

Final Draft Report

**AGRIBUSINESS
INNOVATION STUDY –
THE GHANA EXPERIENCE**

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AGRIBUSINESS INNOVATION STUDY – THE GHANA EXPERIENCE

SECTION 1. INTRODUCTION

1.1 Background

The national development aspirations as defined in Ghana's Growth and Poverty Reduction Strategy (GPRS II) generally highlight wealth creation and poverty reduction. Agribusiness plays a crucial role in the attainment of these aspirations. Like most African countries, agriculture contributes almost 50% of the GDP and employs about 65% of the population especially in the rural areas (NDPC, 2005). Given this importance, agribusiness has been identified in the GPRS II as one of the key areas of focus. Clearly, the efforts to diversify the country's exports demand the exploitation of the ample opportunities available in agribusiness particularly through innovations. In this regard, a study of agribusiness to examine policies and institutional arrangements, either as facilitators or inhibitors and to assess innovativeness of firms is vital for enhancing the contribution of agribusiness to national development.

The liberalization of Ghana's economy is generally traced to the Economic Liberalisation Programme (ERP) introduced in 1983 with the support of the World Bank and the IMF. Prior to this, the post-independence era had been characterized by an import substitution economic strategy with state-owned enterprises (SOE) dominating. By the initiation of the ERP, the well-known weaknesses of a command economy no matter how quasi, had manifested significantly to merit a revolutionary change in direction. The Structural Adjustment Programme (SAP) of 1986, the Financial Sector Reform Programme (FINSAP) of 1988 and other targeted policies came to facilitate the execution of the ERP. The efforts to transform an economy that is fundamentally state-controlled to that which is open to greater private-sector participation were multi-faceted and extremely challenging. Among the several socio-economic policy initiatives were the divestiture of the SOEs, which had become liabilities. From the launching of the ERP in the 1980s through the 1990s to the present, the economic laissez-faire principle has been sustained. The prevailing framework for economic activities places agribusiness at the heart of the economic development aspirations of wealth creation and poverty reduction. The drive to achieve these aspirations depends a great deal on the capacity for innovation, which underlines competitiveness locally as well as globally.

The central goal of Ghana's economic policy as detailed in the Growth and Poverty Reduction Strategy (GPRS II) (2006 – 2009) is to accelerate the growth of the economy to attain middle-income status. In this connection, agriculture is expected to grow at an annual rate of 6% per annum. The GPRS II stipulates that in line with the long term vision of developing an agro-based industrial economy, interventions in the agricultural sector will be complemented with appropriate interventions in the Trade and Industry sector. In the specific strategy of promoting Trade and Industry, the following highlights were spelt out in the GPRS II:

- Ensure proper integration of the nation's production sectors into the domestic market – identify and promote opportunities for economically beneficial linkages along production and supply chains in new and existing productive sectors;

- Increase agro-processing – promote and support the processing, preservation and utilization of crops, animal and fish products, develop and promote the use of standardized packaging materials, facilitate the establishment of small-scale agro-processing industries for export;
- Agricultural marketing – development of farmer based organizations (FBO) capable of securing fair prices for products, encourage the private sector to set-up produce buying companies;
- Increase industrial output and improve the competitiveness of domestic industrial products – mobilize domestic and international resources for production of value-added products, enhance accessibility to productive infrastructure, assist exporters to comply with international standards required by selected export markets (NDPC, 2005, p.35).

The goals outlined for the agricultural and industrial sectors provide a good framework for analyzing the performance of the agri-business sector and the potentials for growth especially with reference to innovations in the value-chain.

As defined and explained extensively by the World Bank (2007) innovation is neither science nor technology but the application of knowledge of all types to achieve desired social and economic outcomes. Innovation combines technical, organizational and other sorts of changes. It is the process by which firms and organizations master and implement design and production of goods and services that are new to them, irrespective of whether they are new to their competitors, their country or the world (Mytelka, 2000). The focus on innovation in agribusiness in Ghana in this study enables an appraisal of the extent of competitiveness in the sub-sector.

1.2 The Selected Commodities – Cocoa, Cassava and Poultry

Three commodities are at the centre of this study namely cassava, cocoa and poultry. Cassava is a major staple in Ghana if not the leading staple. As a food crop it is consumed in almost all parts of the ten administrative regions of the country. As a root crop, the other lesser competitor is yam which is more produced in the northern parts of the country. Research and Development (R&D) on cassava actually goes back to the 1930s in the colonial era. Research was directed at testing, selection and multiplication of elite land races and exotic varieties. Selection criteria included resistance to the mosaic virus, high yields and good cooking quality (CSIR, 1994; Tetteh and Taah, 1989). Over the years, cassava production has increased significantly reaching to over 10 million metric tonnes in 2007 (MOFA, 2008).

Cocoa is the leading foreign exchange earning crop for Ghana. From pre-independence Ghana as well as the early post-independence Ghana up to the 1980s, cocoa was contributing about 45% of the country's foreign exchange earnings and constituting about 65% of total merchandise exports (Oduro, 2000). Ghana's dominance of world cocoa production decreased over the years (33.4% of total world cocoa production in 1960s as against about 14% in 2000s) because of two main reasons. Firstly, other countries such as Cote d'Ivoire, Indonesia and Malaysia remarkably increased their cocoa productions. Secondly, bush fires in the early 1980s, drought, pests and diseases, contributed to

reducing the significance of the cocoa industry. Nevertheless, cocoa occupies a strategic position in the political economy of Ghana and no other cash crop is as important for the people of Ghana (Appiah, 2004).

The poultry industry in Ghana is an important industry given its contribution to the national strategies for feeding and nutrition and for entrepreneurship. There are a number of small and medium enterprises operating in the sector as well as traditional and modern entrepreneurs. It is important also as an avenue for entrepreneurship and employment. Small scale farmers are able to keep a few hundreds of birds and supply the market with eggs and poultry meat. It is estimated that village chickens account for about 60-80% of the poultry population (MOFA, 2002; Gyening, 2006). Aning (2006) estimates the rural poultry population to exceed 25 million. The dominance of the village chicken in the poultry population is crucial as it provides a basis for enhancing food security and nutrition and supporting livelihoods and poverty reduction. In the very deprived regions, there is the highest concentration of village chickens (Aning, 2006)

1.3 Methodology

The general methodology for the study was developed at the Workshop held in Nairobi in December 2007. In broad terms it involves data collection from firms in the identifiable value chains in the respective countries of study including Ghana.

1.3.1 Sampling

At the Nairobi Workshop, it was generally understood that the term “firm” should loosely be used study to describe elements in the sample engaged in the respective economic activities pertinent to the study. Thus at the production level, farmers were included and in this study, commercial farms, cooperative farms and small-scale farmers were interviewed. For poultry, the feed industries and hatcheries were included.

Processing firms were generally those adding value to the produce from the farms; these were firms which engaged in post-production activities. Cocoa was selected as a commodity for high value products and therefore the processing firms would include those in confectionaries, cosmetics and beverages. Since transportation and haulage were critical operations in the cocoa industry, firms engaged in them were included. Buying and selling firms targeting the domestic and the export markets were also selected.

In line with the methodology, the study was focused on three broad areas namely cassava as a staple crop, cocoa products as high value products and poultry. The analysis of innovation on these commodities dwelt on the key value chains of production, processing, packaging, transportation and marketing. Firms were identified in these areas of the value chains and sampling was done purposively to ensure an objective representation of the value chain components, the selected commodities and the formal and informal sectors. It was planned that the overall distribution of the sample would be as shown in Table 1.

Table 1: Distribution of Firms in the Value Chain

	Production	Processing	Transportation	Buying & Selling	Total
Cassava	5	3		2	10
Cocoa	3	5	2	2	12
Poultry	4	3		1	8
Total	13	10	2	5	30

The purposive sampling of the firms was done in consultation with the Association of Ghana Industries and the respective firm associations. Some key government ministries and agencies such the Ministry of Food and Agriculture (MOFA), Ministry of Trade, Industry and Presidential Special Initiatives (MTI&PSI) and Ghana Export Promotion Council (GEPC) were also contacted for data and interview on the relevant policies of the country.

1.3.2 Area of Study

The nature of the study and the selected commodities needed the inclusion of firms located in various parts of the country. Most of the processing firms were in the Accra-Tema Metropolitan Area. However, cocoa farmers and cocoa purchasing companies were located outside Accra-Tema. Field trips were made to the Western, Central, Eastern and Ashanti Regions to interview farmers, licensed cocoa buying companies, poultry industries and other processing firms in agribusiness. Thus there was a fairly wide distribution of the localities within the limitations of the study sample.

1.3.3 Study Sample

As indicated in the case study proposal, small and medium enterprises were selected to represent the key components in the value chain with respect to the three commodities selected for Ghana namely cassava, cocoa and poultry. Annex 1 provides details of the enterprises interviewed.

1.4 Organisation of the Report

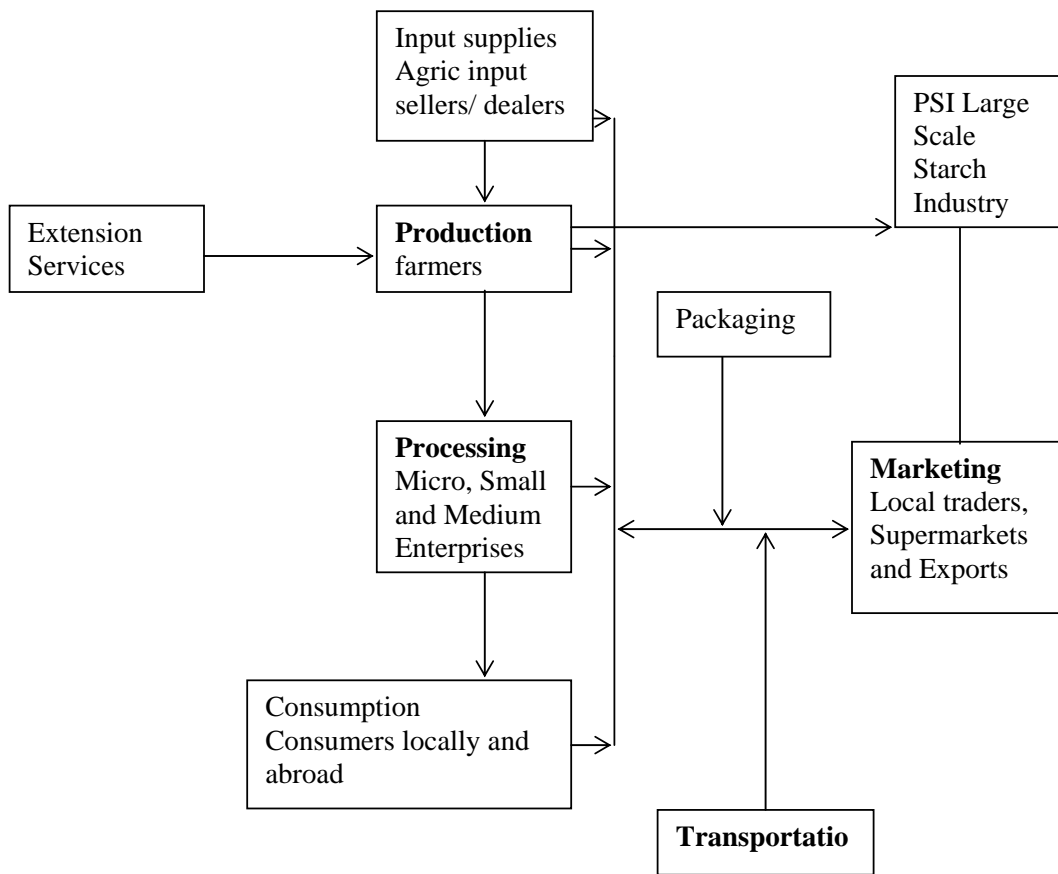
The report is organized into three main sections. Section I is the introduction comprising the background to the study, an overview of the selected commodities, the methodology and other details. The study findings are in Section II including the value chains, the types of innovations and qualitative data from the firms as captured with the prepared questionnaire. The discussion of the issues arising from the study and the policy implications are in Section III.

SECTION II: THE STUDY FINDINGS

2.1 The Value Chain

From the field visits to the firms listed in Appendix 2 and the interviews conducted, the value chain of the three commodities may be summarized diagrammatically showing some variations due primarily to the enhanced role of certain critical actors.

Figure 1: The Cassava Value Chain



The key components in the cassava value chain are the farmers producing cassava for micro and small scale processing. As illustrated in Figure 1, inputs for farming go to the farmers who produce for the micro or small scale processors or for direct consumption. The produce of the farmers also go into the Presidential Special Initiative on Cassava Starch. Transportation is critical as it links almost all the actors in the value chain. Marketing is very crucial locally and abroad. Firms in these components were interviewed during the field work.

Figure 2: The Cocoa Value Chain

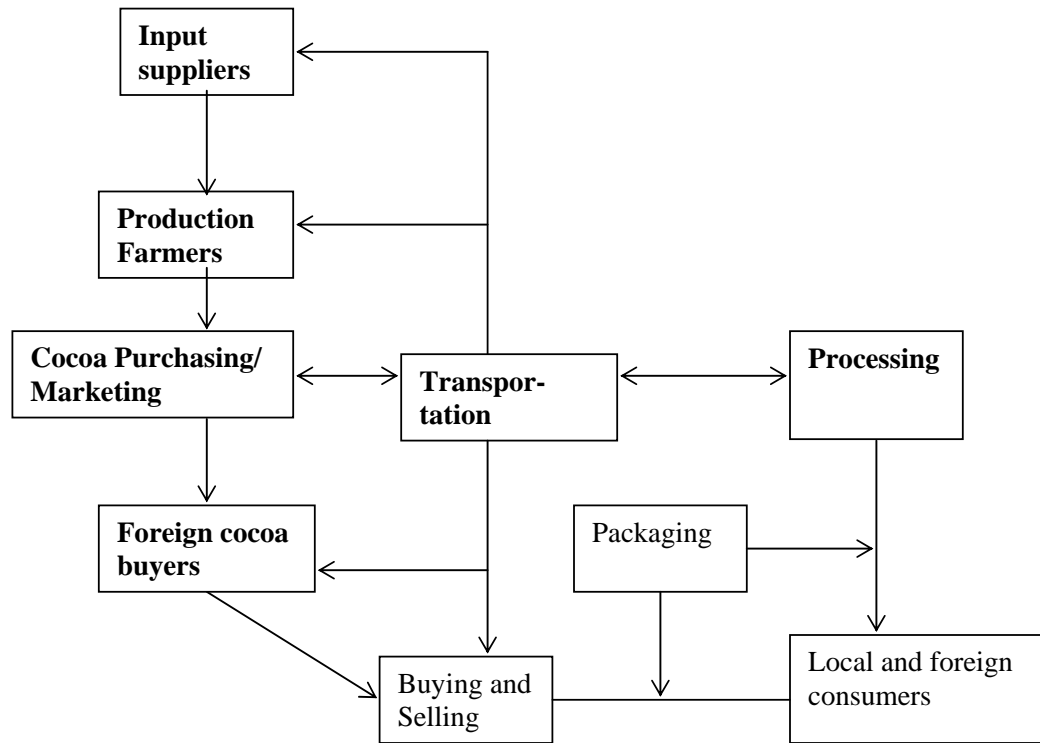


Figure 2 illustrates the key components with inputs such as planting materials and pesticides going to the cocoa farmers who produce for the purchasing companies and for the Ghana Cocoa Board (COCOBOD) to market. The cocoa value chain is one in which the state-established COCOBOD plays a dominant role across the components of the value chain. In production, it plays a major role in making input supplies available to farmers and the Produce Buying Company located in all the cocoa districts enable the farmers to sell their produce at guaranteed prices. Some of the officers of the PBC were interviewed along with some farmers. The licensed cocoa buyers were also represented in the interview sample. The processing, transportation or haulage components of the value chain being very important in the cocoa industry were also represented in the interview sample as shown in Appendix 2.

Figure 3: The Poultry Value Chain

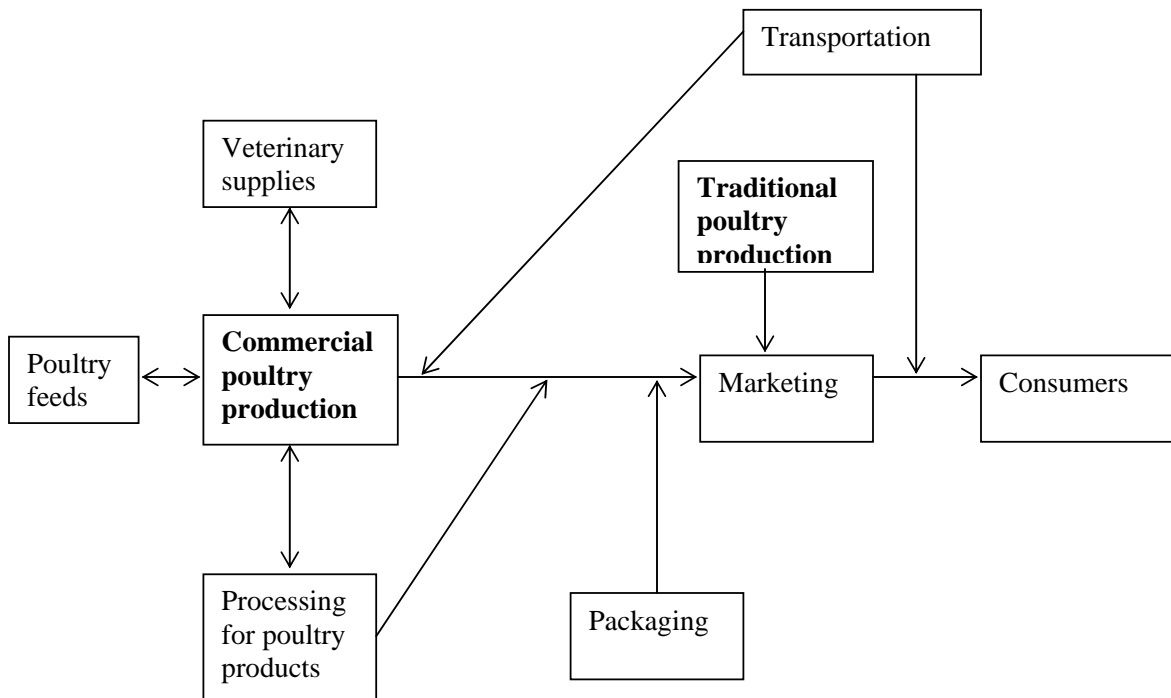


Figure 3 depicts the types of the components in the value chain highlighting the commercial and traditional production. The field work covered the components of poultry feed, commercial poultry production, processing and marketing.

2.2 The Innovations in the Value Chain

The various types of innovations encountered in the field work may be summarized as in Table 2.

Table 2: Types of Innovations and Users

Innovation Type	Descriptions	Users
Technological hardware	Grinding machines, cassava graters, agro-feed plants, packaging equipment; Integration of machinery from different suppliers, replacement of parts to enhance durability.	Food processing companies
Genetic resources	Improved planting materials resistant to pests and diseases and with higher yields.	Cocoa farmers, cassava farmers.
Production techniques	New agronomic practices (e.g. planting in rows, application of	Cocoa and cassava farmers

	chemicals, green manuring, etc.)	
Process	Crystallization of cocoa butter and liquor, product colour variation, degumming with hot water above 80%, capacity to process full range of cocoa grades	WAMCO
Products	Processed local foods e.g. gari, cassava flour, canned palm nut soup; meat products with local spices; soybean-enriched gari; moringa health products; protein-enriched poultry feeds; herbal products for Gumboro poultry disease.	Meaty Foods Ltd., Raktia Farms, Lee Chemical Ventures, Can and Kaa Ltd., Marinoff Farms, Wad African Foods, Selasie Farms.
Organisational	New ventures (licensed cocoa buying); Corporate Village Enterprise; AI Working Group.	Global Haulage Company Ltd.; cassava farmers; poultry farmers.
Marketing	New packages, participation in trade fairs, exhibitions, adverts in mass media	Most agro-industries interviewed

Sources: Field Visit, 2008

Technological hardware innovations are the machinery and industrial plants for making products. Usually these are the expected and obvious innovations in the classical concept of innovation. In the study, there were machines and equipment in the processing component of the value chains. There were grinding machines to grind cassava, presses to press out the liquid before processing into gari and other cassava products. There were plants for producing agro-feeds. There were plants to mix or blend different foods to make new products e.g. protein enriched gari. These were machines which came from the local capital goods industry and also ordered from abroad.

However, with the systemic concept of innovation extending beyond the hardware, the other types of innovations encountered in the field have been specified in Table 2. There were innovations from the agricultural R&D system. Cocoa farmers were planting seedlings, which were improved against the virulent Cocoa Swollen Shoot Virus Disease (CSSVD) at the Cocoa Research Institute of Ghana. Cassava farmers producing for the PSI were also planting *Afisiafi*, which was an improved cassava from the Crops Research Institute.

At the primary production level, there were also innovations in farming. Cocoa farmers adopted improved agronomic practices such as the planting of cocoa seedlings, the application of fertilizer, spraying against capsids and other pests. There were other farming practices such as pruning trees to enhance yields, inspecting and monitoring farms against infestations and harvesting pods to maximize quality of the cocoa beans. All these constitute a package of farming practices extended to cocoa farmers under the auspices of the COCOBOD.

Process innovations are important in that they signify the extent to which the users of the technologies have mastered the technological hardware. WAMCO detailed some of the process innovations, which were done in the course of operating the plants. (See Box 1 on WAMCO.) For example, a process for crystallization of the cocoa butter and liquor (cocoa masse) was developed, which was unique to the company. The colour variation of the products in terms of redness or milkiness was also enhanced for attractiveness. Besides, previously degumming was done using citric acid and this made the customers describe the taste of the cocoa butter produced as “flat” like a cardboard. WAMCO adopted the use of hot water above 80 degrees C. The substitution of citric acid in the degumming process has also reduced cost apart from shortening the process cycle and being very effective.

The processing component of the value chain shows a variety of product innovations coming out mainly from the initiatives of the entrepreneurs. There were processed local foods e.g. gari, cassava flour, maize flour, plantain flour, canned palm nut soup, meat products with local spices, soybean-enriched gari, moringa health products, protein-enriched poultry feeds, herbal products for Gumboro poultry disease, among others. What is important to note is the variety of product innovations in the three commodity sectors illustrating the diversity of opportunities for product innovations in Ghana.

Organisational innovations were also noted from the field visits. Cassava as a commodity used not to have farmer association at least as compared to cocoa farmers. But to implement the PSI on cassava starch, cassava farmers association coming through the concept of the Corporate Village Enterprise (COVE) were formed to mobilize farmers and enhance their roles in the PSI. Another organizational innovation observed in the field work is the evolution of what was principally a transportation or haulage company into a purchasing company. The Global Haulage Company Ltd used to transport cocoa for the Produce Buying Company (PBC), a subsidiary of the COCOBOD. With the liberalization of cocoa purchasing, Global Haulage is now a licensed cocoa buying company in addition to being a haulage company. The new venture has enlarged the scope of the company’s operations significantly.

Marketing innovations were also noted in the field. Several companies have brought innovations in their marketing strategies through advertisements in the mass media, which have also seen expansion in recent years (e.g. more radio companies and television stations), participation in trade fairs and exhibitions locally and abroad. The packaging and labeling have also shown innovations in terms of durability and attraction. Some packaging techniques were innovated to suit particular markets such as the case of the Japanese buyers of WAMCO products requesting for clipping of their packages instead of folding to ensure maximum recovery of contents of the cocoa butter at destination.

BOX 1: WAMCO AS AN INNOVATOR

The West African Mills Company (WAMCO) was first established 1947 by Gills and Dufus to process some of the cocoa beans purchased in the then Gold Coast. After independence in 1957, the plant came under the ownership of the Ghana Cocoa Board (then known as the Cocoa Marketing Board). Later the ownership structure changed to include German investors. There are three main factories producing the highest total value added cocoa export commodities – cocoa butter, natural cocoa liquor or cocoa masse. The total installed capacity is 75,000 tons but operates at 56,000 tons per annum.

Clearly in the long history of the company's existence there have been innovations relating to modifications in hardware, processing techniques, products, packaging and the general manufacturing practices. The drive for such innovations has generally been the need to remain competitive, satisfy customers and meet the evolving international requirements for quality.

WAMCO maintains a Quality Assurance Unit equipped with the basics such as autoclaves, weighing equipment, digital barometers, pH meters, solvent extractors, etc. to enable the company monitor and evaluate product quality. The international standards are stringent. For example the microbial count for salmonella is zero, molds and yeasts should be less than 50 and the total plate count (TPC) is limited at 5,000 colony forming units (CFU). The moisture of the cocoa cake produced should range from 2-5% and the free fatty acids, is 1.75 though WAMCO imposes the more stringent limit of 1.5 on itself.

Technological hardware innovations have come from the successful installation and integration of machinery from different suppliers in Britain, Germany and The Netherlands. Maintenance and repairs require that parts be changed and without some of these innovations, the plant cannot work effectively. For example, the main barometric condenser had to be produced with stainless steel to safeguard the quality of the products. The operation of the deodorizer was also an innovation. WAMCO processing is able to use all grades of cocoa – from the 2J super maincrop through the 2C super light crop to the SB remnant – unlike the case in the other processing companies, which only use the high grade cocoa. The experiences in the operation, maintenance and repair of the plants have produced a maintenance schedule and culture unique to WAMCO. The high point of the internal innovation probably was when the Soxhlet Apparatus was redesigned and modified to allow for recycling of water and the innovator received an award.

In pursuit of Good Manufacturing Practices, containers are fumigated prior to loading, aired to clear fumigant, the container is weighed with the truck and the respective product is loaded bearing appropriate WAMCO code for traceability. There is a multi-institutional gang supervising the process. In WAMCO, there is also a Joint Production Coordinating Meeting every week to review production. Thus, there are training manuals for training and altogether, there seems to be an enabling environment and culture for innovation.

2.3 The Data from the Firms

There were a number of options for presenting the qualitative data gathered from the 31 enterprises where the interviews were conducted. The subsequent sections present the findings focusing on the key topical areas highlighted in the questionnaire namely:

- Business and enterprise;
- Innovation finance, outputs and markets;
- Interactions and linkages;
- Transmission and application of knowledge;
- Education and human resources;
- Creation of new knowledge.

The emphasis was on assessing the innovation system pertaining to these selected commodities and the respective value chain. Some illustrative cases from the field work are used to underscore the points made.

2.3.1 Business and Enterprise

The central question of the study is the access, generation and use of new knowledge in the respective firms. But preliminary or introductory questions were asked about the firms e.g. what type of firm, its structure, and management and contact details. From these preliminary questions, the different firms and their respondents seem to share views specific to their sub-sector operations. The common strand in the three commodities is the structure of the business and enterprises which begins with the basic traditional productive system to the modernized and fairly complex large scale establishment right through the value chain. The small-scale farmer is critical in the production of cassava, cocoa and poultry. Generally, there are perceptible differences in the culture of small scale farmers of these commodities. For example while the traditional cassava farmer may produce cassava as a food crop, the cocoa farmer is primarily producing to sell for cash. The village poultry farmer quite often only keeps the chicken, ducks or guinea fowl in the backyard to supplement protein intake or to sell in to get money in times of need. As far as the production of these commodities at the farm-level is concerned, the traditional farmer is important.

However, with the focus on examining the value chain, the study purposively sampled farmers fairly well above the very traditional level of production for the reason that these farmers are better linked to the value chain and there are clear lines of integration into the processing component of the value chain. The interviews with the cassava farmers at Agona Kwanyarko, Agona Bosomanse and in the vicinity of the Ayensu Starch Company (ASCO) factory were revealing in how the production of cassava for industrial processing could be fraught with challenges in the context of Ghanaian agricultural practices. Some of the challenges were fairly adequately dealt with conceptually through some innovations introduced into the organizational framework of production and the operations of the related schemes.

As mentioned earlier, the production of cassava for industrial processing came under the Presidential Special Initiative (PSI) on Cassava Starch. It was the goal of the government to move Ghana into the club of nations producing industrial starch for the global market.

To achieve this, the concept of Corporate Village Enterprise (COVE) by which a limited liability company whose shareholders are the farmers and strategic investors, was considered to be the best approach. To facilitate the sustainable production of cassava for the ASCO factory, the cassava farmers were organized into an association and assisted to cultivate large acreages. Contracts were signed between the farmers and company. Apparently there was an effort to orientate the farmers towards cash crop production of the commodity.

As in the case of cocoa farmers, the inputs for production e.g. the improved variety of cassava *Afiseafi*, chemicals and extension services were supplied to the farmers. In the contract, there was a guaranteed price for the farmers. But unlike cocoa, cassava being a food crop also has the alternative markets apart from the industrial raw material market and depending on the respective price relativities farmers might sell or not sell to the ASCO factory. That kind of duality in the marketing of cassava has led to problems both for the supply and demand sides. On the demand side, the factory was at the time of the interview (January 2008) closed. The reason given for the shut down is that the factory was undergoing maintenance. Yet, there are problems beyond the need for maintenance. It began about two years ago when the farmers were diverting their harvests to the local food market because at that time they obtained higher prices than were contracted by ASCO. With the closure of the factory, the supply side problems have manifested with the farmers having to grapple with harvests without markets as the local food market is unable to absorb all their produce. More importantly, the farmers signed a contract with ASCO to sell cassava to the factory at almost twice what obtained on the market. Apparently the guaranteed prices stimulated production by the farmers. All the four farmers interviewed in the communities surrounding the factory complained that their cassava was going bad¹ on the farms. The President of the Ayensu Cassava Farmers Association had 328 acres of cassava ready for harvesting but without ready market. Another farmer had about 150 acres of cassava going bad. The farmers said the variety being produced for the starch industry had higher starch content and therefore not very favoured for traditional processing. Buyers for traditional processing therefore pay low prices for the produce. Clearly the organizational innovation of contracting farmers to produce cassava as an industrial raw material had not been very successful.

Nevertheless, processing offers a good option where the demands of industry and consumers fail. Cassava is processed into gari, kokonte and cassava dough using traditional technologies. In recent times, Research and Development have sought to enhance the efficiency of these technologies in terms of the outputs and quality. The Food Research Institute has set up an Integrated Cassava Processing Plant at Pokuase displaying the processing technologies from the grinding of the cassava, through the removal of water and starch to roasting, bagging and sealing. It is the appropriate set up for quality production of gari for the market with optimal standards for hygiene and industrial specifications. The complete adoption of this innovation has however not occurred. Even the industrialists processing cassava for exports only have some components of these machines and produce according to their market requirements.

¹ Going bad simply means the cassava tubers get transformed into a state in which they are not suitable for cooking to use as fufu. In other circumstances, the cassava actually rots.

In the study, food processing enterprises whose products include processed cassava e.g. gari and cassava flour, employing between 20 and 50 workers were interviewed. These enterprises had modernized the traditional processing technologies adopting better manufacturing processes in production. The distinguishing characteristics are the packaging materials complete with the appropriate labels and the orientation to the export market. The enterprises interviewed operated generic technologies which enabled them process other foods such as plantain, maize and legumes. They had strong linkages with institutions engaged in business promotion and development and some e.g. Selasi Farms, mentioned strong linkages with the Food Research Institute of the Council for Scientific and Industrial Research (CSIR).

Cocoa farmers do not have to grapple with the duality of markets. Cocoa is wholly cash crop and they produce to sell to the purchasing company. Until recently, the Produce Buying Company (PBC) of the COCOBOD held a monopolistic market for cocoa purchasing. With the adoption of deregulated policy for the cocoa industry, Licensed Buying Companies have broken the monopoly. Cocoa farmers do not simply cultivate the crop and harvest. There is a fermentation process through which the cocoa bean is taken to give it a distinct flavour. Cocoa farmers carry out this semi processing and dry the cocoa for the buying companies. The knowledge of cocoa production is gained in the cocoa farming environment. But the production of cocoa comes with extensive support services, which are fairly well captured in the organization of the various divisions under the COCOBOD e.g. Quality Control Division, Seed Production Unit, Cocoa Marketing Company and the Cocoa Research Institute of Ghana. Quality control implies vigilance against cocoa pests and diseases e.g. capsids and blackpod disease. The Cocoa Swollen Shoot Virus Diseases have become so important that a unit has been set up to address it. The point is that, in cocoa production, the average farmer is usually small-scale and traditional. However the system and its institutions are quite large and shadowing the political economy of the country.

In the study, the poultry farmers interviewed mainly belonged to the Sector 2 or 3 FAO classifications with poultry bird population ranging from 2,000 to 20,000. Darko Farms and Afariwa Farms may be in Sector 1 given the subsidiary industries of hatcheries and processing plants. Until the ominous outbreaks of the AI, poultry farmers were holding their own despite the stiff price competition on the local market with the influx of the cheaper poultry products. In 2006, a total of 47 countries reported outbreaks of the Highly Pathogenic Avian Influenza (HPAI) – 24 in Europe, 15 in Asia and eight in Africa. From November 2003 to July 25, 2007 there were a total of 319 confirmed cases of human infection resulting in 192 deaths indicating 60.2% mortality (Hong Hanh et al, 2007). The panic caused by the AI almost collapsed the poultry industry in Ghana as most consumers switched to other livestock products and fish. But the timely reaction from the poultry industry and the government allayed the panic and normalized the market for poultry products.

On the specific questions of firms trying new ideas and using new knowledge in the last three years, most of the respondents answered in the affirmative. The new knowledge

included new planting materials, new techniques in production and new machinery and equipment. Most of the respondents indicated that the main impediment to improved productivity and sales by the firms was the liberalized market with what was perceived as the unfair competition from imports.

2.3.2 Innovation Finance, Outputs and Markets

There is an almost unanimous response from the firms sampled that innovation finance as a distinct business practice is almost non-existent in Ghana. Across the value chain from production through processing to marketing, the enterprises did not receive financial resources for the specific purpose of innovation. Whatever expenditure was incurred in innovating e.g. in developing a new food product or adapting a particular machine to perform a specific task, or improving a given process in the enterprise, was done using resources meant for the general operations of the enterprise. Many of the respondents indicated that money was ploughed back in their business operations and that knowing the difficulties in access financial assistance, many firms saved from their profit.

The respondents were very critical of the banks as most of them were not easy to deal with even in securing loans for their business; the requirements for loans are for some of the enterprises too difficult to meet though some succeeded. Marinoff Farm Ltd. based in Kumasi indicated that it was able to obtain loans for its poultry production from the Agricultural Development Bank (ADB), which was set up in 1973 to cater for the needs of those in agriculture either in farming or agro-processing business. It is generally known that ADB has been more responsive to the financing needs of the agricultural sector than other banks. However, Marinoff pointed out that the 15% interest rate it had to pay currently on the bank loan was too high. Though it is one of the lowest rates in the country, the loan repayment is difficult with the depressive market situation. Marinoff strongly advocates for a reduction in the interest rates.

The difficulty in accessing loans is not only a problem with the banking institutions. Other funding schemes also seem to have access conditions, which may not be easily met by the enterprises. In the interviews, Wad African Foods, a firm which processed a range of food products including processed cassava, mentioned the unsuccessful attempt to obtain funding from the Enterprise Development Investment Fund (EDIF). It was rather the FAO that came to their aid with a grant. FAO grant was to enable the firm acquire a dryer to dehydrate the relevant products and reduce the moisture content to the required levels.

There are other sources of finance for the firms. For example, Kuafo Adamfo is a licensed buying company in the cocoa industry. It received assistance from COCOBOD to finance the cocoa purchasing. But it had to supplement this with a loan from Barclays Bank. On the specific financing of innovations in the company no specific financial assistance has been obtained.

Probably on account of that or rather in spite of that, there have been few innovations and these have generally been incremental. The development of new products for example such as in the food processing industries involves experimentation and testing over a

period. For example at Selasie Farms, gari was being enriched with soybean and other protein-rich sources. Various combinations were developed and tested for long shelf life before the final product.

In the poultry industry, there have been some innovations. For example, Asare Farms is experimenting in using Moringa additives in the poultry feeds to reduce mortality. The feeds are prepared using the Quality Protein Maize variety produced by the Crops Research Institute, which has been widely extended to farmers. The Moringa planted is touted as having several health benefits and Asare Farms Company has gone into its cultivation to use on its 20,000 bird farm. Darko Farms Company also indicated that it was able to control the Gumboro disease on its farms using a concoction prepared from the bark of mango trees mixed with “prekese”, a particular tropical fruit. There were also innovations in farm management with respect to housing the birds.

The market plays an important role in the promotion of innovation. Innovated products must find acceptance by consumers to encourage the entrepreneurs. This is one of the biggest challenges facing the industries. Both the local and foreign markets do not easily bend to new innovations in products. Markets for the traditional products produced in Ghana have generally become very competitive. The local poultry industries are particularly critical of the liberalised market, which allows the influx of imported poultry products.

2.3.3 Interaction and Linkages

The firms interviewed identified a number of external actors affecting the firm's performance. These actors include the government, other firms, business associations, the universities, research institutes and local authorities.

The study shows that there are a variety of interactions and linkages among the various enterprises across and within the identifiable components of the value chain. There are associations such as the Ghana Farmers and Fishermen Council, Cocoa Farmers Association, Ghana Poultry Farmers Association, Ghana Feed Millers Association and Association of Ghana Industries (AGI), which bring the firms or enterprises together in pursuit of shared business interests. The AGI in particular is a well-known association with a strong lobbying capacity. The government has declared a Golden Age of Business on the notion that, development will be private-sector driven. Some of the respondents have criticized the government for not doing enough to give expression to the policy of private-sector led development. The respondents called for selective protectionist policies to shield the private sector from unfair competition from foreign companies. It appears that lobbying government to institute such protectionist policies has not been successful for the reason being that the international regime overseeing trade relations is not favourable to these policies.

Respondents also indicated they had linkages with some of the knowledge institutions such as the universities and institutes of the CSIR. In a few cases such linkages were said to be strong with the firm interacting with the research institute to develop products through experimentations. But in many cases, there are no linkages whatsoever with the

enterprises not even being aware of the existence of these institutions. Western Farms based in Winneba maintains relationship with the Animal Science Department of the University of Education at Winneba. Afariwa Farms Company collaborates with the Animal Research Institute for the production of parent stock of birds for the poultry industry. The collaboration used to be with the KNUST. However that broke down and currently there is a strong linkage with the ARI in breeding. However the company is also linked with Hi-line Breeding Co. of India and it is the country market representative for Hi-line. Darko Farms Co. also obtains its parent stocks from a foreign company based in Zimbabwe. The study also found linkages with outside knowledge centers e.g. the collaboration between Asare Farms and the University of Florida on quality issues in poultry feeds. Locally the interaction and linkages come as a result of proximity, convenience and shared field of interest. The international linkages come through business dealings and personal contacts.

For farmers, the linkages are mainly with agricultural extension officers who visit to advice on agronomic practices and new inputs. In the specific case of cocoa, the farmers have strong linkages with either PBC of the COCOBOD or with the licensed buying company operating in the vicinity. The Quality Control Division of COCOBOD assists the farmers to adopt good agricultural practices to optimize yields and maintain good quality of seeds. The farmers association also play important role in ensuring effective business practices for the farmers.

The quality promoting and control institutions also encourage good interactions and linkages with the enterprises especially in relation to products for the supermarkets and the export markets. Raktia Holding Ltd., Selasi Farms, Lee Chemical Ventures and other processing companies mentioned that they had strong linkages with the Food and Drugs Board and the Ghana Standards Board. The Environmental Protection Agency (EPA) also contributes in good production practices in performing its functions – inspecting production premises to ensure compliance with the company’s environmental action plan, which all companies are legally required to prepare and submit to the EPA.

There were linkages among firms operating in a particular sub-sector in their mutual interest. For example in the poultry industry, Ike Farms indicated that it related with Afariwa and Darko Farms for the supply of day-old chicks. The two are large poultry industries with hatcheries and other subsidiaries.

There were linkages also between the value chain components and this became evident during the field work. For example, Lee Chemical Ventures is a food processing firm processing gari and fufu flour for the local and foreign markets. The company is very well linked to some of the leading supermarkets including Kaola, Max Mart, Town and Country Plaza and Evergreen in Tema. In the US, it supplied to Cayces Food, Savannah Imports and Exports and Cecilia Afio Marts, among others. The linkage with the supermarket and for that matter any kind of market is critical to the sustenance of the business activity.

Generally the firms participate in exhibitions and trade fairs locally and sometimes outside the country to market their products and company, gain new knowledge and share experiences. In Ghana a number of trade fairs and exhibitions are held every year e.g. Agricultural Shows, Industry and Technology Fair (INDUTECH), Ghana International Trade Fair, Grand Sales, etc. All these are open to all business enterprises and some of the firms interviewed indicated participation in the fairs to do business and advertise their products. Some of the firms interviewed indicated they participated in trade fairs and exhibitions outside the country for the exposure and development of business contracts.

2.3.4 Transmission and application of knowledge

To the question of where the firms obtained new knowledge relevant to their business operations and market conditions, many of them cited their business associations, business partners especially their suppliers, trade fairs and exhibitions, the mass media, among others. Government offers some sponsorship of expositions such as the Farmers Durbar held on the first Friday of every December in collaboration with private sector companies. But many respondents suggested improvements to the sponsorship of the various fairs and exhibitions.

The enterprises interviewed have shown that knowledge transmission and application can be institutionalized as an organizational practice. In the poultry industry for example, there is the standard way of keeping birds on the farm and the employees are given the basic training to enable them carry out their duties effectively with respect to feeding the birds, maintaining strict hygienic practices, harvesting eggs, monitoring their health, etc. These are common practices across the industry. However, there are salient features that distinguish organizational practices and therefore whereas the eggs coming from one enterprise is spotlessly clean and beautifully packaged, the eggs coming from another farm may not be that well packaged. Whereas on one farm there is a twenty-four hour surveillance of the birds to ensure bio-security, on another farm, surveillance is less stringent. Engaging veterinary doctors to attend to the birds and the regularity of the doctors visits differ from farm to farm. However there is the basic knowledge of the need for veterinary doctors or services on every farm.

Public institutions such as the extension departments of the relevant ministries and organizations are playing useful role in knowledge transmission. For example poultry farmers interviewed in the study commended the Veterinary Services Department of the Ministry of Food and Agriculture (MOFA) for the frequent visits and relevant technical advice. The extension services of the Quality Control Division of COCOBOD also provided important technical services to support cocoa farming, purchasing and shipment. The Division advises farmers on the control of diseases and pests, quality assurance in the harvest and on-farm processing prior to sales to the buying agencies.

2.3.5 Education and human resources

The sample taken from the field work suggests that the level of education of entrepreneurs in Ghana may be high as 60% of the sample has tertiary education. This may be determined with a more rigorous study. However with a national statistic of 64% adult literacy, the level of education is quite high for the Ghanaian population. The

Education Reform introduced in 2006 also aims at enhancing education with emphasis on science education and the improvement of the science to arts student enrolment ratio in the tertiary educational institutions to 60:40. Currently it is the reverse. Attaining this ratio however is a big challenge, given the fact that more and more private university colleges are being founded in Ghana and these are offering mainly courses in business and the arts. It appears that the job market favours the business student. Thus whipping up enthusiasm in science education and studies is a Herculean task.

To the specific question of whether firms were getting what they expected from the graduates from the tertiary educational institutions, many of the respondents indicated dissatisfaction. However, some indicated that graduates from the polytechnics were more technically competent than their counterparts from the universities.

The firms also gave opportunity to the students of the tertiary institutions to train on practical attachment and internship. Often the students are even paid some monies to cover their transportation. In general, the opinion was that graduates of the universities were less practically oriented than the polytechnic graduates. Respondents preferred engaging the latter graduates for the practical technical work in their firms. This notwithstanding, graduates of the universities are preferred for specific reasons. For example, Global Haulage Company Ltd indicated preference for graduates from the universities as they seemed to be better suited for managerial functions and could be sources of innovation in administration. This is a company employing over 250 workers with about twelve holding university degrees.

In some cases, the firms were involved in policy formulation functions of the training institutions. For example the Managing Director of Afariwa Farms is a member of the Council of the CSIR, which is the body set up to attend to all policy issues pertaining to the research institutes of the CSIR. Some of the respondents also indicated they were involved in the preparation of the curricula of the universities.

2.3.6 Creation of new knowledge

A few firms engaged in research or experimentation for new products in-house. Quite often, it is done in collaboration with a research institution and the science departments of the universities. For example, Marinoff Farm Ltd is in good linkage with the Animal Science Department of the Kwame Nkrumah University of Science and Technology (KNUST). As it seeks to develop improved feeds for poultry, it engages the department to carry out analysis on new feeds it formulates with the inclusion of soybean, fish and other proteinous materials. Other firms interviewed e.g. Selasie, WAD, Afariwa and Asare also indicated that there were such linkages.

New knowledge generally comes from outside the firms from the relevant business enterprises abroad and from the research institutes and universities locally. In the cocoa sector, the Cocoa Research Institute of Ghana (CRIG) is the key centre for new knowledge. The interview at the Seed Production Unit of COCOBOD shows that they obtain new genetic resources from CRIG, which also operates under the COCOBOD.

CRIG maintains demonstration farms in the relevant localities to educate the farmers and extension officers in new agronomic practices and the husbandry of cocoa trees.

It was clear from the responses of the firms that the research institute and the universities carried out very little consultation in setting their research agenda. The respondents said these knowledge centres only contact them occasionally. The respondents also mentioned that generally there were no incentives for research and that the main impediment to research was the lack of funds.

However there seems to be a lack of priority placed on the creation of new knowledge and in particular, research in the firms. For example the West African Mills Company Limited (WAMCO) is a leading cocoa processing company in Ghana. Until the establishment of other processing companies such as the Cocoa Processing Company, Barry Callebaut and Cargill, WAMCO is perhaps the best known cocoa processing company in Ghana. But it has no research department though it has a quality control unit to ensure the quality of its products for the export market. It sometimes uses other better equipped laboratories for analysis e.g. microbial load tests are done at the Effia-Nkwanta Hospital which is one of the best in the country. Perhaps the lack of prioritization of Research and Development (R&D) is the reason why there seems to be limited innovations.

On the specific question of whether government science and technology policy supported efforts of private firms in the agricultural sector, most respondents believed that government policies generally did not support the efforts of the private sector. Those in the poultry industry in particular were very aggrieved that government policies had contributed to their uncompetitive performance on the local market. The complaints also have to do with specific policy instruments, which in the view of the firms are inimical to their competitive practice. Meaty Foods Ltd made the point that industries were taxed even before they started production. This is a firm, which is processing meat products including poultry into sausages, ham, bacon, etc. It makes innovations on new products with the use of local spices such as ginger, chili pepper and others. The point is for tax holidays to be granted over period to enable the “infant” industry to mature before taxation. For the strategic area of processing, there needs to be the necessary tax incentives to encourage investment. The complaint from some of the firms is that Ghana seems to grant better incentives to foreign investors given the range of tax holidays, foreign exchange retention and access to land and utilities available to the these investors than to the local investor.

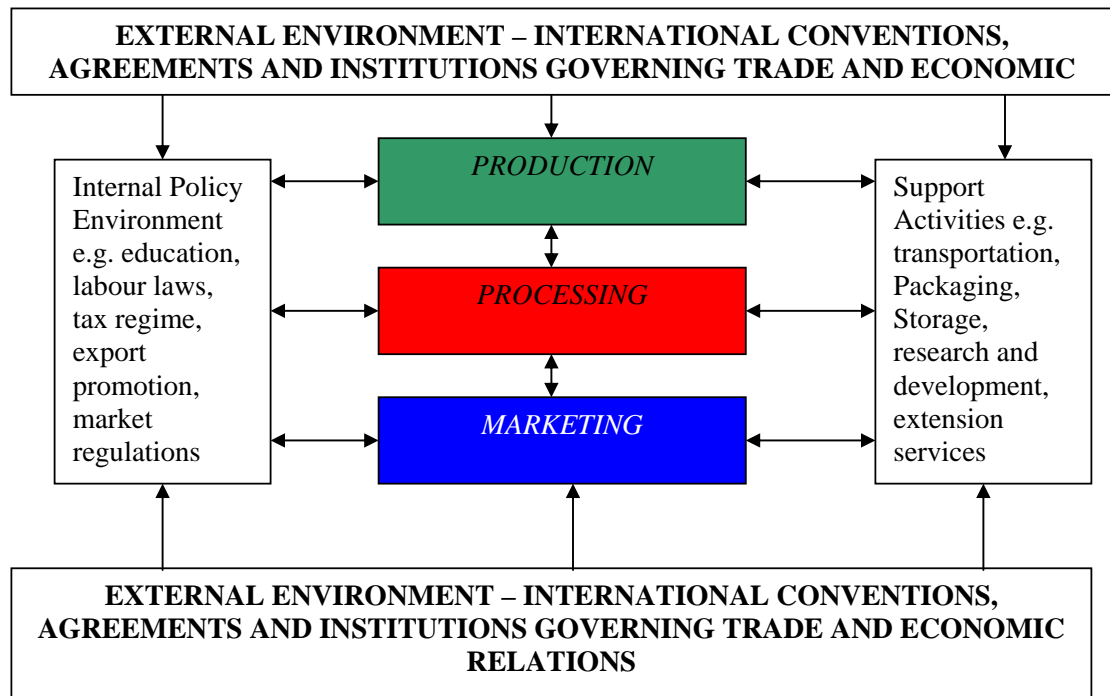
SECTION III: THE ISSUES AND THE POLICY OPTIONS

3.1 The System Approach

The study findings present a number of issues, which generally may be summarized and illustrated in Figure 4 – Schema of Interactions in the Value Chain and Environments to amplify the systemic nature of agri-business. The value chain has been over-simplified in highlighting only the three components of production, processing and marketing. But that

is to put the spotlight on these components with reference to the country study. The support activities are shown to be interactive with the value chain and in some cases integrative. Thus within each of these components, there is the identifiable industries such as extension services, transportation, packaging and storage.

Figure 4: Schema of Interactions in the Value Chain and Environments



3.2 The Public Policy Environment

A persistent refrain in the responses of the enterprises in all the value chain is the negative impact of the liberalized market in Ghana. The perception is that, the government has over-liberalised the market with the influx of cheap (though not necessarily better) foreign goods. The emphatic suggestion is that there should be limited protection of the local market to enable local industries compete. The argument is also that the local industries have to compete against the cheap foreign goods, hamstrung with various taxes and levies, which the importers are not faced with. The fact that these complaints have been in the public domain for several years suggest a number of things such as the insensitivity of government, the poor capacity of the lobbying agents of the business associations and their individual members, some of whom are closely linked to the government. Government needs to bring all stakeholders together to brainstorm on how best to create a level playing field for a win-win situation as far as the market regime

is concerned. However one has to be aware of the fact that everyone cannot be wholly satisfied and that there can only be satisfaction to a certain extent.

The liberalized market policy regime only amplifies the critical role of public or national policies in the performance of agri-business and all other sectors of the economy. Even the performance of the specific commodities and the innovations relating to them are tied to policies formulated and executed by the government and its agencies. A good example is in the cocoa industry. One of the goals set for the cocoa industry is the production of one million metric tons by 2010. In line with this, a couple of initiatives have been introduced such as the programme on Cocoa Abrabopa – the word in the Ghanaian Twi language means “better life”. The Cocoa Abrabopa is a package of agronomic practices and inputs approved by CRIG to increase cocoa yield by over 300%. There is the Asaase Wura Special Cocoa fertilizer, which the farmer applies to the farms, there are the farm management practices such as pruning the canopy to allow sunshine and aeration and to discourage growth of moulds and insects, there is the removal of chupons and mistletoes from the trees. Cocoa Abrabopa is being implemented through cocoa farmer groups of between 10 to 15 farmers. Each group has a facilitator (Cocoa Abrabopa Promoter) who provides technical information and advice. There are also demonstration farms in various parts of the cocoa growing districts where farmers could see evidence of the effectiveness of the Cocoa Abrabopa package. In a country where cocoa farmers harvest only up to three bags of cocoa per acre, the package is already making it possible for the farmers to harvest about fifteen bags of cocoa. Such phenomenal increases in yield have important implications for farmers’ income and Ghana’s foreign exchange earnings.

Public policies however must be systemically done. For example policies in the agricultural sector and even for single commodities such as cocoa, must dovetail into other policies such as those of research and development, information and communication and local government.

3.3 Support Activities

The support activities as depicted in Figure 5 are a range of business activities which are vital to the performance of agri-business to the extent that their poor effect impact negatively on agri-business. A typical example is transportation, which affects all components of the value chain. Poor transportation infrastructure and facilities are major constraints on the supply side of agricultural outputs. The poor road networks are sometimes impassable during the rainy season and the vehicles plying these roads are often not road-worthy breaking down often. It is estimated that transportation accounts for about 70% of total marketing costs (Aryeetey and Nyanteng, 2006).

The challenges relating to roads and transportation also extend to ports and harbours. Altogether, these important infrastructural networks either facilitate or constrain the movement of outputs of agri-business from their centres of production to their respective markets locally or externally. The Tema and Takoradi ports have been modernized in recent years and are handling increasing volumes of cargo. For example, Tema Port, which handles about 80% the country’s import and export cargo, has seen modernization in recent years with steady increase of cargo. The export cargo of 902,621 tons recorded

in the year 2000 more than doubled to 1,949,950 tons in 2005. Import cargo also increased from 5,083,439 in 2000 to 7,748,169 tons in 2005 (*Ports Overview 2005*, p.5). Clearly there is evidence to suggest that the infrastructure to support the movement of goods in and out of the country is improving. What still needs to be done is improvement in handling services to cut down on delays and congestion at the ports.

Packaging is another business activity, which is at the heart of agri-business. Effective packaging protects the products from atmospheric elements and pests, maintains quality and adds attraction for the prospective buyer. But there is more beyond the boxing, crating or even the bottling or canning of products. There are international conventions on labeling especially of food products. Ghana is a signatory to the CODEX convention, which falls under the auspices of the WHO and FAO and there is need to comply with the rules and regulations relating to labeling. Packaging is an industry in its own right with strong links to the advertising industry. In Ghana, it is yet to mature though significant improvement has been made in recent years.

3.4 The External Environment and its Influence

Agricultural production is dominated by small scale producers. When prices are depressed due to poor market conditions they create disincentives for these producers to continue investing their meager resources and time in their respective agricultural productive activities. There is therefore need for intervention to address the market challenges in order to keep these producers in their engagements (Aryeetey and Nyanteng, 2006).

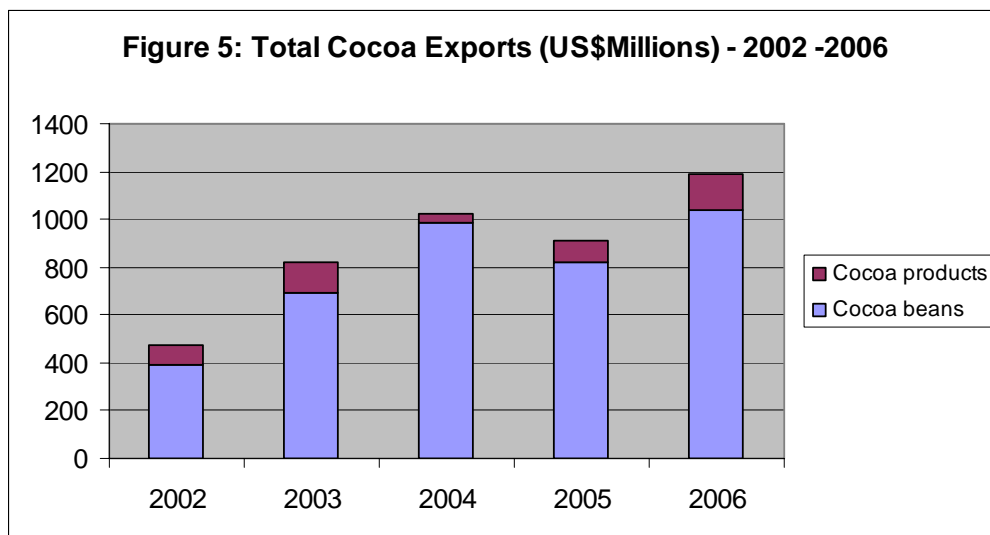
Agribusiness is also being influenced by external factors. An example is the global trends in social accountability and human rights. One of the emerging social issues in the cocoa industry is that of rights of the child and the move to enhanced labour practices and social responsibility. This issue has become so important that COCOBOD has established child labour desks at the Head Office and all Regional Offices to among other things monitor child labour in the cocoa sector, advise management on issues relating to the worst forms of child labour and collaborate with other stakeholders in the efforts to mitigate the practice (COCOBOD, 2007). This is to be expected given the fact that the issue has long engaged the attention of the international community and ILO Convention 182 dealing with the Worst Forms of Child Labour has been ratified by all members of the Cocoa Producers' Alliance with the adoption of the Council Resolution in Brazil in 2000. That these issues have been captured in the national policy and programmes for the cocoa industry in Ghana, shows how important the issues have become for international trade in cocoa.

3.5 Value Addition

The issues of value addition and consumption of cocoa products are also very important. The President of Ghana, Mr. John Agyekum Kuffour at the 2nd African Cocoa Summit held in September 2007 in Accra echoed the concern relating to these issues. He said in 2005/2006 cocoa year, Africa produced approximately 76% of the total world cocoa output and processed only 14% of the total output. Europe produces no cocoa and yet it processed 42% of the out. The statistic for consumption was even worse at barely 3% for

Africa. The challenge is how to increase value addition of the cocoa Ghana and Africa produce and also enlarge the market for the consumption of cocoa products especially as cocoa is known to have good nutritional benefits including high anti-oxidants and vitamins.

Indeed Ghana's cocoa production is targeted at a million tonnes annually. Currently it is of an average of about 700,000 tonnes over the last five years. The objective in cocoa export is to achieve a 50% processing before export producing cocoa butter, cake, roasted nibs, and the valued confectionery. Cocoa processing industries include the Cocoa Processing Company (CPC) of the Ghana Cocoa Board, the West African Mills (WAMCO), Barry Callebaut and Cargill. The CPC is not wholly state-owned. The content of processed and value-added cocoa in the total exports is still relatively low, constituting only about 20% of the total. See Figure 5 below.

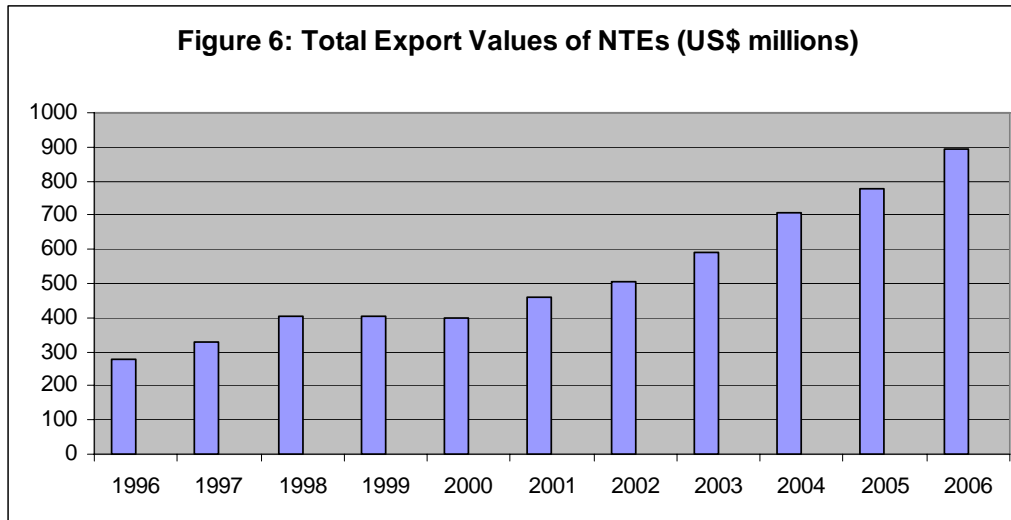


In the 2000s, significant progress was made in boosting cocoa production in Ghana. As Figure 5 depicts, total cocoa exports increased in value from about \$500 million in 2002 to over \$800 million the next year. It then increased to \$1,000 million in 2004, dropping to about \$850 million in 2005 and finally increasing to about \$1,200 million. This kind of earning is very significant for a country like Ghana. However, to even go beyond this achievement and earn more, there is the need to innovate and transform what is virtually a traditional cash crop industry to a buoyant processing and value-addition entity.

Quality assurance in exported commodities is also an important issue and underlines the increasing role the regulatory bodies such as the FDB and the GSB are playing in agri-business. These institutions have found that their functions are meant to facilitate access to the market and not to impede the access. From the responses of the enterprises interviewed it appears that these bodies are living up to their facilitative responsibilities, holding training workshops on the requirements for quality and standards on the international markets and addressing specifics such as the EURO-GAP.

3.6 The Non-Traditional Exports

In recent years, there have been significant increases in the export of the non-traditional export commodities as shown in Figure 6 below.



Source: Data obtained from GEPC

Between 1996 and 2000, the highest annual total export value of NTEs was about \$400 million. However the value increased from about \$460 million in 2001 to \$500 million in 2002 to almost \$600 million in 2003. Since then, it steadily increased through the subsequent years reaching the high-point of almost \$900 million in 2006 (GEPC, 2008). The increases are a result of new additions to the list of NTEs as well as increase in volume of the existing exports.

The setting up of the Ghana Export Promotion Council (GEPC) and some other related institutions has helped to facilitate the development of the NTEs and their exports. The Council organizes training seminars for exporters and expositions on export requirements. The main challenges of access to the international market come not only from the stringent requirements on good manufacturing practices and quality standards but also from the tariff barriers as one move up the value addition ladder. Ghana and other cocoa producing countries have complained of the high tariffs imposed on cocoa products such as chocolates exported to Europe. Quite recently the requirements for compliance to social responsibility and the obligations of states in respect of human rights are also creating their own kind of barriers.

More importantly, NTEs seem to entrench Ghana and most of the developing countries in the export of primary commodities as these countries pursue similar concept of diversifying the economy through the exports of agricultural commodities in their raw form. Value addition is a policy thrust of Ghana's development strategy but it is yet to concretize. So far, government policy thrust as shown in terms of investments seems to

encourage more of the exports of the horticultures and other non-manufactures. The goal of attracting investors to set up manufacturing businesses appears to be less pursued compared to that of the non-traditional exports.

3.7 Facilitators and Inhibitors of Innovation

Analysing the responses from the field visits, the drivers or facilitators of innovation as well as the inhibitors can be summarized as in Table 3.

Table 3: The Facilitators and Inhibitors of Innovation and Policy Options

Facilitators	Inhibitors	Policy Options
<ul style="list-style-type: none"> ➤ Public policies ➤ Firm incentives ➤ R&D capacity ➤ Market opportunities ➤ Competition on market ➤ Donor initiatives 	<ul style="list-style-type: none"> ➤ Influx of foreign products ➤ Limitation of innovative capacity ➤ Lack of knowledge and information ➤ Inadequate funds ➤ No market demand 	<ul style="list-style-type: none"> ➤ Policy incentives for innovations in the firms; ➤ Enhanced R&D capacity to support firm innovations; ➤ Strengthened functional linkages between critical actors in NIS; ➤ Supportive funding mechanisms

The central question is basically what drives innovation? From the study the main facilitators of innovation include the public policies, the firm incentives, R&D capacity and the market opportunities. With the laissez faire market regime prevailing in the country, government economic policies have generally been liberal. While such policies enhance competition and in some cases stimulate innovation, it sometimes inhibit innovation. Firms have shown that where there are incentives for innovations, they are produced. The available skills in the industry can respond to the need for certain incremental innovations, which go to enhance the competitiveness of the firm.

4. CONCLUSION AND SUMMARY OF RECOMMENDATIONS

The study of agri-business in Ghana has underscored the relevance of the concept of innovation as a systemic dynamic. The influences impinging on the components of the value chain are from the principal sources of internal environment and the external environment. The stakeholders need to be aware of the interactive nature of the influences as well as the extent to which their own activities, interactions and linkages with local and external agents could determine the outcomes of their activities.

The firms have shown that there is potential for agribusiness to have a huge impact on Ghana's livelihoods and income-earning. There is also the potential for innovations. However there are constraints in finance and the incentives in the policy instruments. More importantly, government needs to understand and seriously work at the inter-linkages in public policies. It appears that the major challenge in the formulation and

execution of policies is forging the vital connections to ensure synergy and optimize the positive impacts.

In this regard, it is recommended that government should examine its economic policies. While the underlying philosophy of such policies should remain, there is the need to enhance the incentives for local firms to be more innovative and competitive. Considering the inhibitors of innovation, public policies can be put in place to address such inhibitors of innovation. There can be for example, funding schemes devoted primarily to innovations – new products, adaptation of machinery and equipment, improvement in processes, etc.

The national Research and Development capacity in the centres of knowledge and innovation must be strengthened to enable a more beneficial support for local firms. The physical infrastructure in the centres and the human capabilities need to be strengthened. More importantly, the linkage between the centres of knowledge and the enterprises should be strengthened for effective knowledge flow. As the systemic concept of innovation has highlighted, functional linkages among the stakeholders are as critical as the various units in the system. All the factors facilitating innovation must be right to ensure success.

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Annex 1: List of enterprises interviewed.

Enterprise	Activity Type	Address/ Location	Contact Person
1. Selasie Foods & Products	Agro-processing of foods e.g. cassava	Accra (Agbogba)	Mrs. Selasie
2. Meaty Food Ltd.	Meat/ Chicken processing	Lartebiokorshie, Accra	Mr. Joseph Tackie, Box CT 3827, 0289102746
3. Lee Chemical Ventures	Food processing e.g. cassava	Accra (Old Gbawe)	Mr. Lee – 0244376747
4. Kranyarko Farm	Poultry farming – egg and day-old chicks production	Nsawam	Mr. Sampson Ani-Kwadjo, Manager 0274894650
5. Afariwwa Farms	Livestock/ poultry farming	Accra	Nana Owusu Afari (Tertiary)

6. Ayensu Cassava Farmers Assoc.	Cassava farming	Bawjiase	Mr. Samuel Dodd, National President – 0244576008
7. Cassava farmer	Cassava farming	Agona Bosomanse	Robert Tawiah 0249367159
8. Cassava Farmer	Cassava farming	Agona Kwanyako	Samuel Okyere
9. Cassava Farmer	Cassava farming	Agona Kwanyako	Solomon Asante Yemoah, Chairman Local Cassava Farmers Association
10. Town and Country Plaza	Supermarket – wholesale and retail	Achimota, Accra	Mr. T.J. Tijani – 0243471107
11. Eben Supermarket	Shop – retailing	GICEL Estate, Weija, Accra	Mr. Yaw Boakyee – 0277221996
12. Wad African Foods	Agro-processing e.g. cassava, fresh fruits – mango, pineapple, coconut,	Box WJ 371, Accra	Vida Ofori, 021- 853212, 0244994303
13. N&N Mini Mart	Trade in processed food products e.g. cassava flour, gari, dairy products	West Legon, Accra	
14. Can and Kaa Ltd.	Food processing e.g. kokonte (cassava) flour, canned vegetables, palm nut soup concentrates, smoked river and marine fishes	Achimota, Accra	Mr. Kofi A. Asiedu, 0244340746
15. Trans Royal Ghana Ltd.	Cocoa purchasing	Suhum	Reindolf Mark Tetteh 0242944936
16. Cocoa farmer	Cocoa farming	Osiem, (District Best Cocoa Farmer 2007)	Jacob Asirifi No. 1
17. Cocoa farmer	Cocoa farming	Osiem (Regional Best Cocoa Farmer 2004 – 2007)	Opanin Abraham Kwaku Adusei, 0246040484
18. Produce Buying Company Ltd.	Cocoa beans purchases	Suhum	Maxwell Sampson
19. Multi Adom Farms	Poultry farming	Nsawam	Robert Kofi Mensah, Manager – 0242865633
20. Darko Farms	Poultry breeding	Darko Farm, Subsidiary Breeding Farm, Kumasi (Managing Director,	Mr. Senyo Yao Kpodo, 0244587773 (Tertiary education)

		Darko Farms & Co. Ltd., Box 513, Kumasi.)	
21. Asare Farms & Co. Ltd.	Poultry farming	Box AN 2455, Kumasi	Mr. T.F. Asare, 051-24402 (Tertiary Education)
22. Kuafo Adamfo	Cocoa buying and selling	Kuafo Adamfo, Kumasi	Mr. Sebastian Owusu, Deputy Chief Operations Officer, 0244311039 (Tertiary Education)
23. West African Mills Co. Ltd.	Cocoa processing	WAMCO, Takoradi	Mr. Issac Opoku, 031-23456, 0244374435 (MBA)
24. Raktia Holding Ltd.	Producing soy feeds for poultry farmers and other processed foods	Raktia Farms, Kumasi	Mr. Robert Akwasi Nketia, (University education)
25. IKE Farms	Production of poultry products e.g. eggs and chicken	IKE Farms, Essipon-Sekondi	Percy Atta (Secondary level education)
26. COCOBOD, Seed Production Unit	Production of cocoa seedlings	Seed Production Unit of COCOBOD,	Mr. Joseph Akwei-Antwi, 0244130595 (Diploma in Agric)
27. Produce Buying Company, COCOBOD	Purchase of cocoa beans	PBC, COCOBOD, Regional Office, Kumasi	Mr. Freddie Amponsah, Regional Manager, 051-25867, 0244771847
28. Santa Maria Farms	Poultry farming	Santa Maria Farms, Kumasi	Dr. Raphel Owusu Peprah, 0276759955, 0209143973 (Ph.D.)
29. Marinoff Farm Ltd.	Poultry farming	Marinoff Farm Ltd., P.O. Box AH 8361, Kumasi	Mr. Anthony Marinoni, 051-29671, 0208096798
30. Western Farms	Poultry farming	Western Farms, Winneba	Charles Kodjo Odum (Diploma)
31. Global Haulage Company Ltd.	Haulage, warehousing, real estate and fabrication	Global Haulage Co. Ltd., P.O. Box 5286, Accra-North	Mr. Andy C. Agyekum, 021-400173, 021-407332, 0244239963 (Tertiary Education)

Ministries and Agencies Visited for Information

1. Ministry of Food and Agriculture (MOFA) – Statistics Research and Information Division (SRID), Accra
2. Ministry of Trade, Industry and Presidential Special Initiatives, Accra
4. Ghana Export Promotion Council (GEPC)
3. Ghana Cocoa Board (COCOBOD)