

**A STUDY ON THE CONTRIBUTION OF SUPPLY CHAIN MANAGEMENT TO  
GHANA'S RICE INDUSTRY**

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**A thesis submitted in partial fulfillment of the requirements for the award of a degree of  
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## ABSTRACT

The cropping system in Ghana is generally characterized by low productivity especially rice and as such efforts have been made by stakeholders in the industry to address this phenomenon. This development has therefore generated a persistent gap between the supply side of locally cultivated rice and the demand side of it. The system is also characterized by low level of technology and productivity, low income and un-competitiveness in production, processing and distribution hence a weak linkage between production areas and the market largely due to supply chain problems. Other challenges associated with the rice supply chain system are low inventory levels, inadequate facilities, poor road infrastructure leading to post-harvest losses, inadequate investment in irrigation, logistics, lack of information on best farming practices and market trends.

The impact of these hiccups in the rice industry is low level of rice production on a yearly basis. This therefore leads to huge rice imports. To boost rice production, this study employed the six drivers of supply chain management (inventory, transportation, pricing, sourcing, information and facilities) and assessed how each would contribute to the performance of the rice industry in terms of quantity. This study was on the contribution of supply chain management to Ghana's rice industry.

**Approach:** The approach to this study was a theoretical model. Hypotheses were tested using empirical data gathered from respondents through the use of questionnaire and analyzes were made using descriptive analysis, correlation coefficients and multiple linear regression.

**Results and Recommendation:** The results showed a significant positive relationship between each of the six drivers of supply chain and the performance of the rice industry hence the study recommends government's over-riding responsibility with other stakeholders in order to achieve the needed improvement in the industry.

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## **APPROVAL**

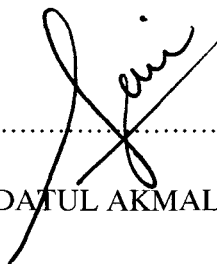
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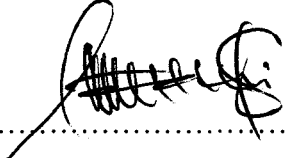
## **DEDICATION**

In lasting memory of our late father

**(ALHAJI O.A. FASASI)**

## DECLARATION

I declare that this thesis, entitled “A Study of the Contribution of Supply Chain Management to Ghana’s Rice Industry” is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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## LIST OF ABBREVIATIONS

<b>FAO</b> .....	Food and Agriculture Organization
<b>FASDEP</b> .....	Food and Agriculture Sector Development Policy
<b>MiDA</b> .....	Millennium Development Authority
<b>MoFA</b> .....	Ministry of Food and Agriculture
<b>NRDS</b> .....	National Rice Development Strategy
<b>PRA</b> .....	Participatory Rural Appraisal
<b>SCM</b> .....	Supply Chain Management
<b>WFP</b> .....	World Food Program

# CHAPTER ONE

## 1.0 INTRODUCTION

The cropping system in Ghana is generally characterized by low productivity especially rice and as such efforts have been made by stakeholders in the industry to address this phenomenon. This development has therefore generated a persistent gap between the supply side of locally cultivated rice and the demand side of it. To meet the growing rice consumption, rice is imported into the country. However, this has led to growing pressure on the nation's balance of trade adversely (Seidu, 2008). According to the National Rice Development Strategy (NRDS, 2009) report, the per capita rice consumption in Ghana stands at 38 kg and by 2015, the per capita rice consumption or usage is estimated to hit 63 kg and as such portraying an average aggregate demand of about 1.68 million metric tons.

Some of the challenges militating against the increase in production of rice are problems of land tenure system, liberalization of the rice market, high costs of farm inputs and implements, poor state of road infrastructure, inadequate rice production facilities, unfavorable market price for rice, poor communication networks to mention just a few.

The crux of this study is to address these challenges through supply chain management so that when the value chain is improved, it will precipitate an increase in the quantity of rice produced annually. This study therefore begins with an overview of Ghana's economy and followed by a brief outlook of Ghana's agriculture sector, the rice industry in Ghana, the global understanding of supply chain management and the challenges of supply chain in rice production in Ghana.

## **1.1 Background to the study**

### **1.1.1 Overview of Ghana's Economy and Size of Population**

The provisional results of the 2010 Population and Housing Census conducted by the Ghana Statistical Service show that Ghana's total population stood at an estimated 24,233,431 people. This shows an overall increase by 28 per cent over the last population census conducted 10 years ago (2000). The results also showed that there is increasing pressure on land hence source of livelihood or food security by the population. Thus, the number of persons per one square kilometer (population density) is almost doubled from 52 in 1984 to 102 in 2010.

Ghana's economy made significant gains in macroeconomic stability since mid-2009 through great reduction in her fiscal and external current account deficits thus reducing inflation to a single digit of 8.4 per cent as at September, 2011 from a high of 20.7 per cent in June, 2009. Not only that, the stock of international reserves rose from US\$ 2.0 billion in 2008 to US\$ 4.98 billion in October, 2011. Given a robust performance in the non-oil sector and the start of oil exploration, real gross domestic product (GDP) growth is estimated at 13.6 per cent in 2011 from 8 per cent in 2008, making Ghana the fastest growing economy in the world in the 2011 fiscal year. Finally, rebasing and revision of the national accounts measurement in 2010, raised Ghana's national income by more than 60 per cent hence moving the country to lower middle-income status (Ghana's Budget Statement, 2012).



### **1.1.2 Brief Outlook of Ghana's Agriculture Sector**

Ghana's agriculture is dominated by subsistence small holder production units with weak linkages to industry and the services sector. The sector is also characterized by low level of technology and productivity, low income and un-competitiveness in production, processing and distribution. Thus the main focus of the current Ghanaian government is agricultural development, over the medium-term which will accelerate the modernization of agriculture through the implementation of the Food and Agriculture Sector Development Policy (FASDEP II, 2007) and its corresponding investment plan. This would strengthen the linkages between the agriculture sector and the services sector thereby enhancing productivity while improving the general income levels of all stakeholders within the value chain.

Denis (2008), observed that though the Ghanaian government's investment in horticultural sector is laudable, it poses a threat to food crop production and the fight against poverty reduction. To Osei-Asare (2010), a major challenge to ensuring massive rice production due to a continuous or growing demand of food supplies from Ghana's middle-income or the elite class though this scenario equally generates an opportunity for developing and investing more in the local food industry by both the private entrepreneurs and the state enterprises.

### **1.1.3 The Rice Industry in Ghana**

The rice industry in Ghana has not seen much transformational changes for quite some time now. This is because government support to this industry is woefully inadequate. Apart from that imported rice have inundated the entire rice market in the country to the disadvantage of local rice producers (Wilhemina et al, 2010). Ghanaian farmers generally face problems of low yields, poor quality and also difficulty in making profits by these local producers. According to the Millennium Development Authority (MiDA, 2009) report, the local rice farmer in Ghana turns to earn a little less than the importers of rice because the farmer operates in a relatively higher cost environment. Quaye (2008) mentioned that Ghanaians largely depend on staple foods like rice, cassava, wheat, millet, maize among others as their diets and sources of energy needed by the body and means of livelihood. In spite of the fact that rice is produced locally, statistics available points to rather gloomy picture indicating that Ghana imports over 50 per cent of her rice consumption requirement and this add more pressure on the nation's balance of payment deficits and indeed threat to local food production especially rice.

It is an open secret that globalization and trade liberalization have brought many challenges including the rice industry to Africa and for that matter, Ghana. Achieving optimum production of rice requires that the aggregate availability of physical supplies of rice is sufficient such that households have adequate access to rice and other staple food supplies through their own production, through market or through other sources and in addition, the optimal utilization of the supply of rice is sufficient or appropriate to meeting the specific dietary needs of individuals (Buah et al, 2011).

According to Kotir (2010), West Africa has been tagged as been susceptible to the vagaries of weather and one of the most vulnerable zone in the entire continent of Africa in terms of climate change leading to events like drought and flood. These changing conditions, inadvertently have contributed to food insecurity in Sub-Saharan African countries. Thus, the West African Sub-region and indeed Ghana is considered as a vulnerable zone and prone to the consequential effects of climate change due to the country's high dependence on agriculture and other natural resources like gold, manganese and most recently, the discovery and exploration of crude oil.

It is also necessary to identify that rice production or its availability is influenced by a myriad of factors including poverty, disparities in resource endowment, weak state institutional structures, weak infrastructure base, ethnic conflicts, fluctuating market conditions, financial difficulties, diseases such as malaria and acquired immune deficiency syndrome (AIDS).

In a related development, Irene and Esther (2008) opined that Ghana is vulnerable to several kinds of drought conditions and desertification processes. Basically, soil erosion and bushfires are common and generally pose a serious threat to the country especially the northern part of the country. Apart from that, other factors that pose threat to Ghana's march towards a sustainable food availability and enhancement of quality rice production are inappropriate mechanization of agriculture and land degradation owing to deforestation and overgrazing by cattle and other domestic ruminants. The impact of these practices have a telling toll on crop yields including rice leading to low incomes and sometimes lost of basic means of livelihood especially in the rural and other deprived areas of the country.

It is quite inseparable, the linkage or bond between desertification, climate change and food supplies. Undoubtedly, the constraints to agricultural development in Ghana among others include erratic rainfall pattern, low soil fertility due to over utilization of land, inadequate irrigational facilities, difficulty in accessing credit to lack of collateral security, post harvest losses, rigid system of land tenure, poor road infrastructure and associated amenities and dangers of yearly bushfires (Frederick et al, 2011).

#### **1.1.4 Global meaning of SCM**

The Council of Supply Chain Management Professionals (CSCMP) in its view describes supply chain management as an all inclusive environment embracing planning and management of a myriad of activities with regard to sourcing and procurement, conversion, logistics management to mention just a few. In addition, this effort is also in the area of coordination and collaboration among all stakeholders ([www.cscmp.org](http://www.cscmp.org)).

In another development, the Global Supply Chain Forum (GSCF) observed that supply chain management is basically an integration of vital business processes spanning from customers through suppliers, service delivery and the general information that adds up to value creation to the benefit of all the players in the chain ([www.nextlevelpurchasing.com](http://www.nextlevelpurchasing.com)).

Dag and Steven (2010) on their part added that supply chain management is a cluster of inter-related activities within a firm or an entire industry with regard to material or equipment handling, procurement, logistics and marketing. They further stated that there are other relevant

structures that induce the free flow of materials or component parts, services, financial engineering throughout the entire chain and ultimately ensuring customer satisfaction.

The Global Supply Chain Forum (GSCF) outlined eight (8) processes that constitute the very foundation for supply chain management (Dag and Steven, 2010 page 6). These are Customer Relationship management, Supplier Relationship Management, Product Development and Commercialization and Return Management as depicted diagrammatically below.

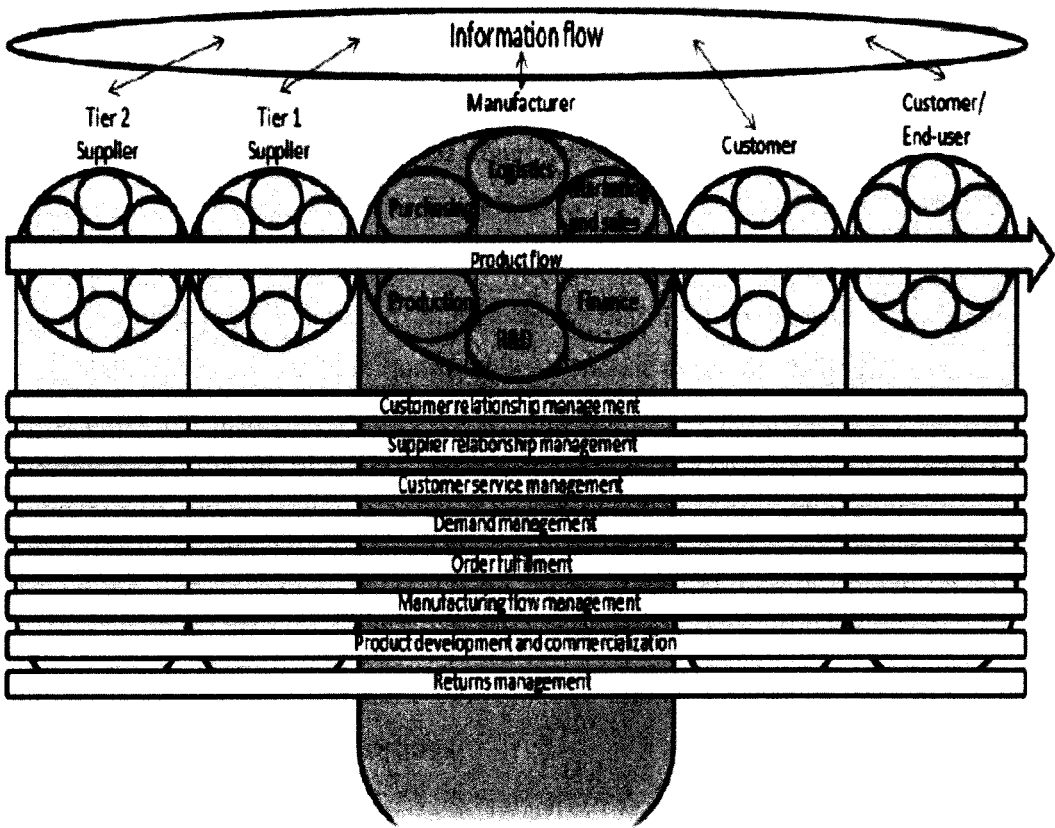


Fig1.1 8-Processes of Supply Chain Management (Source: Dag & Steven, 2010)

Supply chain management is also described in terms of strategic sourcing and it is the development and management of supplier relationships to acquire goods and services in a way that aids in achieving quality delivery in terms of meeting the needs of end-users and the overall

objective of the firm. To achieve this goal, information technology is integrated into the supply chain strategy as succinctly enumerated below (Jacobs and Chase, 2008).

- Efficient supply chains – these are supply chains that utilize strategies aimed at creating the highest cost efficiency while ensuring quality. To achieve this, non-value-added activities are eliminated, pursuance of economies of scale, deployment of optimization techniques so as to ascertain the best capacity utilization in production and distribution while information linkages are created to ensure the most efficient, accurate, cost-effective and continuous quality assurance are transmitted by aid information technology across the supply chain.
- Risk-hedging supply chains – these are supply chains that utilize strategies aimed at pooling and sharing resources in a supply chain so that the risks in supply distortion are equally shared while ensuring quality. In other words, a single stakeholder or entity in a supply chain can be vulnerable or susceptible to supply distortions but if alternative supply resources are available, the risk of disruption is curbed.
- Responsive supply chains – these are supply chains that utilize strategies aimed at being responsive and efficient in terms of quality delivery while ensuring flexibility to changing and diverse needs of customers.
- Agile supply chains – these are supply chains that utilize strategies aimed at ensuring quality checks at every turn of the production process and also flexible to customer needs, while the risks of supply shortages are curtailed by pooling inventory and other capacity resources. They are agile because they have the ability to be responsive to the changing, diverse and unpredictable demands of customers and at the same time minimizing the risks of supply distortions.

### **1.1.5 General Overview of Supply Chain Management**

Globalization has exposed all economic agents ( household, firm and government) to stiff competition for resources and market share. This is partly as a result of the introduction of products with shorter life cycles, borderless trade and the increasing pressure on firms or state enterprises by consumers and other stakeholders in production and services industries to add value to the satisfaction derived from consuming their commodities.

To this end, David et al (2010) defines supply chain management as a set of approaches utilized to efficiently and effectively integrate suppliers, manufacturers, warehouses and stores so that merchandise is produced and distributed at the right quantities to the right locations and at the right time in order to minimize entire costs of the system while satisfying service level requirement is not compromised. Thus, the objective of supply chain management is to be efficient and cost-effective across the entire value chain system. That is total cost of the supply system spanning from transportation and distribution to inventories of raw materials, work-in-process and finished goods are to be minimized. Finally, supply chain management revolves around efficient and effective integration of suppliers, manufacturers, warehouses and stores and it thus embraces the firm's activities at many or varied levels ranging from the strategic level by tactical means to the operational level.

Chopra and Peter (2010), described a supply chain as consisting of all parties or players or stakeholders involved directly or indirectly in fulfilling a customer request. The supply chain therefore entails not only the manufacturers or producers and suppliers but also transporters (haulage carriers or logistics handling) , warehouses or wholesalers, retailers and ultimately the end-users or customers. In an organization, the chain embraces the activities of manufacturers

and all the functions involved in receiving and meeting an order or a customer's request. These functions among others include new product development, marketing, operations, distribution, finance and ultimately customer service. A typology of a supply chain would often take the form as outlined below.

- ❖ Component/Suppliers of raw materials
- ❖ Manufacturers/Producers
- ❖ Wholesalers/Distributors
- ❖ Retailers
- ❖ Customers/Consumers/End-users

In contemporary supply chain management strategy, efficient consumer response (ECR) has emerged to increase the consumer orientation and cost-effectiveness of supply chains. In this era therefore, new management systems have been designed and deployed to improve logistics, increase in the use of information and boost quality management. Thus new generation cooperatives are emerging, strengthening the position of various producer groups and strategic partnering and vertical alliances are cementing sustainable partnerships throughout the supply chain. This include farmers (producers), processors, storage and transportation facilities, marketers, distributors and the customer ( Jan Van Roekel, 2002, Chopra and Peter, 2010).

Finally, Chopra and Peter (2010) alluded that the objective of every supply chain is to maximize the overall value generated to meet customer satisfaction. The value a supply chain generates is the difference between what the end product is worth to the customer and the costs the supply chain system incurs in meeting the customer's request or the lead time order. Thus the difference