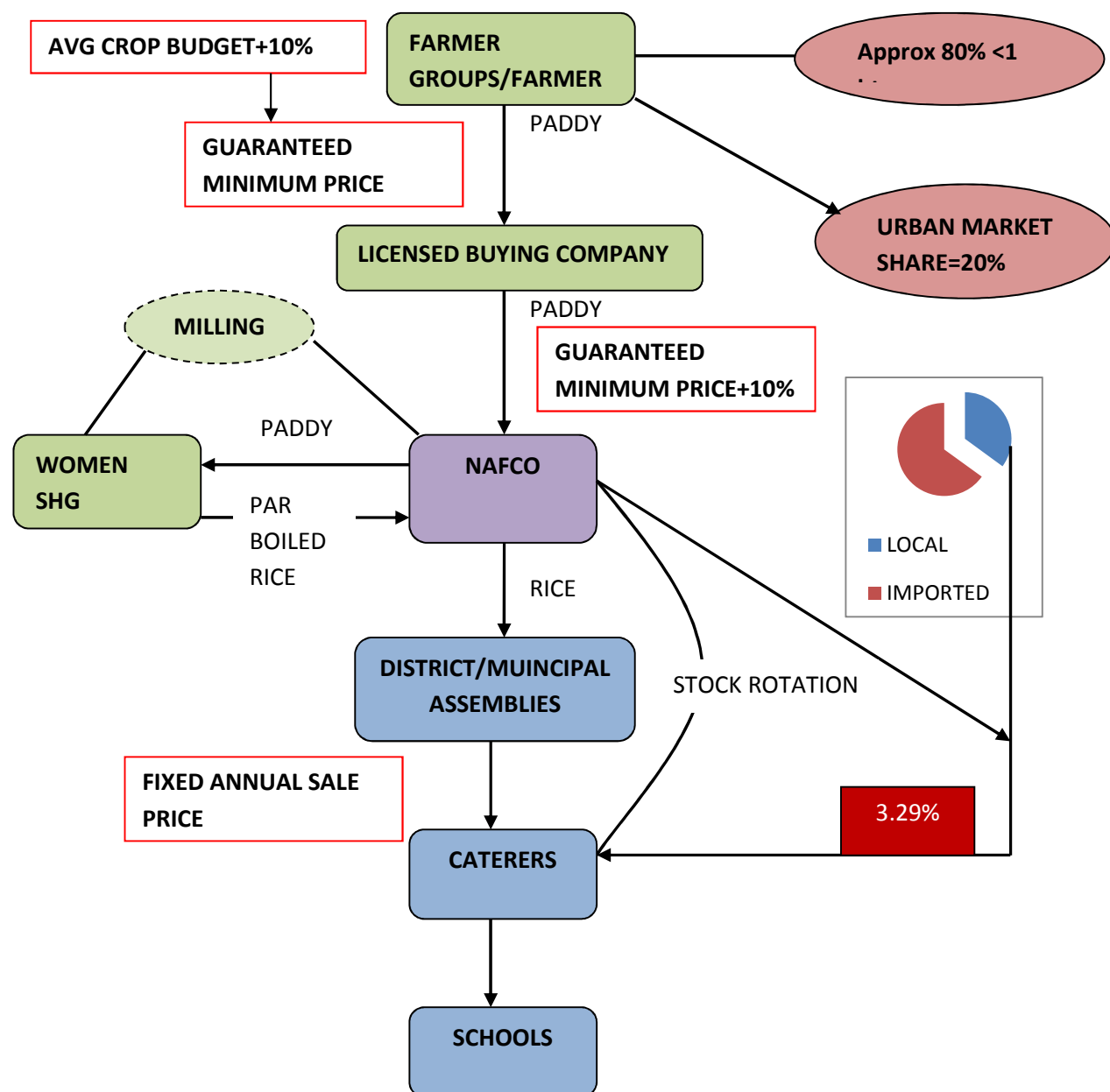
Both parties should agree on pricing. For the first transaction:

- Rice: GH¢80/50kg bag (CIF* price to any point of delivery within Ghana)
- Maize: GH¢45/50kg bag (CIF price to any point of delivery within Ghana)

Payment Terms

Payment for goods should be made as and when GSFP receives its funding from the government.

NAFCO-GFSP SUPPLY LINKAGE ILLUSTRATION



The graph above illustrates the main linkages in the NAFCO-GSFP relationship. NAFCO procures paddy rice as part of its stock operations as described earlier. It employs four private women groups with a total of 5000 members for processing the paddy rice (milling and parboiling). The par-boiled rice is supplied to the caterers for school feeding. As the pie chart on the right hand side shows, local rice has a small share of the national rice market. In 2012-2013, NAFCO supplied approximately 9500 mt of milled rice to GSFP (NAFCO- 190000 * 50 kg). This constitutes approximately 3.29% of the

available total domestic production available for consumption (author's calculation based on provisional 2012 production figures).

CHALLENGES

There are quite a few challenges in the NAFCO supplies to GSFP at both ends of the supply chain. The field survey also identified similar issues through interviews with caterers and other actors.

Most of the challenges at the caterer end relate to issues of communication and quality. These are described in brief below:-

1. The communication channel between the final recipients i.e. the caterers and NAFCO is reported to be very poor. As a result the supply situation becomes highly unpredictable both in terms of time and quantity as caterers are unaware of the delivery schedule.
2. Quality control and consistency is another key challenge, since there are no established mechanisms for testing quality. Furthermore no systems appear to be in place to expeditiously return and replace a consignment that does not meet the agreed quality parameters.
3. There is overall lack of traceability due to poor labeling and inventory management practices.

At the NAFCO point the main challenges are:-

1. Delayed payments from GSFP.
2. Inability to meet GSFP demand. For instance in January 2013, NAFCO was reportedly not able to meet GSFP's demand and a supply risk continued for the subsequent school term as well.

PRICING

A very important aspect that needs to be understood and analyzed in detail is pricing and its impact on caterers in different markets.

This would need to take into account the procurement and holding costs for NAFCO. There is no reliable data on this at present.

Although NAFCO price is uniform across the country, the effects vary substantially across markets and agro-ecological zones. Under the present model caterers are required to use the NAFCO supplied rice and cannot choose to elect out of the arrangement. A basic reading of price trends in different urban and rural markets leads to the inference that there may be some implicit cross subsidization across markets.

The graph (Q) below illustrates the point on variable benefits and compares price trends for 2012 calendar year for local milled rice in selected markets with the pan-seasonal NAFCO sale price of 80 GHC. Caterers procuring from markets Accra, Wa, Bolgatanga benefit throughout the year from the lower NAFCO prices where as Tamale and Techiman pay a premium for NAFCO rice for the first half of the year. The story in 2013 is different as NAFCO raises its sale price to 90 GHC and more caterers end up in the premium paying category.

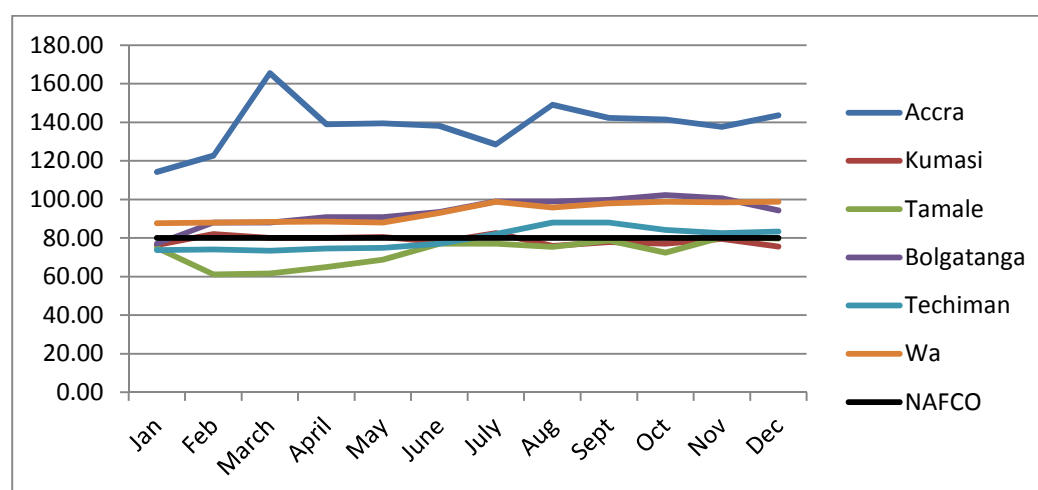
As the graph for 2013 shows only Accra benefitted from NAFCO prices and Kumasi caterers end up paying a premium. This raises some interesting issues on pan-seasonal and pan-territorial sale price for GSFP which would need to be closely examined.

Some amount of premium to insure against price volatility would appear to be justified but the burden across markets should be rationalized.

Similarly large amount of discount in some markets such as Accra as can be seen in bar graph 3 might be an excessive cost burden on NAFCO.

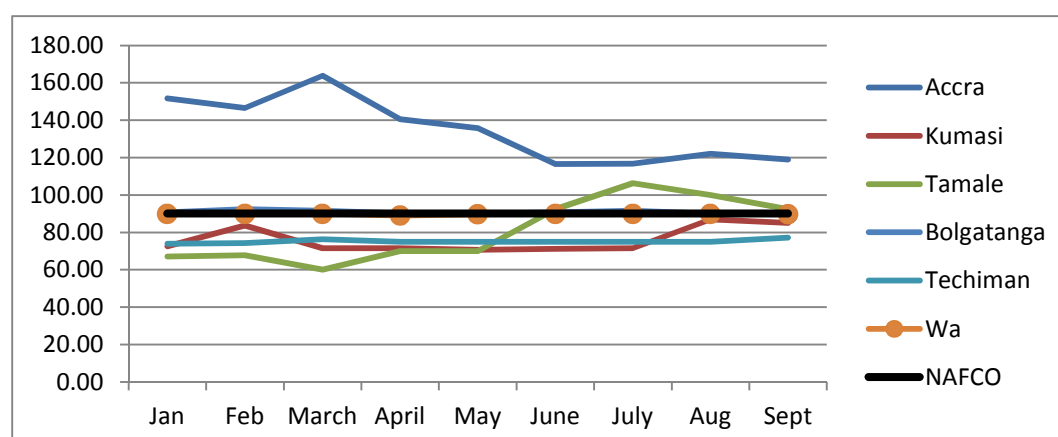
Very importantly the potential implications of this on school feeding meal quality require attention. It would perhaps be more prudent to vary the meal cost given to caterers rather than create an artificial pricing parity for staples through a third agency.

GRAPH-Q: PRICE COMPARISON OF NAFCO SALE PRICE AND WHOLESale PRICES (2012)*



*Based on average 2012 wholesale figures for 50kg local rice bags

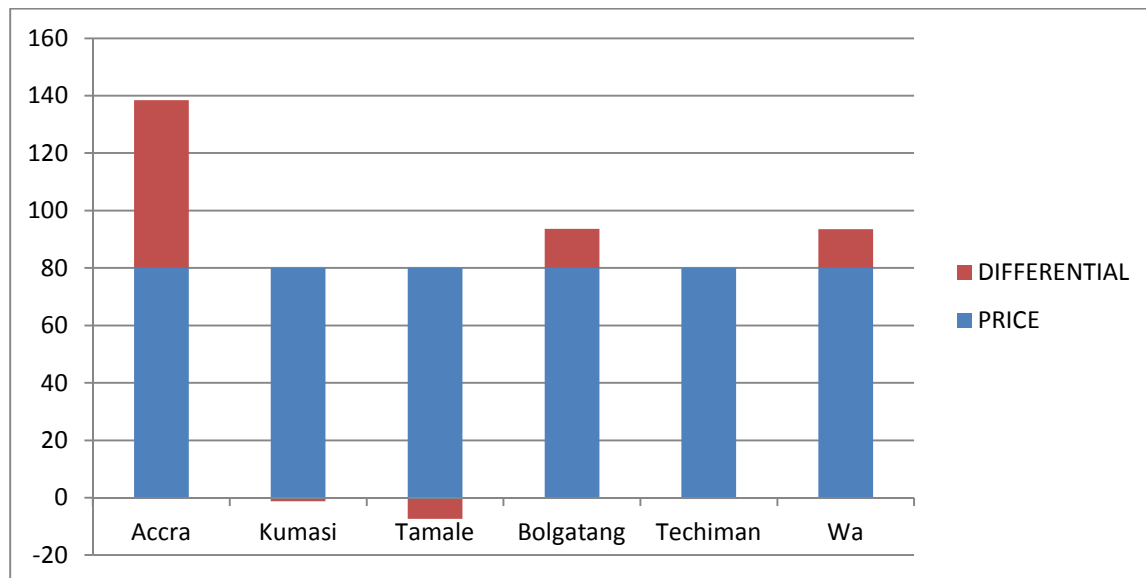
GRAPH-R: PRICE COMPARISON OF NAFCO SALE PRICE AND WHOLESale PRICES (2013)*



The graph below shows the average annual price between NAFCO price and the market price. On average caterers in Accra receive an average annual discount of 58.41 GHC on every bag of rice whereas in Tamale, Kumasi and Techiman caterers on an average pay a premium for NAFCO rice. It is important to note that any inferences based on the annual average figures need to be examined

with caution in assessing the overall all benefits or otherwise of NAFCO prices for caterers. An accurate analysis would need to take into account the volume of purchases made by caterers in different months which depend on the storage capacity and the school calendar. An RCT comparing different procurement models for school feeding amongst other things, being undertaken by PCD and other partners should provide better insights.

GRAPH-S: PRICE DIFFERENTIAL BETWEEN OPEN MARKET PRICE AND NAFCO PRICE



CHAPTER 5: TECHNICAL NEEDS ASSESSMENT

Technical needs assessment was carried out with NAFCO over three consultations in Accra. A final TNA interview was conducted with the Operations Director in October 2013. The consultations identified key issues which need to be addressed across realms of policy, management, institutional structure, funding and capacity. The scope of PCD SGR support includes technical assistance in evidence generation, policy development, operational guidelines development, pilot interventions and impact assessment. The content of the support within grant parameters would entirely depend on the needs as articulated by NAFCO. It is useful to note that for 'needs' beyond the scope of this initiative, support can be provided in developing leads where possible.

STRUCTURAL/CONSTITUTIONAL ISSUES

Overall the most critical structural constraint would appear to be a lack of clarity on the organization's objectives and its role and purpose as an instrument to administer government policy. There appears to be a disconnect between the personality of the company, stated objectives and the fiscal and operational relationship with the agriculture ministry. It has therefore been suggested that the legal framework supporting NAFCO needs to be clarified and the mandate needs to be clearly defined.

RESOURCES/INFRASTRUCTURE/PPP

In terms of resources the organization is severely handicapped by very limited storage infrastructure and financial resources. The assessment identified an urgent need to create a platform for PPP engagement in different aspects of NAFCO storage operations.

OPERATIONAL ISSUES

Operationally the main challenges are related to stock management, procurement, pricing and food safety. The issues around these aspects include:-

1. Demarcation of different stocks i.e. emergency stocks, buffer stocks etc. (ecowas stocks?) commodity exchange
2. Assessing required stock levels. (FAO measurement is for ready to eat)..how do we determine surplus
3. Stock rotation
4. Inventory management system..this should reflect the different stocks including ECOWAS
5. Clear procurement guidelines which may include different procurement modalities
6. Pricing guidelines (*).....commodity exchange
7. Food safety monitoring and assessment at the warehouse level...aflatoxin risk profiling

GSFP-NAFCO linkage

Given that this initiative links two different interventions and organizations there are important issues around harmonizing objectives and streamlining processes that need to be examined closely. Some of the main issue that need to be reviewed include:-

different pricing criteria to accommodate SF?

1. Pricing for GSFP sales
2. Communication between different actors
3. Grievance redressal mechanism
4. Pan-territorial NAFCO sale price
5. Mechanism to elect out of the arrangement

The table below lists the needs along with indicative priorities and suggested activities

TABLE- E: NEEDS ASSESSMENT PRIORITY AND ACTIVITIES

S.No	NEEDS	SCOPE	PRIORITY	ACTIVITIES
1	Review of NAFCO regulatory framework and mandate	Y	High	-
2	Stock management policy	Y	High	Research on stock management aspects, policy development, operational guidelines.
3	Inventory management technology	Y	High	Pilot inventory management system development and testing by software vendor
4	Procurement	Y	Med	Procurement guidelines, pilot intervention
5	Pricing	Y	Low	Market analysis, pricing guidelines review
6	PPP on Storage/warehousing facilities	Y	High	PPP workshop/meeting
7	Food safety risk assessment	Y	Med	Food safety survey at community and warehouse level
8	Onsite food safety equipment	Y	High	Pilot testing of identified equipment/methods
9	Food safety training/pest control	N	High	-
10	Review of GSFP-NAFCO linkage	Y	High	Review of policy and operational linkage, development of manual/guidelines

REFERENCES

1. Ama,K.O (1975), Rice Marketing in Ghana, An Analysis of Government Intervention in Business, The Scandinavian Institute of African Studies: Uppsala.
2. Angelucci F (2012), Analysis of incentives and disincentives for maize in Ghana. Technical notes series, MAFAP, FAO, Rome
3. Angelucci F., Asante-Poku A. and Anaadumba,P(2013), Analysis of incentives and disincentives for rice in Ghana. Technical notes series, MAFAP, FAO, Rome
4. Aryeetey,E.B et al (2004), The Right to Development Report-Ghana Country Study, Legal Resources Centre: Accra
5. Benin,S et al (2011), Evaluation of Four Special Initiatives of the Ministry of Food and Agriculture, Government of Ghana
6. Brandileone, G et al (2013), GSFP-Re-evaluating the Role of Buffer Stocks in School Feeding, IBD/PCD.
7. Brooks,J et al (2007), Distortions to Agricultural Incentives in Ghana, Agricultural Distortions Working Paper 47. World Bank
8. FAO (2005),Fertilizer use by crop in Ghana ,FAO :Rome
9. Frimpong,H.N (2013), Food Security in Northern Ghana: Policy Issues in Historical and Contemporary Contexts, Africa Portal Backgrounder, No.62.
10. Gage,D et al (2012),The Market for Maize, Rice, Soy and Warehousing in Northern Ghana, USAID
11. Ghana Agricultural Sector Review (1985), Report No. 5366-GH, World Bank
12. MoFA (2007), Food and Agriculture Sector Development Policy (FASDEP II), MoFA: Accra
13. MoFA (2010), Medium Term Agricultural Sector Investment Plan (METASIP) 2011-2015, MoFA: Accra
14. National Development Planning Commission (2010), Ghana Poverty Reduction Strategy Paper II, Government of Ghana
15. Pupilampu,K.P (1999), 'The State, Agricultural Policies and Food Security in Ghana (1983–1994)', Canadian Journal of Development Studies/Revue canadienne d'études du développement, 20:2, 337-359.
16. Stryker,J.D et al (1990), 'Trade, Exchange Rate, and Agricultural Pricing Policies in Ghana', World Bank Comparative Studies.
17. WTO (1968), Background Material for Article XVIII: B Consultation with Ghana, WTO

ANNEX-A: FOOD BALANCE SHEET 2011/2012

Type of Commodity	Gross Biological Production (MT)	Available Domestic Production Available for Human Consumption** (MT)	Total for	Total Imports of Commodities (MT)	Carry Over Stock (MT)	Total Exports of Commodities (MT)	Total Supply of Commodities (MT)	Per Capita Consumption (Kg/Annum)	Estimated Net Consumption of Commodities (MT)	Net Deficit/ Surplus (MT)
CEREALS	2,433,356	1,830,742		662,798	277,464	15,100	2,755,905		2,256,380	499,525
Maize	1,683,984	1,178,789		15,690	119,448	15,000	1,298,927	45.0	1,088,430	210,497
Rice (Milled)***	278,385	242,195		257,006	78,030	100	577,131	24.0	596,400	-19,269
Millet	183,922	160,012			16,001		176,013	5.0	124,250	51,763
Sorghum	287,065	249,747			24,975		274,721	5.0	124,250	150,471
Wheat	0	0		390,102	39,010		429,112	13.0	323,050	106,062
STARCHY STAPLES	25,455,799	19,316,491		0	0	2,050	19,314,441		10,007,095	9,307,346
Cassava	14,240,867	9,968,607					9,968,607	154.0	3,799,565	6,169,042
Yam	6,295,453	5,036,362				2,000	5,034,362	50.0	3,106,250	1,928,112

Plantain	3,619,834	3,076,859			50	3,076,809	85.0	2,107,280	969,529
Cocoyam	1,299,645	1,234,663				1,234,663	38.0	994,000	240,663
LEGUMES:	883,008	774,519	0	0	100	774,419		472,150	
Groundnuts	479,245	431,321			50	431,271	12.0	298,200	133,071
Cowpea	239,253	203,365				203,365	5.0	124,250	79,115
Soyabean	164,510	139,834			50	139,784	2.0	49,700	90,084

Source: SRID

*Notes: **Estimated Population for 2011=24.966, based on 2010 census figure.*

95% for cocoyam; 90% for groundnuts; 85% for plantain and cowpea. Livestock feed, wastage and seed account for the discount

*** Milled rice is 60% of the paddy

ANNEX-B: CROPPING CALENDAR

Agro-ecological zones	Administrative areas	Agricultural practices	Crop	Additional Information	Planting period - onset	Planting period - end	Sowing / Planting rate	Length of the cropping cycle	Harvesting period - onset	Harvesting period - end
Coastal savannah zone	Covers parts of Central, Greater Accra and Volta Regions.	Crops grown: maize, cassava and vegetables. Livestock, especially cattle.	Maize	First season	20/03	30/04	20-22	90-120 days	10/08	20/09
Coastal savannah zone	Covers parts of Central, Greater Accra and Volta Regions.	Crops grown: maize, cassava and vegetables. Livestock, especially cattle.	Maize	Second season	20/07	20/08	20-22	90-120 days	10/11	20/12
Guinea savannah zone	Northern, Upper-East and Upper-West Regions.	Main crops: rice (produced in the valley bottoms). Cotton, millet, sorghum and yam. Maize, groundnut and vegetables are widely produced.	Maize		20/05	20/06	20-22	90-120 days	10/09	30/09
Guinea savannah zone	Northern, Upper-East and Upper-West Regions.	Main crops: rice (produced in the valley bottoms). Cotton, millet, sorghum and yam. Maize, groundnut and vegetables are widely produced.	Millet, finger		01/06	16/09	8-10	90-120 days	01/09	30/11
Guinea savannah zone	Northern, Upper-East and Upper-West Regions.	Main crops: rice (produced in the valley bottoms). Cotton, millet, sorghum and yam. Maize, groundnut and vegetables are widely produced.	Rice		10/06	31/07	40	110-120 days	10/11	10/12
Guinea savannah zone	Northern, Upper-East and Upper-West Regions.	Main crops: rice (produced in the valley bottoms). Cotton, millet, sorghum and yam. Maize, groundnut and vegetables are widely produced.	Sorghum		10/07	31/07	5-8	100-120 days	10/11	20/12
Rain forest	Eastern, Western,	Crops: cocoa crop, cassava, plantain	Maize	First season	10/03	30/04	20-22	90-120	10/08	20/09

zone	Southern parts of Ashanti and Brong-Ahafo Regions.	and cocoyam. Not suitable for continuous mechanization.						days		
Rain forest zone	Eastern, Western, Southern parts of Ashanti and Brong-Ahafo Regions.	Crops: cocoa crop, cassava, plantain and cocoyam. Not suitable for continuous mechanization.	Maize	Second season	20/07	20/09	20-22	90-120 days	10/11	20/12
Rain forest zone	Eastern, Western, Southern parts of Ashanti and Brong-Ahafo Regions.	Crops: cocoa crop, cassava, plantain and cocoyam. Not suitable for continuous mechanization.	Rice		01/05	20/06	40	110-120 days	01/10	20/11
Transitional zone	Northern parts of Ashanti and Brong-Ahafo Regions.	Crops: Maize, yam and tobacco, cassava.	Maize	First season	20/03	30/04	20-22	90-120 days	10/08	20/09
Transitional zone	Northern parts of Ashanti and Brong-Ahafo Regions.	Crops: Maize, yam and tobacco, cassava.	Maize	second season	20/07	31/08	20-22	95-120 days	01/11	10/12
Transitional zone	Northern parts of Ashanti and Brong-Ahafo Regions.	Crops: Maize, yam and tobacco, cassava.	Rice		01/06	31/07	40	110-120 days	10/10	20/12
Transitional zone	Northern parts of Ashanti and Brong-Ahafo Regions.	Crops: Maize, yam and tobacco, cassava.	Sorghum		20/08	20/09	5-8	100-120 days	10/11	31/12

(Source:FAO)



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