ADOPTION OF A WAREHOUSING MANAGEMENT SYSTEM: THE CASE FOR BULK COCOA WAREHOUSE

BY

SAMUEL ODURO-ASARE
Regional Maritime University Index No. 00000885
University of Ghana Index No. 10236261

THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF M.A PORTS AND SHIPPING ADMINISTRATION DEGREE.

AUGUST, 2007
DECLARATION

I declare that except for the references to other people’s work, which have been duly acknowledged, this dissertation is the result of my own research carried under the supervision of Prof. Max Assimeng and Mr. Alock Asamoah.

Signature

SAMUEL ODURO-ASARE
(STUDENT)
Date 29-5-2009

Prof. Max Assimeng
(Supervisor)
Date: 1/6/09

Mr. Alock Asamoah
(Supervisor)
Date: 29/05/09
ACKNOWLEDGEMENT

My special thanks go to the respondents who offered themselves for the interview. The outcome of this study has been as a result of their responses during the interview.

I am also grateful to COCOBOD, my employers, who sponsored and allowed me to undertake this study programme.

I wish to express my profound gratitude to my project Supervisors, Professor Max Assimeng and Mr Alock Asamoah, for their invaluable guidance, insightful contributions and encouragement without which this thesis would not have been successfully completed.

I would also like to single out and recognize the efforts and support of my dearest wife, Josephine. She has been a true pillar behind the completion of this thesis. Special gratitude goes to my wonderful children, Frema, Nana Abena, Ohenewa and Oheneba, for their love and encouragement. Nana Adwoa, thank you for the encouragement you gave to me.

Finally, I dedicate this project to God, and I give Him all the glory for the wondrous things he has done.
ABSTRACT

The Cocoa sub-sector continues to dominate in the overall economic performance of Ghana. The 35th Annual Report of COCOBOD revealed that, COCOBOD paid a total of 997 billion cedis as export and local duty to the government treasury during the 2003/2004 crop season. Logistics activities such as warehousing are undertaken to help achieve maximum earnings from cocoa sales. The warehousing system practiced by COCOBOD is the conventional type, where the commodity is warehoused and shipped in bags, manually. In the global Logistics and Maritime industries, however, there is a growing shift towards mechanisation.

Given the above global situation, the study sought to find out whether the conventional system of warehousing practiced by COCOBOD, has been responding adequately to the new trends in warehousing management. Also, the study considers the issue of whether it is possible that the new bulk warehousing system suggested will be a further improvement in responding to the current trends and challenges of the market.

The objectives of the study, therefore, were to assess the advantages of the suggested bulk warehouse. To help achieve the objectives of the study, the purposive sampling method was used. Respondents whose backgrounds are technical and are also professionally related to the study were specifically
contacted. The diagnostic technique of data collection which is associated with oral or unstructured interviews was used.

The study revealed that the conventional warehousing and handling system had poor space utilisation capacity. The General Manager of Unicontrol Commodity mentioned that, storage of cocoa in bags has 1 tonne per square metre as the utilisation capacity as against 3 tonne per square metre in the case of bulk storage. The manual system of warehousing also, made ships to spend more days in port than at sea. The Port Operations Manager of CMC intimated that, a vessel loading 8000 tonnes of cocoa in bags would take about five days to load. The General Manager of Unicontrol Commodity revealed that a typical conveyor system has the capacity to load 200 tonnes of bulk cocoa per hour. A 5000 tonne vessel is thus loaded in just one day, he posited. Also, the rate of infestation was seen to be very high with the shipment of cocoa in bags (about 71% of cocoa shipped in January, 2007 alone). The Deputy Executive Director of QCD revealed that with the removal of the jute sacks in bulk warehouse, cases of infestation are drastically reduced. There was no incidence of infestation between 2001 and 2006, involving a tonnage of 1,650,529.6875 of cocoa shipped in bulk. The automation of the system also ensured exact and accurate delivery of consignments. The study revealed that, the trend of shipment of cocoa is gearing more towards bulk. The General Manager of Unicontrol Commodity revealed that, in response to packaging and logistics requirements of some European governments and the European Cocoa Association where the
use of jute sacks is being phased out, buying, warehousing and shipment policies are now towards bulk.

Based on the findings of the study, it is recommended that COCOBOD constitutes project teams to work and recommend on the technical, financial and human capital aspects of the project. Also, the need for collaboration with stakeholders such as GPHA, shipowners and agents towards the synchronization of warehousing/shipment needs and port development, is recommended. That COCOBOD enters into development, investment and financing collaborative discussions with financial partners, to finance the project is recommended.
# TABLE OF CONTENT

## CHAPTER ONE: INTRODUCTION

1.0 Background to Study ...............................1
1.1 Warehousing and Pre-shipment Activities of COCOBOD ...............2
1.2 The Need for Warehousing System ................................7
1.3 Reasons for Storage ..................................9
   1.3.1 Transportation-Production Cost Reduction ...............9
   1.3.2 Coordination of Supply and Demand ......................10
   1.3.3 Production Needs ..................................10
   1.3.4 Marketing Considerations .............................11
1.4 Warehousing Functions ..................................11
   1.4.1 Holding ...........................................11
   1.4.2 Consolidation .....................................12
   1.4.3 Break-bulk .......................................12
   1.4.4 Mixing ...........................................12
1.5 Types of Warehouses ..................................13
   1.5.1 Commodity Warehouses ...............................13
   1.5.2 Bulk Storage Warehouses .............................13
   1.5.3 Temperature Controlled Warehouses .....................14
   1.5.4 Household goods Warehouses ..........................14
   1.5.5 General Merchandise Warehouses ......................14
   1.5.6 Mini-Warehouses ..................................14
CHAPTER FOUR (a): CONVENTIONAL HANDLING OF COCOA

4.0 Introduction........................................................................................................55
4.1 Logistics Chain and Handling of Cocoa Up-Country........................................56
  4.1.1 Society Level..................................................................................................56
  4.1.2 Depots............................................................................................................56
4.2 Logistics Chain and Handling of Cocoa at the Ports.........................................57
  4.2.1 Take-over Process.........................................................................................57
  4.2.2 Offloading.....................................................................................................58
  4.2.3 Stacking and Storage....................................................................................59
  4.2.4 Evacuation....................................................................................................59
4.3 Data Analysis.......................................................................................................60
  4.3.1 Advantages of Conventional Handling and Warehousing of Cocoa............60
    4.3.1.1 Employment Generation.........................................................................60
    4.3.1.2 Cargo Packaging.....................................................................................61
    4.3.1.3 Ease of Counting and Accountability.....................................................62
  4.3.2 Disadvantages of Conventional Handling and Warehousing of Cocoa........63
    4.3.2.1 Utilisation of Warehousing Space............................................................63
    4.3.2.2 Low Ship Turn-around Time..................................................................64
    4.3.2.3 Problems Relating Manual Counting......................................................66
4.3.2.4 Shipment Discrepancies and Infestation at Destination ......................... 67

4.4 Conclusion ................................................................................................. 70

CHAPTER FOUR (b): BULK WAREHOUSING AND HANDLING OF COCOA

4 (b).0 Evolution of Bulk Cocoa Handling ......................................................... 71

4 (b).1 The Operation of Bulk Cocoa Warehouse ............................................. 72

4 (b).2 Data Analysis ....................................................................................... 73

4 (b).2.1 Reasons for Bulk Warehousing ....................................................... 73

4 (b).2.1.1 Optimal Use of Storage and Warehousing Space ................. 73

4 (b).2.1.2 Lower Insect Development ....................................................... 75

4 (b).2.1.3 Lower Freight as a Result of Economies of Scale ............. 76

4 (b).2.1.4 Reduction in Transit Time ......................................................... 77

4 (b).2.1.5 The Benefits of Automation in Bulk Handling .................. 78

4 (b).2.1.6 Current Trend of Buyers Requirements ................................... 78

4 (b).2.1.7 Effect of Bulk Warehousing on CMC’s Sales Policy .......... 81

4 (b).2.1.8 Dual Purpose Warehouses ....................................................... 82

4 (b).2.1.9 Effect of Bulk Warehousing on Shipping Documentation .... 82

4 (b).2.2 Disadvantages of Bulk Warehousing of Cocoa .................. 83

4 (b).2.2.1 High Initial Cost of Investment ................................................. 83

4 (b).2.2.2 Low Rate of Employment Associated with Bulk Warehousing . 84

4 (b).2.2.3 Frequent Breakdown of Equipment ...................................... 86

4 (b).3 Conclusion ......................................................................................... 87
CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.0 Conclusions.................................................................................................................88
5.1 Introduction..................................................................................................................88
5.2 Specific Conclusions.................................................................................................88
5.3 Recommendations.................................................................................................92

References......................................................................................................................95
Appendix 1: Interview Guide.........................................................................................100
Appendix 2: Schedule of Meetings...............................................................................102
Appendices C+: Miscellaneous Pictures, etc.................................................................103
### LIST OF TABLES

<table>
<thead>
<tr>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 4.1: Employment of Dockers</td>
<td>60</td>
</tr>
<tr>
<td>Table 4.2: Ship Turn around Time of Vessels</td>
<td>65</td>
</tr>
<tr>
<td>Loading Cocoa in Bags</td>
<td></td>
</tr>
<tr>
<td>Table 4.3: Short Landed Cocoa at Destination</td>
<td>67</td>
</tr>
<tr>
<td>Table 4.4: Cocoa Discrepancy Report</td>
<td>69</td>
</tr>
<tr>
<td>Table 4(b).5: Trends in Bulk Shipment</td>
<td>80</td>
</tr>
</tbody>
</table>
LIST OF ABBREVIATION

COCOBOD..............Ghana Cocoa Board
CMC.....................Cocoa Marketing Company (Ghana) Limited
FCC......................Federation of Cocoa Commerce Limited
FOB......................Free On Board
GPHA...................Ghana Ports and Harbours Authority
LBC.....................Licensed Buying Company
QCD......................Quality Control Division of COCOBOD
TEU......................Twenty Feet Equivalent Unit
UCC.....................Unicontrol Commodity (Ghana) Limited
UNCTAD...............United Nations Conference on Trade and Development
WPO......................Warehousing and Port Operations Department of CMC
CHAPTER ONE
INTRODUCTION

1.0 BACKGROUND TO STUDY

To be able to derive the maximum earnings and benefits from the sale of cocoa on the international commodity market, COCOBOD ensures that sound handling and logistics activities are adopted and carried out. A key handling practice undertaken is the warehousing management of the crop. This practice ensures that the crop is consolidated, adequately prepared and made ready for shipment. Other evacuations such as deliveries to local processing factories are also effected from warehouses.

Cocoa in bags brought from up-country in truck-loads is offloaded into warehouses. The warehouses allow for the crop to be consolidated till large economic quantities are attained to allow for its shipment. The commodity is carefully stacked on wooden pallets in warehouses. The stacks of cocoa are fumigated to kill all insects and pests. Fumigation is also done to break their infestation cycle. The fumigation period lasts for five (5) days after which the commodity becomes ready for shipment. Cocoa is released from warehouses to service vessels that are in port to transport the commodity to buyers located abroad.

During shipment, the fumigated stacks of cocoa are either stuffed into containers or are put directly into vessel's hold (break bulk) depending on the mode of
shipment. In situations where the mode of shipment is bulk, sacks containing the cocoa beans are split open and the contents poured into either containers or ship’s hold.

1.1 WAREHOUSING AND PRE-SHIPMENT ACTIVITIES OF COCOBOD

The warehousing and pre-shipment activities of COCOBOD are undertaken by Cocoa Marketing Company and are located within the ports to allow for easy access to the port and shipping facilities. The crop so purchased from farmers by Licensed Buying Companies, is transported to the port for it to be warehoused and prepared for shipment. It is at the port that the final handling and warehousing of the crop is done to get it ready for shipment.

It must be noted that, the current warehousing system practised by Cocoa Marketing Company (CMC) is the type whereby the commodity is handled, warehoused and shipped in bags. These activities, that is, handling, warehousing and shipment of cocoa, are carried out manually by cocoa dockers (labour). This system is referred to as the Conventional type of Warehousing and Handling.

Also, the Ghana Ports and Harbours Authority (GPHA) until 2004 provided warehousing facilities at the ports of Tema and Takoradi for cocoa storage. GPHA has since this period either demolished or re-entered the warehouses. This situation has reduced drastically the warehousing capacity of CMC in terms of cocoa handling (COCOBOD, 2006 a).
The current warehousing capacity operated by Cocoa Marketing Company is as follows:

<table>
<thead>
<tr>
<th>Location</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tema</td>
<td>125,500 Tonnes</td>
</tr>
<tr>
<td>Takoradi</td>
<td>109,000 Tonnes</td>
</tr>
<tr>
<td>Kumasi</td>
<td>68,000 Tonnes</td>
</tr>
</tbody>
</table>

This gives a total of 302,500 tonnes of warehousing capacity for the storage of cocoa in Ghana (CMC, 2007).

In spite of the giant strides being taken by COCOBOD in terms of production levels which stood at 740,000 tonnes in 2005/2006 (COCOBOD, 2006 a), warehousing capacities have not been able to cope with the rate of delivery. It has also failed to maximise the use of existing space and has thus led to congestion at the ports. This issue was buttressed by the Minister for Finance, Mr Kwadwo Baah Wiredu when he pointed out that some of the problems encountered during the 2005/2006 season and in the past have included among others congestions at the Take Over centres (Ghana Review, 2006 p12).
There is, therefore, the need to address the management question of warehousing and storage with its attendant seasonal congestion with regards to cocoa operations. The Chief Executive Officer of COCOBOD stressed this point when he said there is the need to change the handling of cocoa and rather modernise the warehousing and port handling operations to enable COCOBOD cope with the increased volume of cocoa passing through the ports (Ghana Review, 2006 p12).

It must, however, be said that in the Logistics and Maritime industries, there is a growing shift towards mechanisation and the adoption of improved technology where operational activities are capital intensive. This has resulted in the use and adoption of technologically advanced warehousing systems, high speed conveyor systems, vigorous port development and the building of modern and faster vessels, to help meet industry requirements (Scholten, 2000).

All these are done with the view to improving efficiency, meeting customer requirements and reduce cost of operation.

Since the main objective of the marketing of cocoa is to meet the requirements of buyers on the international market, and to raise revenue and foreign exchange for the government, all operational and logistics strategies adopted must be technologically advanced and efficient, to help realise these objectives. This must
be done in the most efficient and effective manner that will help lead to cost reduction.

Unlike the above situation, the current conventional warehousing and handling system used by Cocoa Marketing Company is manual and not mechanised. The problems associated with this system have been marked with its attendant cost to the cocoa industry.

It must be emphasised that, the cost and expenditures on the handling of cocoa, take a greater proportion of the revenue so derived from the sale of the commodity on the world commodity market. This has not helped in realising fully, the revenue generation potential of the cocoa industry for accelerated national development.

The various cost centres associated with the handling of cocoa are grouped into

1. Logistics cost, which covers the procurement of items such as jute sacks and twines.
2. Haulage and transport costs which also cover primary and secondary evacuations and inter-warehouse transfers.
3. Labour costs which include standardisation, offloading, stacking and shipment undertaken by cocoa dockers.
4. Warehousing and port operations costs consisting of warehousing rent, lighting, cost of dressing containers, etc.

5. Fumigation costs which comprise of cost of chemicals and labour used in the prevention and control of infestation (COCOBOD, 2005).

Cocoa Marketing Company's International Sales Policy allows for a three (3) monthly shipment period (October – December, November- January, January-March), within which period the buyer must declare the port of destination for his consignment (CMC, 2006). Because warehousing facilities are relatively expensive in consuming nations, especially in Western Europe, buyers mostly nominate vessels and pick their supplies at the tail end of the sales contract period. This system, while favouring the buyer, puts a lot of pressure on our warehousing capacities and it is more severe as a result of the conventional type of warehousing (COCOBOD, 2006 a).

The above situation, therefore, presents a challenge to the managers of the cocoa industry towards the adoption of a system of handling and warehousing of the commodity that takes cognisance of the current trends of the industry, in terms of customer requirements, technology and increasing production levels of cocoa.

Bulk warehousing as an alternative warehousing management system is suggested in the study.
1.2 THE NEED FOR WAREHOUSING SYSTEM

If demand for a firm's products were known for sure and products could be supplied instantaneously to meet the demand, theoretically storage would not be required since no inventories would be held (Guelzo, 1986). In other words if what is produced is immediately demanded and consumed by customers there will be no products available to store. This will mean that there will not be the need for warehousing. However, it is neither practical nor economical to operate a firm in this manner since demand usually cannot be predicted exactly (van Hoek, et al, 2005). Even to approach perfect supply and demand co-ordination, production would have to be instantly responsive, and transportation would have to be perfectly reliable without any lag in delivery time (Christopher, 2002). This is just not available to a firm at any reasonable cost (Rushton, et al, 2000). Therefore, firms use inventories to improve supply-demand co-ordination and to lower overall costs. It follows that maintaining inventories produces the need for warehousing and, to a large extent, the need for materials handling as well. Storage becomes an economic convenience rather than a necessity. (Ballou, 1999)

The costs of warehousing and materials handling are justified because they can be traded off with transportation and production-purchase costs. That is by warehousing some inventory; a firm can often lower production costs through economical production, lot sizing and sequencing. By this means, the firm avoids the wide fluctuations in output levels due to uncertainties and variations in
demand patterns (Christopher, 1985). Also, the warehousing of these inventories can lead to lower transportation costs through the shipment of larger, more economical quantities. According to van Hoek, et al, (2005), the object of inventory management is to use just enough warehousing so that a good, economical balance can be realized among warehousing, production, and transportation costs.

Some of the recent pressures on logistics, that is, forever increasing customer service levels, inventory reduction, time compression and cost minimisation have inevitably changed the structure of supply chain and the position and working of warehouses within the supply chains (Christopher, 2002).

It must be emphasized that the old concept of warehouses as places to store goods has been superseded. Warehouses primarily exist to facilitate the movement of goods to the end user (Rushton, et al, 2000). Warehouses are now seen as throughput facilities in the supply chain management as opposed to being mere storage facilities. The pressure to reduce inventory with increased customer service care has also necessitated the development of what is now referred to as 'stockless depot' which engages in such operations as transhipment and cross-docking (Rushton et al, 2000).

The level of technology to utilise in a warehousing operation is also as important as the need for the warehouse. The range of technology spans from conventional
warehousing where manual operations are employed through to automated computer-controlled systems with conveyors and automated guided vehicles (AGVs), and on to robotic applications. The reason for the choice of a particular technology level depends on the financial, marketing and other factors such as company image, flexibility for future change and the personal perception of the appropriateness of a particular technology to a particular company (Blanchard, 1992)

1.3 REASONS FOR STORAGE

In the logistics and supply chain management, firms use storage space for the following reasons among others:

1.3.1 Transportation-Production Cost Reduction

Transportation cost becomes less expensive when goods are hauled in economically large quantities. Warehousing helps this to be achieved when goods are stockpiled to allow for large volumes to be consolidated, helping fill truckloads or shiploads. Ballou (1999) posited that per unit transport cost is thus reduced as a result. Warehousing, thus, allows transportation to be well planned and co-ordinated to prevent waste.

Production costs on the other hand could be reduced because supply points draw from warehouse stocks rather than placing orders directly on the production points, which often cause changes in the production schedule.
1.3.2 Co-ordination of Supply and Demand

Firms with highly seasonal production along with reasonably constant demand have a problem of co-ordinating supply with demand. For example, food companies that are into the production of canned vegetables and fruits are forced to stockpile production output in order to supply the market place during the non-growing season. Conversely, firms that must supply a product to a seasonal and uncertain demand typically produce at a constant level throughout the year in order to minimize production costs and to build inventories needed to meet the demand during a relatively short selling season. Whenever it becomes too expensive to co-ordinate supply and demand precisely, warehousing is needed (Briggs, 1960).

Commodity price considerations may also produce a need for warehousing. Those materials and products that experience wide swings in price from time to time may encourage a firm to purchase these in advance of their need when the prices of these materials are at their lowest. Warehousing usually is needed, but it is to be noted that, its cost can be offset by the better price obtained for the commodities (Ernst, et al, 1989).

1.3.3 Production Needs

Warehousing may be part of the production process. The manufacture of certain products such as cheese, wines and liquors require a period of time for aging and, therefore, need a warehouse to enable this process take place.
Warehouses serve not only to hold the product during this phase of manufacture but, in the case where products are taxed, the warehouse can be used to secure or ‘bond’ the product until the time of sale. In this way, companies can delay paying taxes on the product until the product is sold (Ballou, 1999).

1.3.4 Marketing Considerations
Marketing is frequently concerned with how readily available the product is to the marketplace (Christopher, 2002). Warehousing is used to put value into a product. That is, by warehousing a product close to customers, delivery time can often be reduced or supply is made readily available (Rushton, et al, 2000). This improved customer service through faster delivery can increase sales.

1.4 WAREHOUSING FUNCTIONS
Storage facilities are designed to perform certain functions to satisfy the specific needs of the firm establishing it (Briggs, 1960). The design and layout often reflect the particular function of the warehouse, and include the following:

1.4.1 Holding
The obvious use of storage facilities is to provide protection and the orderly holding of inventories. Goods or inventories are held or kept in warehouses till they are needed. Schonsleben (2000), writes that holding of stocks in warehouses may range from long-term, specialised storage (as in aging liquors),
to general-purpose merchandise storage (as in seasonal holding of goods), to
temporary holding of goods (as in trucking terminal).

1.4.2 Consolidation
Where goods originate from a number of sources it becomes economical to
establish a collection point to consolidate the small consignments into larger
ones. Consolidation allows for larger volumes to be realised warranting shipment
of economically large volume of goods. This has the effect of reducing
transportation cost to offset the cost of warehousing.

1.4.3 Break-bulk
Warehouses are used to break or knock down larger volume of goods into
smaller quantities to allow for transportation or shipment in less-than-vehicle-load
quantities. Break-bulk is common in distribution or terminal warehouses
especially when inbound transportation rates per unit exceed the outbound rates
per unit (Briggs, 1960).

1.4.4 Mixing
Warehouses as mixing points permit volume shipments of portions of the product
line to be collected at a single point, and then assembled into orders and
reshipped to customers (Bowersox et al, 1996). Illustrating further, Guelzo (1986)
states, in a typical book distribution centre, consignments from different printing
houses are mixed together and shipped to customers. Without a mixing point,
customer orders might be filled directly from producing points at high transportation rates on small volume shipments.

1.5 TYPES OF WAREHOUSES

A variety of warehouse types exist depending on the nature of activity engaged in by the firm operating them. The specialised needs of a firm would influence the customised design and use of a warehouse type (Rushton et al, 2000). The following are examples of warehouse types as there are an infinite variety of them.

1.5.1 Commodity warehouses

These warehouses are for the storage of commodities such as cotton, tobacco, grains, cocoa and coffee that experience price fluctuation on the world commodity market (Rushton, et al, 2000).

1.5.2 Bulk storage warehouses

Warehouses of this nature offer storage and handling of products in bulk. Products such as liquid chemicals, oil, and syrups are stored in this type of warehouses (Ballou, 1999). Agricultural products such as wheat, coffee and cocoa are also stored in bulk to take advantage of economies of scale.
1.5.3 Temperature-controlled warehouses

These are warehouses that control the storage environment. Both temperature and humidity are regulated (Ballou, 1999). Perishables, such as fruits, vegetables, and frozen foods, as well as some chemicals and drugs, require this type of storage.

1.5.4 Household goods warehouses

Storage and handling of household items and furniture are specialty of these warehouses (Ballou, 1999).

1.5.5 General merchandise warehouses

These warehouses, the most common type, handle a broad range of merchandise. The merchandise usually does not require any special facility or handling (Ballou, 1999).

1.5.6 Mini-warehouses

These are small warehouses having space from 20 to 200 square feet and are often grouped together in clusters. They are intended as extra space, and a few services are provided (Briggs, 1960).

1.6 PROBLEM STATEMENT

The study is to find out whether the conventional system of warehousing management has been responding adequately to the new trends in warehousing
management and to the challenges posed by the global logistics industry. Also, the study considers the issue of whether it is possible that the new bulk warehouse management arrangement suggested will be a further improvement in responding to the current trends and challenges of the market in relation to cocoa, and help cut down costs and improve upon productivity.

1.7 OBJECTIVES OF STUDY

This study focuses more on bulk warehousing and handling of cocoa as an alternative to the conventional system. It seeks to assess:

i. The profitability of bulk warehousing.

ii. The effect of bulk warehousing on the quality of cocoa beans.

iii. The effect of bulk warehousing on the utilisation of warehousing space.

iv. The effect of bulk warehousing on vessels turn-around time

v. The strategic location of bulk warehousing in the logistics strategy and overall port development strategy of Ghana.

vi. The effect of bulk warehousing on the forward sales policy of Cocoa Marketing Company.

1.8 JUSTIFICATION OF THE STUDY

The study is justified on the grounds that savings that would be made through the adoption of an efficient warehousing management can be used to develop other
equally important functional areas in the cocoa sub-sector and the economy as a whole.

Also with the ever increasing technological advancement in warehousing management, the manual system thus becomes archaic. A system that is technologically advanced with higher productivity rates is laudable, hence this study.

1.9 SCOPE OF THE STUDY

The study considers the warehousing management and handling of cocoa at the ports where the final pre-shipment handling of the commodity is done. Specific pre-shipment operational areas considered include offloading, stacking, fumigation, and space management. Also the stuffing of containers and the loading of vessels especially for break bulk and mega bulk shipment are considered. Terminal operations and planning and gang control have also been included in the study.

1.10 CHAPTER ORGANISATION

The study is organised into the following chapters:

Chapter 1: Introduction

Chapter 2: Literature Review

Chapter 3: Profile of COCOBOD and Research Methodology

Chapter 4(a): Conventional Handling of Cocoa
Chapter 4(b): Bulk Warehousing and Handling of Cocoa

Chapter 5: Conclusions and Recommendations

DEFINITION OF OPERATIONAL TERMS

Raw Cocoa Beans
This refers to the whole seeds of the cocoa tree (FCC, 2006 sec.1/1), that have not undergone any processing in order to cause a change in its raw form.

Bulk Cocoa or Cocoa Beans in Bulk
This denotes raw cocoa beans that are not bagged, but handled in its loose form. The beans are stored and transported in its loose form without any form of packaging.

Bulk Cocoa Warehouse
These are specially designed warehouses purposely used for the storage of cocoa beans in bulk. They are designed to have asphalted floors and prefabricated superstructures that are well ventilated.

Conventional Warehouse
These are warehouses solely used for the storage of cocoa in bags. With this system the commodity is well stacked on pallets to prevent contact with the floor. Stacks are in bays and rows with aisles in between them to allow for good
ventilation, easy movement and order picking during evacuation. Handling of cocoa in these warehouses is manually done without any form of mechanisation.

**Short Landing of Cocoa**

This refers to situations where consignments of cocoa received by buyers at destinations fall short of quantities agreed in sales contracts.

**Shipment Discrepancies**

These refer to bags of cocoa that are rendered defective in quality and packaging as a result of improper handling during shipment. They are in the form of wet, burst and oil stained bags. Shipment discrepancies, also, result from bags of cocoa that fall into the sea.

**Mega-Bulk Shipment**

This refers to the mode of shipment where loose raw cocoa beans are poured direct into ship’s hold (FCC, 2006 sec. 27/3) without any form of packaging, via conveyor belt system.

**Up-Country**

This refers to the cocoa growing areas in Ghana. These are located in the hinterlands or the forest regions of the country.
Federation of Cocoa Commerce Ltd.

This federation establishes marketing rules for the marketing of cocoa beans and cocoa products on the international cocoa commodity market. The federation, also referred to as 'FCC', provides parties with a choice of English and French Arbitration services for the resolution of any dispute arising out of contracts which are subject to the marketing rules established.

Ship's Hold

The interior of a vessel below the decks where cargo is stowed.

Forward Sales/Futures Market/CMC Sales Policy

A contract by which the seller(CMC) undertakes to deliver and the buyer undertakes to take delivery of a stipulated quantity of a standard commodity(cocoa beans) at a future date, with the date and related price being fixed at the time the contract is entered into. The procedure enables dealers to safeguard their position against the risk of price fluctuations. At the time of the trade, buyer and seller agree to the price that will be paid for the commodity when it is delivered in the future.

With the sales policy of CMC buyers have up to a three month period within which to take delivery of the cocoa so purchased. This means that CMC would have to warehouse the commodity within the period even though the commodity is deemed to have been sold.
1.11 Conclusion

This chapter considered the need for warehousing, and the fact that warehousing practices must conform to current modern trends. The warehousing practice adopted by CMC was also highlighted.

The fact that the sales policy of CMC put some pressure on the current warehousing capacity and practices was considered.

The next chapter would consider some of the theories and literature on bulk handling and warehousing strategies.
CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

COCOBOD has initiated moves aimed at attaining One Million tonnes of cocoa production by the year 2010 (Daily Graphic, March, 2007 p47). These moves include intensification of extension activities and the mass spraying exercise, the expansion of the hi-tech package, under which large quantities of fertilisers are distributed to farmers to achieve higher yield, and the introduction of a hybrid type of cocoa which is disease tolerant and takes a minimum of two (2) years to bear fruit.

With the introduction of the hi-tech package, farmer is likely to harvest between 10 and 15 bags per acre, as against the 4 to 5 bags per acre prior to the introduction.

The new hybrid cocoa was developed and introduced by the Cocoa Research Institute of Ghana (CRIG), and that this new variety coupled with the application of fertilisers would help attain the one million tonne target by the year 2010.

Having realised that the various cocoa diseases were part of the causes of low yields in the past, COCOBOD has also embarked on an exercise to uproot all diseased cocoa trees and those which come into contact with the diseased trees
and assist farmers to replant their farms with early bearing, high-yielding and disease-tolerant varieties (COCOBOD, 2006 b).

The cocoa swollen shoot disease which was destroying crops is now under control and the mass spraying exercise, which is free of charge, is dealing with the black pod disease and the cocoa capsid, an insect which destroys the cocoa plant.

The above has brought about an increasing trend of cocoa production since the 2000/2001 crop year, from 394,500 tonnes to 496,800 tonnes in 2002/2003, 736,600 tonnes in 2003/2004 and an all time high of 740,000 tonnes in 2005/2006 (COCOBOD, 2006 b)

This upturn in cocoa production levels would require a corresponding adoption of a warehousing system that would adequately address the storage and pre-shipment handling of this large tonnage, without necessarily increasing the handling cost.

The warehousing system that is adopted must allow for effective synchronization between the period of production, production levels, design and capacity of warehouse, and the requirements of customers (Schonsleben, 2000). This issue of synchronization necessitates that there should be an agreement in the
logistics network encompassing, in its entirety, the stages of production, through to storage, and all the way to the customer.

The warehousing management system must be such as to allow for the storage of any tonnage of cocoa, bringing to a minimum congestion. Its availability in terms of capacity should ideally reach 100% (Forgaty, et al, 1991). The storage system should have high work centre efficiency and high capacity utilization so as to lead to lower costs (Oden, et al, 1993).

It must also be flexible enough to adapt to customer demands (Christopher, 2002). Customer demands tend to show rapid variation and the system of storage must have the capacity and flexibility to satisfy those demands. The warehousing system must have a high order success rate to help achieve customer value (Schonsleben, 2000).

2.1 Materials Carrying Cost
According to Ballou (1999), the cost of warehousing activities is estimated to absorb 26% of a firm’s logistics expenditure. The cost of any warehousing management system that is higher than this figure is seen to be expensive and uneconomical. It will rather be prudent on the part of warehouse managers to adopt sound management approach to reduce this percentage in order to derive the maximum benefit from the handling of the said product or commodity. It must be said that, most managers are really used to the maintenance of their old
fashioned and costly system of warehousing management, such that nothing prompts them to change. Others too have not taken the pain of finding for themselves the implications of this on their growth performance. Chadwick (1998) posited that it is surprising that many managers are not particularly interested in this very important area, especially when one considers the substantial amount of working capital that is expended on warehouse management and materials handling.

Costs incurred in the handling of materials and inventory management are classified into handling cost, acquisition cost, stores and warehousing cost, labour cost, holding cost and administrative cost (Schonsleben, 2000). Others are cost on insurance, labour, rent, lighting and heating (Chadwick 1998).

In the handling of cocoa, costs are incurred on labour during offloading, stacking and evacuation of same. Costs are also incurred on warehouse rent and repairs, insurance and lighting.

Summing up on the need for cost reduction as an objective for sound warehousing management and materials handling, Ballou (1999) wrote that the objectives for materials handling are cost centred. That is to reduce handling cost and to increase space utilisation.
2.2 Economics of Bulk Cargo

In shipping, bulk cargo is referred to as any cargo that is transported in large quantities or consignments usually a shipload in order to reduce transport costs (Stopford, 2000). According to him this has necessitated the building of bigger vessels with capacities to carry cargoes in large quantities in order to enjoy economies of scale. He posited further that a fundamental principle of shipping economics is that unit costs can be reduced by increasing the size of the cargo on the shipping leg. Bigger vessels have lower unit costs and unit cargo and storage are also cheaper at high throughput volumes.

Increased production levels and trade volumes have caused companies to adopt bulk handling and shipment systems to enjoy the benefits of economies of scale (Stopford, 2000). Applying this principle in warehousing management, Rushton, et al (2000) wrote that firms are compelled to adopt storage facilities that are bulk oriented in order to reduce on costs through effective space utilisation.

2.3 Bulk Cargo and Ship Design

According to Stopford (2000), the increasing trend in the bulk trade has influenced the design of ships. The purpose of these ships is to carry homogeneous cargoes in bulk. They have clear holds and large hatches. These ships are called bulk carriers. Bulk carriers are self trimmers in that they are hopper-shaped at the bottom. The effect of this is that, as discharging proceeds, the cargo falls towards the centre and thus will be under the square of the hatch
so that all cargo is accessible to grabs without any manual labour being needed to ‘trim’ it from the sides (Tutorship, 1990). Similarly there are ‘shoulder’ tanks which are designed to approximately the angle as the cargo will fall into when being loaded. This also means that there is no need to put men into holds to spread the cargo round. More particularly the shape reduces the free surface so that the extent to which the cargo is able to shift in bad weather is kept well within safe limits.

The design of these ships is such that it reduces to the minimum the cost of labour and also ensures safety and stability of ships. This, therefore, has a tremendous advantage to companies in terms of operational efficiency and profit maximisation.

2.4 Bulk Cargo Handling

Each time cargo is handled during its storage and transport, it costs money. This presupposes that the most efficient handling system must be adopted to reduce on cost. Stopford (2000) posits that a 15,000 deadweight tweendecker transporting bagged cargo is handled by labour during loading and unloading and might take several weeks to undertake these operations. In contrast, according to him, a large modern grain (bulk) elevator can discharge the same vessel carrying bulk grain at the rate of 2000 tonnes per hour. With these facilities, the same vessel could be handled in a day, since the handling equipments handle large volumes of materials per unit time.
Bulk cargo is handled by the use of high productivity bulk handling equipments contributing to the overall cost efficiency of operations by reducing the unit cost of loading and discharging (Bulk Solids, 2001), and minimizing the time ships spend in handling cargo.

The equipments must have high performance levels with low associated failures and wear problems. They must be extremely reliable, environmentally friendly and efficient in terms of energy consumption. The speed, reliability and efficiency of the equipments will help reduce cost, lower prices and attract more customers, and thus help to increase production and profits (Scholten, 2000).

According to Rushton, et al, (2000) picking account for up to 50% of the direct operating staff in a warehouse. He revealed that with manual picking methods and pickers moving between picking locations, 50% to 70% of an order picker's time could be spent moving, with only a small proportion of the time being spent physically picking. This situation is true to a typical conventional warehouse operation. He established that in a high speed conveyor system which is associated with bulk handling; there is elimination of unnecessary movement and minimization of the necessary movement.

2.5 Maximizing Loaded Days of Ships at Sea

According to Stopford (2000), a ship's time is divided between productive loaded days at sea and unproductive loaded days spent especially in port. Port days, he
revealed, depend upon the type of ship, the loading facilities available, and the type of cargo being loaded. The more time the ship spends in port, the less it spends carrying cargo. Homogeneous cargoes such as grains, which are warehoused and shipped in bulk, can load very quickly with automation such as conveyor system. Vessels carrying bulk cargo, therefore, spend less time in port and rather more time at sea which is more productive and profitable. The loading and discharging of bagged cargo manually, on the other hand, have adverse effects on the loaded days of vessels at sea.

2.6 Warehousing and Quality Assurance

Storage and handling of products must be efficient in a manner that will not reduce or affect their quality adversely. A good system of quality surveillance that will ensure continually monitoring and verification of the quality status of the product must be adopted (ISO, 1999). The individual operator of a warehouse must have a system of storage management that has the necessary technologies and processes of quality monitoring and assurance (Schonsleben, 2000) to help maintain the quality of the products in the course of their handling. Such must be the situation since products tend to lose their quality through improper handling, storage and transportation.

The warehousing system and its associated quality assurance measure adopted must ensure lower rates of defects and customer complaints. A high complaint
rate indicates insufficient quality, and can lead to customers looking elsewhere for supplies (Christopher, 2002).

2.7 Choice of Warehousing Management

The choice of a warehousing system would definitely depend on the trends and pressures of the industry. Emphasising on this issue, Scholten (2000) enumerated the following factors as those bringing about change in both economic and technical conditions of a warehousing system:

- Shifts in consumer demand patterns
- Cost pressures on industry
- Progress in computer technology
- The fact that modern vessels run faster, spend less time in port and that have high speed equipments to service them (load and unload).

It is realised from these factors that firms must initiate strategies that will help them meet the demands of the industry in order for them to stay in business. Ballou (1999) refers to this strategy of adaptation in warehousing management as ‘attack strategies’. According to him this must be done in order for businesses to ‘meet competition’.

The choice of a storage system, therefore, would depend on the dynamics of the industry and firms must adapt accordingly.
2.8 Meeting Customer Requirements

We are entering the era of supply chain competition. There is, therefore, the need to create value delivery systems that are more responsive to fast changing markets. Companies must recognise that increasingly it is through their capabilities and competencies that they compete (Christopher, 2002).

This means that organizations create superior value for customers and consumers by managing their core processes better than competitors manage theirs (van Hoek, et al, 2005). These core processes encompass such activities as new product development, supplier development, order fulfilment and customer management. By performing these fundamental activities in a more cost effective way than competitors, organisations will gain the advantage in the marketplace (Rushton, et al, 2000).

These fast changing market trends have characterised the International Cocoa Commodity Market too. Traditionally, cocoa beans were stored and transported in bags owing to the difficulties associated with bulk storage. But modern bulk storage have overcome this problem, and today European buyers prefer to make savings on bags and labour by receiving their cocoa in bulk (GPHA, 2006).

Amsterdam is known to be the world’s largest cocoa port. Transhipment of over Seven Hundred Thousand (700,000) tonnes of cocoa is handled at the port of Amsterdam (Amsport, 2006). The tonnage handled by this port is well over 20%
of global production of cocoa which is about Three Million Six Hundred and Seventy Five Thousand (3,675,000) tonnes per annum (ICCO, 2006 pp2-3).

Amsport (2006) posits that West Africa is the main source of Amsterdam’s cocoa imports which arrive in bulk. About half of the cocoa imports are received in mega bulk, whilst the remainder is transported in bulk-in-container and only a small percentage is in bags.

As a result of this, a number of bulk warehousing companies are located within the port area. These warehousing companies are involved in the reception and delivery of cocoa to the factories in the Amsterdam area, and the European hinterland, by inland water and rail transport.

The main processing factories that utilise the cocoa handled at the Amsterdam port are located on the banks of the Zaan River, north-west of Amsterdam. These include Archer Daniels Midland (ADM), Cargill (Gerkens) and Continental Cocoa which process the cocoa into chocolate and other delicacies.

By their sizes and production capacities, these processors play a leading role in influencing and controlling traffic volumes of the commodity, and in the determination of the mode of shipment of cocoa to Amsterdam and Continental Europe. About 100,000 tonnes of bulk cocoa beans is moved on to the European
hinterland market via Port of Amsterdam on inland barges and rail transport systems.

The shipment of the commodity in bulk allows for cheaper, easier and faster discharge at destination points. Grabs and mechanical suction equipments are used to discharge cocoa into specially made pay-loaders and barges into custom designed bulk warehouses belonging to customers who are mainly the leading cocoa processors.

2.9 Liner Freight Rates as Percentage Price for Cocoa

Freight rates of liner services as a percentage of market prices of cocoa have been increasing steadily over the years (UNCTAD, 2005). The UNCTAD Report revealed that freight rates as a ratio of Free On Board (fob) price of cocoa has increased from 2.4 in 1970 to 3.7 in 2004.

The possibility of further increase in the fob price of cocoa and freight rates ratio is high due to the strong bargaining stance of liner shipping conferences and the current trends in their collusive practices. Liner shipping companies are now engaging in alliances in order to attain much dominance in the trade routes in which they operate. This enables them to have control over freight rates fixing and other shipping terms. A recent development in the liner shipping business is the management strategy of total buy out and acquisitions of other equally bigger shipping companies (Farthing and Brownrigg, 1999). All these are with the
intention of having global and regional dominance in their various trades in order to have total control and influence over freight fixing and other trade terms.

Others, too, are expanding their business frontiers to operate as multimodal transport operators in which they have included the various modes of transport into their operations in order to serve their customers on door to door terms. This has caused these liner companies to have total control over the entire transport spectrum right from the warehouse of the seller and/or shipper to the premises of the buyer and/or consignee. With this system, liner companies are able to influence freight rates and other trade and transport conditions over which the shipper is totally under their influence and control.

Shippers on the other hand have managed to counter this dominance through the formation of shippers' councils to lead in freight rate negotiations. Even though this strategy has tended to achieve some form of success, the seeming consistent and steady increase in freight rate ratio of fob price of cocoa indicates the resilience of the collusive strength of the liner shipping companies. Cocoa Marketing Company has over the years utilised the services of Ghana's version of shippers' council to negotiate freight rates. The Ghana Shippers Council together with Cocoa Marketing Company periodically negotiates freight rates for the shipment of cocoa and cocoa products with the Europe West Africa Trade Agreement (EWATA). Through these negotiations, agreed and regulated rates for the shipment of cocoa beans and derivatives from the ports of Tema and
Takoradi to Europe are established. This leads to substantial amount of savings in foreign exchange made to the country since rates are sometimes stabilized or reduced (Gyamera, undated p20).

In addition to the above, Cocoa Marketing Company could increase the tonnage of cocoa shipped per container. This suggests that more cocoa could be stuffed into a container to take advantage of economies of scale, since flat and/or fixed box rates are charged by liner shipping companies per container irrespective of the tonnage of the commodity stuffed into it. With the increased tonnage per container, per unit cost in terms of freight rates is thus reduced. This helps to reduce the effect of rising freight rates on the export earnings on cocoa.

2.10 Conclusion
The above are works done by others relating to the area of study. They are, therefore, going to form the theoretical framework upon which the study is going to be conducted.

The next chapter would look at the profile of COCOBOD, and the Research Methodology used in conducting the study
Takoradi to Europe are established. This leads to substantial amount of savings in foreign exchange made to the country since rates are sometimes stabilized or reduced (Gyamera, undated p20).

In addition to the above, Cocoa Marketing Company could increase the tonnage of cocoa shipped per container. This suggests that more cocoa could be stuffed into a container to take advantage of economies of scale, since flat and/or fixed box rates are charged by liner shipping companies per container irrespective of the tonnage of the commodity stuffed into it. With the increased tonnage per container, per unit cost in terms of freight rates is thus reduced. This helps to reduce the effect of rising freight rates on the export earnings on cocoa.

2.10 Conclusion
The above are works done by others relating to the area of study. They are, therefore, going to form the theoretical framework upon which the study is going to be conducted.

The next chapter would look at the profile of COCOBOD, and the Research Methodology used in conducting the study.
CHAPTER THREE
PROFILE OF COCOBOD AND RESEARCH METHODOLOGY

3.0 GHANA COCOA BOARD

The saying 'Cocoa is Ghana, Ghana is Cocoa' portrays the important role cocoa plays in the economy of Ghana as mentioned earlier in the first chapter. Cocoa is the second foreign exchange earner and the lives of many farmers and their families depend on it.

Cocoa first arrived in the country in the early years of the nineteenth century. History has it that cocoa was first brought to Ghana by the Dutch missionaries but it was not until Tetteh Quarshie, a native of Osu in Accra, who had travelled to Fernando Po and had worked there as a blacksmith, returned with Amelonado cocoa pods in 1879 that it began to spread.

Since then cocoa cultivation assumed commercial dimensions and spread to other forest areas of the country. Currently, there are six cocoa growing areas namely Ashanti, Brong Ahafo, Eastern, Volta, Central and Western regions (Ghana Review, 2006 p9).

In recognition of the contribution of cocoa to the development of Ghana, the government established the Ghana Cocoa Board in 1947. It was charged with the responsibility of undertaking the following objectives.
i. To encourage the production of cocoa, coffee, and sheanuts.

ii. To initiate programmes aimed at controlling pests and diseases of coffee, cocoa, sheanuts.

iii. To undertake and encourage the processing in Ghana of cocoa, coffee, sheanuts and cocoa waste with the aim of adding value for export and local consumption.

iv. To undertake, promote and encourage scientific research aimed at improving the quality and yield of cocoa, coffee, sheanuts and other tropical crops.

v. To regulate the internal marketing of cocoa, the marketing of coffee and sheanuts.

vi. To secure the most favourable arrangements for the purchase, grading, sealing and certification, sale and export of cocoa, coffee and sheanuts.

vii. To assist in the development of the cocoa, coffee and sheanuts industries in Ghana.
viii. To purchase, market and export cocoa products and cocoa produced in Ghana which is graded under the cocoa industry Decree, 1968 NLCD 278 (COCOBOD, 2006 b).

3.0.1 Functions of COCOBOD

The performance of the above objectives made the Ghana Cocoa Board to establish specialised subsidiaries/divisions to take charge of the specialised functions of purchase of the produce from farmers, marketing same on the international market, scientific research, extension services, and quality control and processing of cocoa. The functions are classified into two main sectors, namely, Pre-harvest and Post-harvest and are performed by these specialised subsidiaries/divisions of the Board.

The Pre-harvest Sector functions are performed by the Cocoa Research Institute of Ghana (CRIG), the Seed Production Unit (SPU), and the Cocoa Swollen Shoot Virus Disease Control Unit (CSSVDCU). They deal with the fundamental issues on actual cocoa production at the farm gate level.

The Post-harvest Sector functions are undertaken by the Quality Control Division (QCD) and the Cocoa Marketing Company (CMC). The Post-harvest activities of COCOBOD start with quality control measures of QCD which farmers must observe to facilitate the acceptance of their produce at the buying centres by the
licensed buying companies engaged in internal marketing of cocoa at the time (COCOBOD, 2006 b).

It must be said, however that, the internal marketing of cocoa (purchases from farmers) has been privatised and is undertaken by Licensed Buying Companies such as Produce Buying Company (PBC) and Kuapa Kokoo Limited. Also the Cocoa Processing Company at Tema is now listed on the Ghana Stock Exchange and, therefore, ceases to be a subsidiary of COCOBOD, even though COCOBOD has equity share holding in it.

3.1 Social Responsibilities of COCOBOD

Cocoa has been and continues to be the economic backbone of the economy of Ghana. This is seen in terms of the employment the cocoa sector offers to people whether directly or indirectly, and also the revenue it generates for the government to help undertake the development agenda of the country. The 35th Annual Report of Ghana Cocoa Board (COCOBOD) confirms that, COCOBOD paid a total of $997 billion as export and local duty to government treasury during the 2003/2004 crop season. COCOBOD also contributed $ 250 billion to the Consolidated Fund as a result of the 2002/2003 profit of $844.8 billion. This achievement is unprecedented in the history of COCOBOD and was due to the considerable increase in gross sales and favourable Free On Board (FOB) price achieved on the world commodity market (COCOBOD, 2004).
In 2005, COCOBOD had total employee strength of 5,413 as against 5,050 in 2004 (COCOBOD 2005). This figure is apart from those people associated with the industry indirectly such as hauliers and suppliers.

COCOBOD has made tremendous contribution towards the education of the youth in Ghana, especially families of cocoa farmers. It has set up a scholarship scheme to cater for the needs of cocoa farmers who are pursuing various courses in second cycle institutions in Ghana.

Since the award was instituted in 1951, many prominent Ghanaians including the author, whose relatives are cocoa farmers have benefited from the scheme.

When the scheme was established in 1951, COCOBOD initially invested a capital fund of over 14 million cedis purposely to finance the scheme which covered overseas tertiary institutions as well. By July 1960, COCOBOD had awarded scholarships to 1,106 students to pursue courses in various fields of human endeavour: 222 studied Law, 185 Medicine, 85 Accountancy and several others pursued courses in other specialised fields (Ghana Review, 2006 p9). In 2004, COCOBOD offered a scholarship grant of 18 billion cedis to deserving students. This basically covered boarding fees of wards of farmers and employees in second cycle educational institutions in Ghana (COCOBOD, 2004).
During the 2005/2006 academic year, 2,731 scholarships were awarded to students in the second cycle institutions of which 91.6 per cent were awarded to wards of cocoa farmers (Ghana Review, 2006 p12).

In May 1948, COCOBOD made a grant of 1,793,436 cedis to the government towards the establishment of an endowment fund for the University College of Gold Coast (now University of Ghana). COCOBOD granted further amount of 1.3 million cedis to help establish the Faculty of Agriculture, and its ancillary Sciences. It was envisaged that the faculty would conduct research on the cocoa industry.

In the health sector, COCOBOD has also set up three health centres in Accra, Kumasi, and Tafo to cater for the health needs of cocoa farmers, staff of COCOBOD and the communities in which they operate. The Cocoa Clinic in Accra is equipped with modern facilities to manage all kinds of health problems.

In 1961, COCOBOD also constructed a hospital in Mampong Akuapim in memory of Tetteh Quarshie, who brought cocoa into Ghana. COCOBOD has constructed other health centres in Tepa and Trabuom in the Ashanti Region, Nkrankwanta and Abuom in the Brong Ahafo. The defunct Cocoa Clinic in Sankore in the Brong Ahafo region is being rehabilitated and handed over to the Asunafo District Assembly. Plans are afoot to build a clinic in Sefwi Debiso in the Western region (Ghana Review, 2006 p9).
3.2 THE SUBSIDIARIES/DIVISIONS OF COCOBOD

These consist of the following:

3.2.1 Quality Control Division
It is responsible for inspection, grading, processing and sealing of cocoa, coffee and sheanuts for the local and international markets. It is also responsible for fumigation and disinfestations of produce. This division is responsible for maintaining the quality of cocoa. It is charged with the responsibility of inspecting storage sheds and warehouses. It is to ensure that these conform to the quality standards established by the cocoa industry quality regulations.

3.2.2 Seed Production Unit
This is responsible for the multiplication and distribution of improved cocoa and coffee planting materials to farmers.

3.2.3 Cocoa Swollen Shoot Virus Disease Control Unit
It is responsible for the control of the cocoa swollen shoot virus disease.

3.2.4 Cocoa Research Institute of Ghana
The institute undertakes agronomic research into problems relating to the production of cocoa. It also provides information and advises on matters relating to cocoa production and other related crops. It plays a critical role in assisting COCOBOD raise cocoa production, using specially developed nutrients and...
fertilizers. It also develops hybrid seeds and seedlings for distribution to farmers and research into various diseases affecting cocoa production.

3.2.5 Cocoa Marketing Company (Ghana) Ltd

This is a specialised and wholly owned subsidiary solely responsible for the sale of Ghana's Cocoa Beans, Cocoa Liquor, Cocoa Cake and Butter from West Africa Mills Company (LTD) in Takoradi on the international market.

All sales by Cocoa Marketing Company are made to firms registered by the Company as Buyers on Cost, Insurance and Freight terms without any commission whatsoever. In special circumstances, however, the Company can make sales on such other terms as Cost and Insurance and Free On Board basis.

Firms wishing to be registered as buyers for Cocoa beans are required to provide evidence of their membership of the Federation of Cocoa Commerce Ltd and or the Cocoa Merchants Association of America, New York.

Sales by the Cocoa Marketing Company are made by private treaty on the basis of World Market values at the best prices obtainable, and negotiations are governed by normal commercial considerations only, without any kind of discrimination in favour of or against any individual firm or particular company.
Sales are effected on the basis of Cash against Documents via documentary collection. The Company, however, reserves the right to insist on the establishment of Letters of Credit whenever it deems it necessary to do so.

The minimum quantity for a Contract of Cocoa beans to all the main ports of discharge is 50 metric tonnes.

Sales are made for three monthly shipment periods, thus October/December, November/January, and December/February. With this sales policy, the sales are made on the basis of Main United Kingdom ports. Differentials are chargeable on all European and USA outports. The company reserves the right to reject declared ports which are not easily accessible. Buyers are required to declare ports of destination at the time of negotiation or at least two (2) clear calendar months prior to the commencement of the contract shipment period (CMC, 2006).

In 1985, as a result of the restructuring programme embarked upon by COCOBOD, this subsidiary was tasked with an additional responsibility of performing the Take-over functions within the internal marketing system. The Take-over functions involve the receipt of cocoa from the Licensed Buying Companies, and warehousing of the stocks so received in preparation for shipment. The take-over functions of warehousing and pre-shipment activities take place at the Take-over centres of Tema, Takoradi and Kumasi. These
centres are located within the precincts of the ports of Tema and Takoradi, with the Kumasi centre being an inland port. It is from these take-over centres that the shipment of the commodity is done.

3.3 Health Benefits of Cocoa

It is generally acknowledged that cocoa was originally considered a sacred plant with medicinal purposes as far back as 500AD, among the Mayans and Aztecs of South America who not only drank the cocoa beverage but actually worshipped it and used it for rituals and celebrations.

Now, there is growing evidence of the health benefits of cocoa in fighting cancer, stroke, heart attack, hypertension, diabetes, asthma, aging and erectile dysfunction. Regular consumption of cocoa products, it is believed, give the user more antioxidants which can prevent the aforementioned diseases.

Research has shown that cocoa contains flavanol antioxidants and vitamins which are effective in preventing many diseases. Natural cocoa powder and chocolate, for example, have been found to be rich sources of high quality polyphenol antioxidants, potentially beneficial compounds similar to those found in fruits, vegetables and red wine that may have the potential to reduce the risk of developing heart disease and certain cancers (Ghana Review, 2006 p9).
3.4 Policies toward a Vibrant Cocoa Industry in Ghana

3.4.1 Cocoa Sector Policy

In an effort to arrest the decline in cocoa production and make the cocoa industry effective and efficient, the government of Ghana embarked on cocoa sector reforms in 1984/85. These reforms involved institutional and operational re-organisation in several areas of the cocoa industry, resulting in changes in several areas of the cocoa industry. The strategy covered areas such as production, research, extension, internal and external marketing, cocoa quality control, processing infrastructure, finance, pricing and taxation.

The objectives of the strategy are to ensure increased and sustainable production, enhance the incomes of farmers and maintain the quality of Ghana’s cocoa beans. These are to be achieved through effective internal and external marketing, adequate incentive for farmers through adjustments in the producer price, streamlining cocoa research and extension services and making the operations of the COCOBOD more efficient. The strategy envisaged that cocoa production will increase to 500,000 tonnes by 2004/2005 and stabilise at 700,000 tonnes by the year 2009/2010. Indeed the 500,000 mark was surpassed in the year 2005/2006 when production hit an all time high of 740,000 tonnes. The strategy has, thus been revised accordingly to envisage a production target of 1,000,000 tonne mark by the year 2010 (Ghana Review, 2006 p15).
3.4.2 Cocoa ‘high tech’ Programme

There is a substantial scope for increasing cocoa production in the country through the use of existing improved technologies. Currently, a project called ‘Cocoa High Tech’ involving the application of fertilisers, improved planting materials and the application of insecticides and fungicides on cocoa farms is being implemented.

3.4.3 Cocoa Production

Cocoa production in Ghana is a smallholder activity providing employment and incomes for about 800,000 farm families. Traditional tools such as the hoe and cutlass are the major production tools. As a matter of fact cocoa production in Ghana is not mechanised and technology is still at its rudimentary stage.

3.4.4 Producer Pricing and Bonus Payment

The producer price of cocoa is determined by the Producer Price Review Committee (PPRC) established by the government. The committee meets to decide the producer price to be paid to farmers. Membership of the PPRC include representatives of cocoa farmers, Licensed Buying Companies (LBC), cocoa hauliers, Quality Control Division of COCOBOD, Cocoa Marketing Company, COCOBOD, the Institute of Statistical Social and Economic Research of the University of Ghana, the Bank of Ghana and Ministry of Finance. The Minister of Finance chairs the committee.
A key element of the producer pricing policy is to increase the producer price percentage of the FOB price from the 56 percent mark in 1984/85 to about 70 percent by cocoa year 2004/2005. The objective is to ensure that the hard working cocoa farmers benefit from their labour. In January 2001, the producer price stood at 3,475,000 cedis per tonne (217,187 per bag). By May 2001, it was increased to 3,872,000 cedis per tonne. By October 2003, the producer price had been increased to 9 million cedis per metric tonne. Currently the farmer enjoys over 70 percent of the net FOB price as the producer price now stands at 9,150,000 cedis.

The bonus scheme was instituted by COCOBOD as a means of rewarding farmers for their efforts. Between May and September 2001, farmers were paid a bonus of 12,000 cedis per bag of cocoa. By October 2003 farmers received a bonus of 22,000 cedis per bag of cocoa (Ghana Review, 2006 p16).

3.4.5 Licensed Buying Companies and the Internal Marketing of Cocoa

Licensed Buying Companies (LBC) refer to companies that have been licensed by COCOBOD to engage in the internal marketing of cocoa in Ghana. The internal marketing of cocoa involves the purchase of cocoa from farmers in head loads at designated points up-country. The stocks so purchased are checked against quality standards, after which they are bagged, weighed and transported to the ports to be taken-over by Cocoa Marketing Company. There is no limit to
the number of LBC’s. At the moment there are twenty-two (22) companies licensed to participate in the internal marketing of cocoa.

3.5 RESEARCH METHODOLOGY

This section focuses on the methodology used for the study. It discusses the population and the selection of the sampling size and the procedure used in the collection of data. It also includes the description of the instruments used in the data collection (Opoku, 2005 p12).

3.5.1 The Study Area

The study considered the warehousing management of cocoa within the cocoa industry of Ghana. Since COCOBOD is the statutory institution mandated to manage the cocoa industry, it is thus considered as the study area. Specific areas considered are the Take-over centres, Depots and Societies where warehousing and handling of cocoa are done.

The Take-over centres are managed by Area Managers together with heads of departments. They supervise the receipts of cocoa from the LBC’s into warehouses. The warehouses are manned by Depot keepers. These are all employees of Cocoa Marketing Company.

Other stakeholders who ensure the handling and shipment of the crop at the take-over centres are Quality Control officials, Port Authority officials, Hauliers
and Shipping Agencies. At the corporate COCOBOD level, The Chief Executive and his deputies, together with Directors, Divisional Directors and operational managers are important stakeholders. They decide on the policy direction of COCOBOD in terms of logistics, handling, warehousing and shipment strategies to adopt.

Stakeholders located at destination that play vital roles in the handling of the commodity are also considered in the study area. These include major carriers such as Supermaritime International B.V. (Splethoff). Destination commodity inspection and superintendents such as SGS are included in the study area.

3.5.2 Sampling

According to Robson (1993) and Saunders (2005) cited by Dwumfour (2006), pointed out the impracticability of interviewing or questioning the entire population. Skewed budget and time constraint were considered as some of the factors which propel the need to sample a particular situation at a particular time and apply it more generally. The stakeholders mentioned above were, as a result, sampled to obtain information from them.

To help adhere to and achieve the objectives of the study, the purposive sampling method was used (Twumasi, 1986). Respondents whose backgrounds are technical, and are professionally related to the topic under study were specifically contacted. Top level management personnel whose operations and
functions were related to the study were thus, targeted for the study. The respondents have been related to the handling of cocoa between 15 years and 34 years.

The respondents interviewed were the following:

1. The Deputy Chief Executive (Operations), COCOBOD
2. The Deputy Managing Director, Cocoa Marketing Company.
3. The Deputy Executive Director, Quality Control Division
4. The Senior Shipping Manager, Cocoa Marketing Company
5. The Warehousing and Port Operations Manager, Cocoa Marketing Company
6. The Marketing Manager, Cocoa Marketing Company
7. The Principal Shipping Officer, Cocoa Marketing Company
8. The Area Managers, Tema, Takoradi, Cocoa Marketing Company
9. The Regional Managers, Tema, Takoradi, Quality Control Division,
10. The Stevedore Managers, Tema, Takoradi, GPHA
11. The General Manager, Unicontrol Commodity (Ghana) Ltd
12. The Operations Manager, Unicontrol Commodity (Ghana) Ltd
13. The Manager, SGS, Tema
14. The Managing Director, Supermaritime International B. V. Rotterdam
15. The Managing Director, Global Haulage Company, Accra

The response rate was 100% as all the targeted respondents duly responded to the interview.
3.5.3 Data Collection Technique

The research work is designed as a case study one since it is peculiar to the Cocoa Marketing Company alone. The diagnostic technique of data collection which is associated with oral or unstructured interviews was used (Kwabia, 2006). Information was sought through one-on-one interviews from top level management personnel. Dwumfour (2006) citing Davis and Cosensa (1993) posited that interviews represented a primary source of data collection. In order to derive the maximum co-operation from respondents, a set of questions that were not necessarily sequential along which the conversation proceeded was used (Kwabia, 2006).

All the interviews were conducted in a very relaxed manner. The interview with the Managing Director of Supermaritime for instance was conducted through a chat room conversation on the internet. This is because he was located in Rotterdam in the Netherlands.

Another technique also adopted in the study was Primary Observation. With this, the researcher becomes a participant and an observer at the same time (Kwabia, 2006). As a staff of Cocoa Marketing Company, I am directly involved in the warehousing and port operations activities of the company. This has provided me with valuable knowledge about most of the significant aspects of warehouse management and handling of cocoa. Information derived from this technique has been used significantly in the study.
Secondary data was also used extensively in the study. Statistics and other information were received from such institutions as:

1. Ghana Ports and Harbours Authority
2. Unicontrol Commodity (Ghana) Ltd
3. Ghana Cocoa Board
4. Cocoa Marketing Company (Ghana) Ltd
5. International Cocoa Organisation

Other sources of secondary information used in the study included:

1. Books
2. Journals
3. Newspaper Reports
4. Research work from personalities and institutions.

3.5.4 Pre-Testing

Two senior officer colleague friends of mine, namely the Principal Shipping Officer and the Principal Trader, were selected for the pre-test of the interview schedule. The pre-test is a try out test for the validity of the questions, and for examining how meaningful they are, and whether there is any need to change or modify or include certain questions, before the actual fieldwork is undertaken (Twumasi, 1986). These two respondents were instructed to make note of any ambiguity or uncertainty with the wording and structure of the questions. Their comments were further discussed and the questions that were consistently misinterpreted were refined to ensure that the actual questions could be read and
understood. The interview schedule was further reviewed by my supervisors and their comments implemented.

Also, the response of these colleagues to the interview schedule, were incorporated into the views solicited from the sample population, in the data analysis.

3.5.5 Data Analysis

According to Kumekpor (2002), cited by Iddrisu (2007), the analysis and interpretation of the raw data of an investigation are the means by which the research problem is answered, and stated hypothesis are tested. He posited that, data analysis consists of the statistical calculations performed with the raw data to provide answers to the questions initiating the research.

The approach of data analysis used in this study was descriptive in nature. Charts and diagrams were used to organise, summarise and illustrate the data gathered during the study (Opoku, 2005).

3.6 Conclusion

COCOBOD is the sole organisation mandated to manage the affairs of the cocoa industry in Ghana. Any policy direction and change relating to the industry, therefore, becomes their sole responsibility. Since the study specifically relates to COCOBOD, and is peculiar to them alone, the non probability case study
research methodology was used to conduct the research. It is seen from the responses of the interviewees that, the interview was generally successful.

The next chapter would consider the data analysis of the response of the interview, and other secondary data. The chapter would specifically consider conventional warehousing and handling of cocoa.
4.0 Introduction

This chapter considers the handling of cocoa in bags from the farm gate to the ports.

COCOBOD (2006) citing Knapp (1920) posited that, until the late 1920’s there was no road network connecting especially, the Eastern Region and other centres of cocoa production to the coast. The drive and ingenuity displayed by the people of the Gold Coast in evacuating cocoa to the port was a great phenomenon which characterised the development of the wholly peasant-owned industry in the Gold Coast. Carrying loads on the head was the traditional method of transporting goods; and this was naturally the means by which a great deal of cocoa was evacuated. Weights of up to 30 kg were transported as head loads by women and children to the purchasing centres, whilst heavier loads of up to 50 kg were carried by men over distances of 15 to 20 km.

A second method, originally employed on the Akwapim Hills to transport palm oil to the coast, was also adopted for the transportation of cocoa. This consisted of filling old palm oil barrels with cocoa and rolling them to the coast. Huge barrels containing up to half a ton of cocoa were rolled down to Accra in this manner. From 1914 onwards the use of motor lorries began for transporting cocoa in the
coastal areas where the road network was reliable, and this became more widespread as the road network improved (COCOBOD, 2006).

4.1 Logistics Chain and Handling of Cocoa Up-Country

4.1.1 Society Level

Cocoa is cultivated in small holder farms by peasant farmers in the forest regions of Ghana. The handling of the commodity actually starts with these farmers when it is harvested, fermented and dried, all through natural means. Rudimentary equipment such as cutlass, wooden platforms on which the drying is done, and baskets are used to handle these activities.

The crop is sent to the societies (buying and collection centres) where the actual purchases are done by the LBC's. The cocoa so purchased is check-tested for quality. It is then graded, sealed, weighed and bagged in vegetable oil treated jute sacks at 64kg. With this the crop is ready for its transportation to the depots. The transportation of purchased bags of cocoa from farmers at the society level to the depots is referred to as primary evacuation.

4.1.2 Depots

These are warehouses that are used for consolidation and storage purposes. Depots are located quite close to major roads and railway lines to the ports. The crop brought from societies in smaller quantities, is consolidated into larger economic quantities, to allow for easy and cheaper transportation to the ports.
In consignments of between 510 bags and 600 bags depending on the chassis of truck, and 480 bags per railway wagon, the crop is transported to the ports. The transportation of consignments of cocoa from the depots to the ports is referred to as secondary evacuation.

4.2 Logistics Chain and Handling of Cocoa at the Ports

The main handling activities that take place at the port involve offloading, storage and shipment.

4.2.1 Take-over Process

Cocoa brought from the depots to the ports is taken-over by Cocoa Marketing Company from the LBC's. Vehicles arriving at the ports are directed to the appropriate take-over points for offloading.

At the take-over points the following inspections are conducted:

- Physical inspection of the jute bags for stains including wetness in any form, either by water, oil or chemical.
- Check to see whether all necessary inscriptions including the grade of cocoa and the crop year are clearly marked on the jute bags, and the seal is intact.
- Whether the jute bags are strong and not frayed. Dirty and weak jute bags are rejected.
Each bag of cocoa is check-weighed and only bags of the approved weight of 63.8 kgs gross are received into warehouses.

- The cocoa is check-tested for quality.
- Bags of cocoa are tallied to determine the exact quantity.

The procedures for taking-over cocoa at the ports are supervised by the following officials and representatives: the LBC's representatives, CMC's warehousing officer, CMC's audit representative, CMC's security representative, and Quality Control Division's representative.

Consignments that satisfy the above requirements are taken-over into the warehouses for storage.

4.2.2 Offloading

This involves the discharging of cocoa from trucks or railway wagons into warehouses. Dockers constituted into gangs are booked to undertake this operation. A gang consists of 17 men. The gangs on their heads carry the cocoa. By the terms of the contract, each gang offloads 180 tonnes (2880 bags) of cocoa. The operation of gangs is purely on Third Party Logistics terms through outsourcing. Private Labour Companies thus provide labour for CMC. It must be emphasised that, the take-over inspection procedures are adhered to during the offloading of the 2880 bags.
4.2.3 Stacking and Storage

The consignments offloaded into the warehouses are well stacked on wooden pallets to prevent contact with the floor. Stacks are in bays and rows with aisles in between them. This is to allow for good ventilation, easy movement and order picking during evacuation. Basically, stacking allows for fumigation to be done, in order to prevent or reduce infestation. Stacking also allows for effective warehousing space utilisation.

A well built stack of cocoa is about 350 tonnes, and does not go beyond 22 bags high. With these stacks, cocoa is stored in readiness for shipment.

4.2.4 Evacuation

The release of parcels of cocoa from warehouses to buyers is referred to as evacuation. It is effected when buyers decide to lift their consignments, after shipment and factory delivery sales contracts are made. Evacuation is either to the local processing factories or shipment abroad. Depending on the buyers’ requirements, the commodity is either shipped in bags or in bulk.

Gangs are booked to carry cocoa from the warehouses during evacuation. Stevedore gangs are also booked to load, arrange and neatly pack the cocoa in vessel's holds (See Appendix C1).
In situations where the buyer requires bulk shipment, stevedores use knives to split the bags open. The contents are poured into vessels, containers, or barges depending on the mode of shipment (see Appendices C5, C7, C8, and C9).

4.3 Data Analysis

4.3.1 Advantages of Conventional Handling and Warehousing of Cocoa

4.3.1.1 Employment Generation

Warehousing and handling of cocoa in bags is labour intensive and, therefore, offers a high level of employment. Responding to Question 4, (what are the advantages of the systems of warehousing) of the interview guide, 100% of the respondents were unanimous in alluding to this issue of employment generation.

Statistics from the Warehousing and Port Operations department of CMC, also confirmed this situation. This is seen in the table below:

Table 4.1: Employment of Dockers

<table>
<thead>
<tr>
<th>Port</th>
<th>Number of Gangs</th>
<th>Number of Dockers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kumasi</td>
<td>15</td>
<td>210</td>
</tr>
<tr>
<td>Takoradi</td>
<td>43</td>
<td>688</td>
</tr>
<tr>
<td>Tema</td>
<td>56</td>
<td>784</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>114</strong></td>
<td><strong>1682</strong></td>
</tr>
</tbody>
</table>

Source: WPO Dept., CMC.
From the table above, it is seen that a total of 1682 people are employed directly as cocoa dockers, due to the manual nature of handling. This figure is apart from those engaged indirectly, such as directors and administrative staff of labour companies.

4.3.1.2 Cargo Packaging

Packaging refers to the protection given to cargo whilst in storage and transit to ensure that the integrity, that is, the content, quality, and quantity of the consignment is preserved from origin to destination. Ballou (1999) reiterated the fact that most products are distributed in packages. According to Beckman, et al, (1967) cited by Ballou (1999), there are a number of reasons why a packaging expense is incurred. Among these are the following:

- To facilitate storage and handling
- To promote better utilisation of transport equipment
- To provide product protection
- To facilitate the use of the product
- To change the product density

With the case of cocoa, jute sacks are used as packaging material to facilitate storage and handling. Market rule 16/16.1 of the Federation of Cocoa Commerce states that, “cocoa beans shall be packed in new, clean, sound, non-returnable bags of sufficient strength to withstand the transit and storage which are woven from natural fibres and which are suitable for food contact use”. The sacks are
embossed with trade marks that typify cocoa from Ghana. This helps to
distinguish Ghana cocoa from others. The significant thing about the marks is
that, it helps trace the origins of the said bag through to the Quality Control officer
who check-tested the quality of the crop up-country.

Responding to the advantages of the conventional handling and warehousing of
cocoa, 80% of the respondents said jute sacks offer a better protective
packaging for cocoa. They were of the view that, the marks on the bags help with
the description of consignments on bills of lading. To them, the sacks also help
detect and reveal damage as a result of improper handling.

4.3.1.3 Ease of Counting and Accountability

Bags as modes of packaging, offer an easy and convenient way of counting and
taking stocks. Giving reasons for the benefits of handling cocoa in bags, 90% of
the respondents maintained that bags offer good units of account in inventory
management. They contended that the accuracy of exact quantities to be
received into warehouses, and loaded into vessels, is given further boost by bags
as unit of account. Guess work and approximation are eliminated in inventory
management, when bags are used as unit of account. Exact quantities received
into warehouses, stored and evacuated are documented accordingly in units of
bags. Also, exact quantities in bags, loaded and shipped, are inscribed on bills of
lading for the attention of buyers, in conformity with contract terms.
4.3.2 Disadvantages of Conventional Handling and Warehousing of Cocoa

4.3.2.1 Utilisation of Warehousing Space

Warehousing space was seen not to be well maximised in its utilisation with the conventional system. Out of the respondents interviewed, 85% said, space utilisation has been poor with warehousing of cocoa in bags. Respondents maintained that, aisles and other spaces left in between stacks to allow for movement during order picking, rather end up taking more space. To them, these spaces could be used in order to help increase the warehouse capacity. The cumulative effect of these spaces is such that, relatively small quantity of stocks is stored in warehouses.

The Marketing Manager of CMC intimated during interview that, the fact that warehouses are able to contain relatively small quantities at a time, poses serious effect on the sales policy of CMC. The consolidation of small quantities at a time means that few sales contracts can be serviced or honoured at a time. This leaves a huge backlog of sales contracts to service. The effect of this is that, shipment schedules are unduly delayed. Vessels, therefore, would have to wait for a long time at anchorage waiting for cargo to be made ready, or sail without the full complements of the cargo planned to be shipped. Also, the finances of COCOBOD are severely affected, since payment for sales are made on the basis of cash against documents after shipments.
Explaining further, the Warehousing and Port Operations Manager of CMC posited that, pallets used for stacking also take up a lot of space. He mentioned in particular that, the bulky nature of the sizes of the pallets use up a lot of space which otherwise could have been used for the storage of cocoa. He mentioned specifically that, a shed that takes 18,000 tonnes of Cocoa in bulk could only take 15,000 tonnes of cocoa when warehoused in bags, because of the aisles and pallets that take greater part of the warehousing space (see Appendix C2).

It became evident that, due to the poor space utilisation, warehouses become full in a very short time, with just a small quantity of stocks. This situation, according to the respondents, has caused trucks arriving from up-country with consignments of cocoa to unduly delay before they are discharged. The delay in offloading, therefore, leads to congestion at the ports.

4.3.2.2 Low Ship Turn-around Time
Gangs load cocoa from warehouses onto trailers which are transported alongside ship. Cranes of vessels hook the cocoa into the hold of vessels. Upon receiving the hooked cocoa in the vessel, stevedore gangs manually pack and arrange the bags of cocoa, to ensure space utilisation and stability of vessel. It was revealed by the Warehousing and Port Operations Manager of CMC that, cocoa dockers have the capacity to load 1500 tonnes of cocoa per day, to service break-bulk vessels. Stevedores on the other hand, load vessels at 250 tonnes per gang per shift. On a typical day according to him, six (6) stevedoring gangs work on a
vessel. A vessel lifting 8000 tonnes of cocoa, for example, would take about five (5) days to load. This causes vessels to spend more days in port than at sea, therefore, reducing ships turn-around time. This in effect, reduces port productivity and thus affect the overall port performance.

The above situation was confirmed by the statistics provided below by the Shipping Department of CMC.

Table 4.2: Ship Turn-around Time of vessels loading cocoa in bags

<table>
<thead>
<tr>
<th>Vessel</th>
<th>Quantity Loaded (Tonnes)</th>
<th>Date Loading Started</th>
<th>Date Loading Completed</th>
<th>Days used for Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.V OPAL</td>
<td>500</td>
<td>30-12-2006</td>
<td>31-12-2006</td>
<td>2</td>
</tr>
<tr>
<td>M.V. ACTIVE</td>
<td>2500</td>
<td>19-02-2007</td>
<td>21-02-2007</td>
<td>3</td>
</tr>
<tr>
<td>M.V. RUBIN</td>
<td>3500</td>
<td>28-03-2007</td>
<td>31-03-2007</td>
<td>4</td>
</tr>
<tr>
<td>M.V. ALEXANDER</td>
<td>500</td>
<td>10-04-2007</td>
<td>11-04-2007</td>
<td>2</td>
</tr>
<tr>
<td>M.V. SZCZECIN</td>
<td>4050</td>
<td>02-05-2007</td>
<td>05-05-2007</td>
<td>4</td>
</tr>
<tr>
<td>M.V. RUBIN</td>
<td>1500</td>
<td>06-06-2007</td>
<td>07-06-2007</td>
<td>2</td>
</tr>
<tr>
<td>M.V. MAGDALENA</td>
<td>5000</td>
<td>12-06-2007</td>
<td>16-06-2007</td>
<td>5</td>
</tr>
<tr>
<td>M.V.SAFMARINE TEXAS</td>
<td>1050</td>
<td>28-06-2007</td>
<td>29-06-2007</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: Shipping Dept., CMC.
It is seen from the above table that vessels spend a great deal of time loading cocoa in bags at ports. M.V. Magdalena for instance used five (5) days to load 5000 tonnes. This means that 1000 tonnes was loaded per day. This may be attributed to the fact that, stevedores would have to patiently arrange and pack the bags of cocoa in the vessel’s hold. The result of this is that vessels spend more days in port which in turn affects port productivity.

4.3.2.3 Problems Relating to Manual Counting

The Shipping Manager of CMC intimated that, buyers frequently complain that, the actual quantity of cocoa they receive at destination have frequently fallen short of the contract quantities. This situation is referred to as short landing in the Cocoa Commodity Trade. Since price fixation is based on quantities sold and delivered, any deviation thereof affects the sales contract. Market rule 8/8.2.1 of FCC states that, “unless otherwise specified in the short form contract the resultant price shall be expressed in either pounds Sterling per metric tonne or US Dollars per metric tonne”. This means that pricing is based and quoted on the quantities sold. Any change in the quantities, therefore, would affect the pricing of the consignment sold.

The issue of short landing was seen to be as a result of problems associated with manual handling of cocoa. Out of the respondents interviewed, 95% attributed the reasons for this to be lack of exercising due diligence, fatigue and inadequate supervision.
The table below confirms the situation above:

**Table 4.3: Short landed Cocoa at Destination**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of containers</th>
<th>Quantity Shipped (bags)</th>
<th>Quantity Received (bags)</th>
<th>Quantity Short landed (bags)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>520</td>
<td>104,000</td>
<td>103,616</td>
<td>384</td>
</tr>
<tr>
<td>2005</td>
<td>1,022</td>
<td>204,400</td>
<td>203,219</td>
<td>1,181</td>
</tr>
<tr>
<td>2006</td>
<td>2,648</td>
<td>529,600</td>
<td>527,686</td>
<td>1,914</td>
</tr>
<tr>
<td>Total</td>
<td>4,190</td>
<td>838,000</td>
<td>834,521</td>
<td>3,479</td>
</tr>
</tbody>
</table>

Source: Shipping Dept., CMC

The table above shows that, out of 838,000 bags of cocoa shipped between 2004 and 2006, 834,521 bags were received by buyers abroad. This involved 4,190 standard Twenty Foot containers (TEU), which takes 200 bags (12.5 tonnes) of cocoa each. A short landed figure of 3,479 bags was recorded. It is also seen from the table that, the incidence of short landing has been increasing since 2004.

**4.3.2.4 Shipment Discrepancies and Infestation at Destination**

The Deputy Executive Director of Quality Control Division of COCOBOD mentioned that some of the problems affecting the quality of food products, in their supply chain management include infestation and contamination. According
to him, insects infesting cocoa are attracted to the jute sacks that are used to package the crop. This is because, the sacks are vegetable oil treated and serve as a good nesting abode for the insects. The insects lay their eggs and pupate especially at the seams, he revealed. They attack the cocoa and, therefore, reduce its quality.

He intimated that, the problem becomes more serious with cocoa in transit. Confirming this, the Senior Shipping Manager said, shipments to the Far East which involve series of transhipments suffer the most from infestation. This is because; the sailing days are lengthened, allowing eggs to develop further. This tends to boost the infestation cycle. Examples of insects infesting cocoa include moths, beetles and weevils. Available statistics from the Shipping Department indicates that, in 2003 and 2004, the number of reported cases of infestation was 25 and 36 respectively. The total tonnages involved were 7,725 and 10,925. SGS report for January, 2007 indicates that, out of the 26,350 tonnes of bagged cocoa shipped per 31 vessels, 18,750 tonnes was reported to have been infested. This is about 71% of the total tonnage shipped in January, 2007.

At destination, buyers spend extra money on re-fumigation. The cost of re-fumigation is passed on to COCOBOD, thereby increasing the overall handling cost of the Commodity, which in turn affect the revenue target of COCOBOD.
Quite apart from the foregoing, a good number of bags are either lost over board, or declared wet, oil stained or burst during loading of vessels. This was made known by the Stevedore Manager of G.P.H.A. He mentioned that, this normally happens when cranes hook cocoa from the quay into the vessels' hold. Bags of cocoa usually fall from the hook into the sea, or get burst upon falling or get stained with oil upon contact with the quay.

Statistics provided by the Warehousing and Port Operations (WPO) Department of CMC confirmed the above situation.

Table 4.4 Cocoa Discrepancy Report

<table>
<thead>
<tr>
<th>Crop Year</th>
<th>Burst (tonnes)</th>
<th>Wet (tonnes)</th>
<th>Loss Over Board (tonnes)</th>
<th>Oil Stained (tonnes)</th>
<th>TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004/2005</td>
<td>94.8750</td>
<td>581.6250</td>
<td>6.1875</td>
<td>0.5625</td>
<td>683.2500</td>
</tr>
<tr>
<td>2005/2006</td>
<td>127.3750</td>
<td>61.6875</td>
<td>1.1875</td>
<td>-</td>
<td>190.2500</td>
</tr>
<tr>
<td>Total</td>
<td>222.2500</td>
<td>643.3125</td>
<td>7.3750</td>
<td>0.5625</td>
<td>873.5000</td>
</tr>
</tbody>
</table>

Source: WPO Dept., CMC.

It is seen from the table 4.4 that, a total of 873.5000 tonnes of cocoa was declared discrepant during the two seasons. Most of the losses are as a result of the cocoa getting burst and wet. It was made known by the WPO Manager that,
the quality of discrepant cocoa normally falls, even after salvaging and restandardisation. The fall in the quality of the said cocoa renders it unattractive on the world commodity market, and, therefore, attracts low prices. Also, high cost is incurred in the salvaging and restandardisation of the cocoa. All these have serious economic implications on the finances of COCOBOD, in terms of reduced revenue levels.

4.4 Conclusion

It is seen from the analysis that, the conventional warehousing and handling of cocoa, has not been that economical, in terms of cost and ship performance.

The next chapter would consider bulk warehousing of cocoa as a warehouse management strategy.
CHAPTER FOUR (b)

BULK WAREHOUSING AND HANDLING OF COCOA

4(b) Evolution of Bulk Cocoa Handling

Traditionally, cocoa has been stored and shipped from origin countries packed in jute sacks. Activities such as handling, inspection, transport and storage were all geared towards this mode of handling. The benefits derived from economies of scale were not possible with many trading houses and grinders, buying limited quantities of cocoa beans, as a result.

A rapid change occurred in the 1970's, when large grain traders such as Cargill Incorporated, and later Archer Daniel Midland Incorporated, took stakes not only in cocoa trading houses, but also in cocoa grinding industries. Grinding capacity rapidly increased from their involvement. In 1965 the Dutch, for instance, ground 150,000 tonnes of cocoa beans. This figure shot up to 400,000 tonnes in 1997. In part, the chocolate manufacturers increasing the amount of semi finished products from grinders caused this rise. Instead of buying the cocoa beans themselves and making chocolates, the chocolate houses found it more economic to buy the semi finished products from the grinders.

During the 1980's, the price of cocoa plummeted drastically forcing many trade houses out of business. As there were fewer trade houses available to supply the increased capacity of the processors, the grinding industry consequently had to review its buying policy. In order to secure a regular supply of cocoa beans,
cocoa processors intensified their contracts with origin shippers and making long term contracts. These involved shipments of several thousand tonnes of cocoa beans through individual shippers. With this situation, an effective system of storage, handling and transport had to be adopted to keep pace with the increased tonnage. The grinding industries, therefore, resorted to bulk storage and transport as the mode of handling the commodity. The grinding industries have since gained considerable expertise in the bulk handling of the commodity (UCC, undated).

4(b).1 The Operation of Bulk Cocoa Warehouse

Cocoa beans are poured in loose state into warehouses. The beans are consolidated in heaps of 5000 tonnes each. The walls of the warehouses are reinforced to take the weight of cocoa beans in bulk. The warehouses are specially designed for cocoa in bulk. The whole process – from taking in, pouring and storing cocoa beans in bulk, and loading into vessels – is operated by specialised equipment. Pay loaders or suckers into hoppers, which stand above a conveyer belt system that has a weighing conveyor belt that weighs the entire cocoa, load it and it is put into the hold of the vessel via a big conveyor. The design of the hoppers and conveyer belts minimize the amount of broken beans when loading the cargo into the hold of the vessel.

Bulk cocoa bean shipments come in two (2) forms. These are containerised and mega-bulk.
With the containerised, bulk cocoa is stuffed into standard containers using conveyor belts. Polythene linings are used to line the containers to prevent contact with metal surface of the container. A small opening is left at the frontage to allow for easy discharge of the cargo by tilting the container on specially designed trucks.

Mega-bulk shipment, on the other hand, is where the cocoa beans are poured direct into the ship's hold, via conveyor belt (see Appendices C4, C6). Discharging is done by using grabs to scoop the beans from the hold of the vessel. Cargo is then poured into specially designed bulk trucks, lighters, barges or rail wagons for discharge into warehouses at destination.

4(b).2 Data Analysis

4(b).2.1 Reasons for Bulk Warehousing

There are several advantages that are derived as a result of the adoption of bulk warehousing of cocoa. The following are examples as per the interview conducted:

4(b).2.1.1 Optimal use of Storage and Warehousing Space

Storing cocoa in bulk tends to utilize warehouse floor space more efficiently than when it is stored in bags. All the respondents interviewed alluded to this fact. According to the General Manager of Unicontrol Commodity, a warehouse with a total floor space of 9000 square metres has an average storage capacity of
30,000 tonnes, when storage is in bulk. A warehouse of similar total surface only has a capacity of 11,000 tonnes when stored in bags. The General Manager of Unicontrol Commodity revealed that, by convention, storing cocoa in bulk has a floor utilization capacity of 3 tonnes per square metre. Storing cocoa in bags, on the other hand, according to him, has a floor utilization capacity of 1 tonne per square metre.

Confirming the above situation the Warehousing and Port Operations Manager intimated that, the floor space used up by pallets and aisles as in bags storage, are absent with bulk storage (see Appendix C3). Such spaces, according to him, are efficiently used up by actual stocks of cocoa. This, therefore, contributes in maximizing the floor utilization capacity of bulk warehouses.

The effect of the above is that, fewer warehouses would be required to store relatively bigger volumes of cocoa.

Inefficient space utilization with the conventional system of warehousing means that, more storage space would be needed to store cocoa. This would necessitate the rental and/or construction of more warehouses. It must be emphasised that, more warehouses rented would mean higher cost of rentals. The same goes for the payment of insurance, electricity and other related overhead costs. Also, more warehouse keepers would have to be employed to
man the numerous warehouses rented or constructed. The costs associated with employment are obvious and cannot be ruled out in this circumstance.

With the adoption of bulk cocoa warehouse and handling, floor space would be optimally utilised as seen from the above analysis. This would lead to fewer warehouses used for storage. It would tend to reduce cost on insurance and other overheads. Savings made as a result could be channelled to more productive ventures in the cocoa industry.

4(b).2.1.2 Lower Insect Development

The improvement of standards in food production is a priority. Those involved in the chain of bringing of food products to consumers are continually faced with the need to ensure a wholesome product. Since cocoa is a food product, the best handling and hygiene practices must be adopted to ensure its wholesomeness.

According to the General Manager of Unicontrol Commodity, handling of cocoa in bulk form has shown that a better quality product – lower incidence of insect infestation, no record occurrence of rodent infestation and less development of mould – happens with bulk storage and shipments.

The Deputy Executive Director of QCD confirmed the above when he said, in bulk handling, the jute sacks are obviated. The insects find it difficult to lay eggs and to pupate as there is no sacking material (jute sacks) in the warehouse and during shipment. Without the protection of the sacking, the cocoon phase,
(Ephestia ssp which cause most of the infestation from West Africa including Ghana), finds it difficult to develop further, thereby providing a break in its life-cycle, hence lower insect infestation. Likewise, rodents enjoy nesting in cocoa piles because of the sacking that they tease out and use. He said, remove the jute and rodent activity ceases.

Confirming the situation above, the Managing Director of Supermaritime intimated that, experience so far has shown that, in bulk cocoa storage and shipment, no reproduction of insects occurs. Even infested cocoa parcels brought into bulk warehouses become free of insects after the end of the first life cycle, due to lack of jute sacks.

Statistics from the Shipping Department of CMC indicates that, 1,650,529.6875 tonnes of cocoa was shipped in bulk form between 2001 and 2006. The SGS out turn report on quality on this tonnage, within this period, confirms that there was no reported incidence of infestation at destination.

4(b).2.1.3 Lower Freight as a result of Economies of Scale

Bulk cocoa handling has the added benefit of deriving the gains of economies of scale. Larger quantities of the commodity fill up a whole vessel and this reduces freight charges as compared to bags shipment. A standard twenty foot container (TEU) takes 12.5 tonnes (200 bags) of cocoa in bags. On the other hand, the same TEU takes 16.67 tonnes (266 bags) of cocoa in bulk. A 2000 tonne
shipment of cocoa in bags, for instance, will utilise 160 TEU's. That of bulk cocoa will go into 120 TEU's. Payment of freight on 40 TEU's is thus saved. Also, since freight is determined on box rates and not on quantity per box, it makes economic sense to ship in bulk than in bags.

4(b).2.1.4 Reduction in Transit Time

The loading and discharging capacity with bulk cocoa is a lot higher compared to cocoa in bags. According to the General Manager of Uniconrol Commodity, the conveyor belt system with its speed makes up for the slow pace with which the conventional handling is carried out manually. He said the conveyor belt and ship loader systems create a fast and efficient loading of bulk containers and mega-bulk vessels (see Appendices C4, C6). A typical conveyor system has the capacity to load 200 tonnes of cocoa per hour, he intimated. A 5000 tonne cocoa vessel is loaded in just one day. This helps reduce the number of days vessels spend in port, thereby maximising the days spent at sea. Also, this helps increase the productivity of ports.

The use of conveyor systems and other forms of mechanisation of the bulk system, help to reduce cost of labour. It also helps to reduce the effect of other labour related issues such as labour unrest. Labour unrest affects ship's turn around time as ships are not worked on during such periods. The Warehousing and Port Operations Manager mentioned that, there was labour unrest between 1st January and 7th January, 2007 by cocoa dockers. Within this period, nine (9)
vessels which were planned to load 5,700 tonnes of cocoa could not do so. Loading of these vessels could only commence on the 9th of January, 2007. The vessels were, therefore delayed for well over a week. This affected their turn around time significantly.

The above phenomenon is basically minimal with mechanised bulk handling of cocoa.

4(b).2.1.5 The Benefits of Automation in Bulk Handling

The General Manager of Unicontrol Commodity indicated that, conveyor belts used have in-built weighing systems. These help with the loading and discharging of accurate tonnages, thereby solving the problems associated with manual counting. This helps ensure accurate inventory in warehouses and during evacuations from warehouses.

Automation also helps prevent losses due to burst bags and bags falling into the sea during loading and discharging of bags.

4(b).2.1.6 Current Trend of Buyers Requirements

Buying policies of customers buying cocoa beans, in recent times, have shown a move towards bulk cocoa. According to Unicontrol Commodity (Holland) B.V., in response to demand from European buyers, they now handle about 90% of cocoa in bulk, in their cocoa terminals dotted all over the major European ports.
Confirming this trend, Amsport (2006), quoting Mr John Clark of C:N. Shipping said: “A number of successful consignments have been delivered, and this new method is now accepted as a regular way of transporting the commodity. The latest 3000 tonnes shipment was brought from Ghana by M.V. BACO II to the port of Tilbury where six (6) barges were floated out”. According to him, “more and more customers are opting for bulk shipments and with each barge carrying 500 tonnes, this is enormous benefit for the trade”. Laying much emphasis on the service schedules of vessels as a result of bulk handling of cocoa, Mr Clark had this to say: “We expect the total tonnage of cocoa beans shipment to increase. BACO vessels are going to be kept busy during the cocoa season with full ships”.

The reason for this trend is obvious. Vessels are full with bulk cocoa and the benefits of economies of scale will certainly be derived. Unicontrol Commodity revealed that, there is tremendous reduction in the number of broken beans in bulk cocoa. The benefits as a result of this system of handling cocoa have compelled buyers to respond accordingly.

Also, it was revealed that buyers do spend huge sums of money on the disposal of used empty jute sacks. They claim that the used sacks are burnt in incinerators and have serious environmental implications on their operations. The General Manager of Unicontrol Commodity mentioned in particular that, the government of Holland has banned the delivery of cocoa beans in bags on factory floors. He posited that the new rule is the delivery of cocoa in bulk, which
eliminates entirely the nuisance of the effect of empty jute sacks on the environment. He said, even buyers whose consignments of cocoa arrive at the ports in bags, are required to empty its contents right at the ports before they are delivered at the factory floor in bulk.

Statistics from the Shipping Department of CMC also suggest a trend towards bulk cocoa demands by customers. This is seen in the table below:

<table>
<thead>
<tr>
<th>Crop Year</th>
<th>Total Shipment (Tonnes)</th>
<th>Total Bulk Shipment (Tonnes)</th>
<th>Total Conventional Shipment (Tonnes)</th>
<th>Percentage Bulk Shipment (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001/2002</td>
<td>291,610.7500</td>
<td>101,351.0000</td>
<td>190,259.7500</td>
<td>34.76</td>
</tr>
<tr>
<td>2003/2004</td>
<td>638,046.5625</td>
<td>438,143.4375</td>
<td>199,903.1250</td>
<td>68.67</td>
</tr>
<tr>
<td>2005/2006</td>
<td>630,900.8125</td>
<td>513,837.5625</td>
<td>177,063.2500</td>
<td>81.45</td>
</tr>
<tr>
<td>Total</td>
<td>2,512,635.4375</td>
<td>1,650,529.6875</td>
<td>862,105.7500</td>
<td></td>
</tr>
</tbody>
</table>

Source: Shipping Dept., CMC

From the table above, it is observed that a total of 1,650,529.6875 tonnes of cocoa have been shipped in bulk, between 2001 and 2006. In 2001/2002 for
instance, 34.76% out of the total shipment was shipped as bulk. This figure rose to 68.67% in 2003/2004. By 2005/2006, the percentage of bulk shipment out of the total shipment had increased to 81.45%. Conventional shipment on the other hand, was 862,105.7500 tonnes, out of a total shipment of 2,512,635.4375 tonnes within the period. The above trend suggests that buyers are opting for bulk shipment as against conventional shipment, from a low percentage of 34.76 in 2001/2002 to a high percentage of 81.45 in 2005/2006.

The Shipping Manager mentioned that a trend that is gradually being accepted by buyers is the containerisation of bulk cocoa. He intimated that this system has almost solved the problem of sweat that develops on bagged cocoa in containers. Another advantage according to him, which is derived from this system, is the fact that import containers are returned in full loads with cocoa in bulk. He posited that buyers benefit through the receipt of more cocoa per container, whilst shipping companies benefit through the maximisation of freight and space on board vessels.

4(b).2.1.7 Effect of Bulk Warehousing on CMC's Sales Policy

Since bulk warehouses are able to store more cocoa beans at any given time, more sales contracts can be made. This is because more stocks would be available to be sold. Also, the fact that buyers have up to three months to lift their parcels would not put undue pressure on warehousing space. This is because,
as a result of efficient space management, it would take a long while for warehouses to be filled up to capacity.

It is seen from the above that, bulk warehousing favours the sales policy of CMC in which buyers are to lift their consignment, within a three month period.

4(b).2.1.8 Dual Purpose Warehouses

It was revealed by Unicontrol Commodity that, bulk warehouses serve dual purposes. They can be used both for bulk and conventional storage. By their structural design, the floors are made of bitumen and not concrete. Naked cocoa beans become mouldy on contact with concrete floors. Their walls are also reinforced to withstand the pressure of the weight of bulk cocoa.

The above gives the advantage of the flexibility to change warehousing systems, as dictated by trends and direction of trade.

4(b).2.1.9 Effect of Bulk Handling on Shipping Documentation

The need for more TEU's when cocoa is shipped in bags requires for more copies of bills of lading and other documents. The Marketing Manager of CMC mentioned that shipping documents show evidence of sales contract, and that payment is only effected upon their presentation. This means that the speed and accuracy with which these documents are prepared are of great importance to CMC. It was specifically mentioned that, a 10,000 tonne shipment of cocoa in
TEU’s would require 800 of the boxes. This will mean that, clerks would have to capture all the numbers of the boxes on the bills of lading and other documents. (See Appendices C10 (a), C10 (b)). The Manager intimated that, this takes much time and effort. Also, more papers are needed for documentation on just a single shipment.

Unlike the above, a mega bulk shipment of 10,000 tonnes of cocoa beans would require just a single entry on a single page of a bill of lading. (See appendix C11). This will mean that, documents will be prepared and sent with dispatch and sales contract payments quickly made.

4(b).2.2 Disadvantages of Bulk Warehousing of Cocoa

4(b).2.2.1 High Initial Cost of Investment

The Deputy Chief Executive (Operations) of COCOBOD intimated that, the adoption of such a system of warehousing would require an initial high level of investment. This would involve the construction of new warehouses, redesigning of existing ones and the procurement of conveyor belt systems.

This was confirmed by the General Manager of Unicontrol Commodity when he said that bulk warehousing and handling of cocoa is capital intensive. He intimated that this involves the acquisition of conveyor belt systems, pay loaders, hoppers, weighing machines and the construction of the pre-fabricated warehouse structure itself with asphalted floors. He mentioned specifically that, a
20,000 metric tonne capacity bulk warehouse which is fully automated costs about Twenty Five Million Euros to build.

With the vision of COCOBOD targeting a One Million tonne production level by the year 2010, would thus require a high level of capital injection to be able to meet the bulk warehousing requirements.

The Deputy Chief Executive (Operations) was rather quick to add that, even though the initial monetary considerations are huge, the eventual benefits would far outweigh the acquisition cost.

4(b).2.2 Low Rate of Employment Associated with Bulk Warehousing

Another important issue raised by respondents were that of job losses and unemployment resulting from the adoption of bulk warehousing management. About 85% of the respondents intimated that, since the system is mainly automated, it would offer employment to just a few numbers of people. This in effect would not support the employment generation policy of the government.

Confirming this assertion, the General Manager of Unicontrol Commodity revealed that a 5000 tonne capacity vessel is loaded with only five people, namely; a warehouse keeper, a conveyor mechanic, 2 pay loader operators and a conveyor operator. He said that technically, jobs would be lost in the course of
transition from conventional handling to bulk handling due to the highly mechanised nature of the bulk handling operations.

A vessel of a similar capacity loading 5000 tonnes of bagged cocoa on the other hand, would require 33 gangs to effect the operation. With a gang consisting of 17 people, and with each gang loading 150 tonnes, means that approximately 533 people would be engaged to load such a vessel. This means that more people are employed per every shipment operation than that of bulk cocoa handling.

In a developing country such as Ghana where unemployment is a major problem, the government would want to undertake projects such as that of the conventional system, to help solve the problem of unemployment.

It must rather be said that, the adoption of an efficient system of handling would stimulate economic growth and help redeploy resources such as capital and labour to other sectors of the economy to boost growth, which would in turn help solve the unemployment problem.

Also to be noted is the challenge of managing the retrenchment and/or redeployment of labour resulting from the transition from conventional system of handling to the bulk handling system. The WPO Manager intimated that experiences indicate that retrenched staff resulting from automation would have
to be given some orientation on retrenchment through seminars, workshops and
durbars. They also have to be retrained and properly compensated financially.

4(b).2.2.3 Frequent Breakdown of Equipment

The General Manager of Unicontrol Commodity intimated that the main enemy of
automation and a highly mechanised operation is the frequent breakdown of
equipments and its associated maintenance cost.

He mentioned specifically that, the repair of breakdowns affecting conveyor
system requires the dismantling of the whole conveyor setup. According to him
the dismantling alone takes about two (2) hours to undertake. The actual
maintenance and repair works then follows immediately after the fault is
detected. The repair also takes about three (3) hours to undertake depending on
the nature and gravity of the fault. He retorted that the time within which the
breakdown and repair work takes place affect the loading plan of vessels. He
said this causes the loading time of ships to be extended well beyond what has
been planned, thereby causing vessels to spend more time in port than
expected, thus reducing ships productivity.

The General Manager intimated that, with a well structured maintenance plan
and orderly and timely procurement of genuine parts, the reliability of the
equipments is guaranteed and the life cycle of same is extended to help meet
operational demands.
4(b).3. Conclusions

The analysis above suggests that, the bulk warehousing management system is more economical in terms of cost saving even though it requires huge initial capital outlay and does not also support the employment generation policy of governments of developing nations such as Ghana. It also helps in the improvement of ship and port performance.

The next chapter would attempt to consider and summarise the conclusions and recommendations drawn from the study.
CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.0 CONCLUSIONS

5.1 Introduction
The overall study has placed some emphasis on the flaws of the conventional warehousing of cocoa and the need to shift from it. The shift will require a bold management initiative since change with its associated cost elements is difficult to pursue. Since the cocoa industry is one of the main foreign exchange earners of the country, the need to improve upon its performance and operational strategies will definitely be of national interest.

5.2 Specific Conclusions
The study brought to the fore the following issues related to the conventional warehousing of cocoa:

- Ineffective utilisation of warehousing space
- Low ships turn around time
- Problems relating to manual counting
- Higher percentage of infestation at destination
- Higher expenditures on overhead costs

The introduction of the bulk warehousing system, on the other hand, ensures:

- Optimal use of storage space
- Lower insect development
- Lower freight as a result of economies of scale
- Reduction in transit time
- Automation and its associated benefits thereof
- Meeting customers requirements

The bulk warehouse system is designed to automate cocoa handling processes and to increase productivity in warehouses. The automation of the system helps to increase the accuracy of shipment orders, and eliminate errors related to manual handling. The effective space utilisation associated with it is scaled to accommodate future business growth. It also helps to implement multiple picking methods and therefore helps to save time, and reduce costs.

The design and operation of the bulk system is such as to increase inventory handling accuracy, optimise allocation of human resources within the warehouses, and control carrying costs associated with manual handling. The system, therefore, would enable CMC as a shipper to efficiently pick, pack and ship orders with an efficient picking and shipping accuracy.

The speed with which vessels are loaded helps to reduce ships turn around time. This helps to eliminate the delays associated with the loading of vessels especially during the handling and shipment of cocoa. The payment of such costs as demurrage is thus eliminated in bulk warehouse system. This also translates into helping ports to increase their productivity and ultimate
performance. This situation fits very well into the vision of Port of Tema to becoming a hub port in the West African sub region. The speeds with which vessels are loaded and discharged are attractions to ship owners and charterers wanting to use a particular port. The implementation of the bulk warehouse system has the potential of attracting vessels to the ports of Ghana, therefore, making the ports preferred and obvious choices.

The study revealed that, the incidence of infestation of cocoa during transit is drastically reduced. Bulk cocoa does not provide a good nesting for insects to lay eggs and to pupate. It helps to break the cycle of infestation, if any. Between 2001 and 2006, there was no incidence of infestation at destination, which involved the shipment of 1,650,529.6875 tonnes of cocoa. The cost of refumigation of infested cocoa at destination, which is often associated with conventional handling, is thus reduced. Bulk warehouse and handling of cocoa, therefore, becomes a cost saving strategy. It also helps to ensure the maintenance of the quality of cocoa as a food product.

The study revealed that, a total of 2,512,635.4375 tonnes of cocoa was shipped between 2001 and 2006. In 2001/2002 for instance, 34.76% out of the total shipment was shipped as bulk. This rose to 68.67% in 2003/2004. By 2005/2006, the percentage of bulk shipment had increased to 81.45% out of the total shipment. This is an indication that buyers are opting for the shipment and delivery of cocoa in bulk at destination. The implication of this on the cost profile
of COCOBOD is that, expenditures on the procurement and importation of jute
sacks would be eliminated. Foreign exchange would, therefore, be saved. To the
buyers, this system offers a cheaper and an economic option of shipping,
discharging and storing of the commodity.

The benefit of this system to the ship owner is the fact that import containers are
returned in full loads with cocoa in bulk. This helps to maximise freight and
space, and eliminate broken stowage.

The optimisation of human resources allocation in bulk warehouses, and the
drastic reduction of human activity during loading of vessels, reduces human
contact and activity, within the port area. This situation reduces potential threats
of terrorism within the precincts of ports. Since Ghana, and of course the ports in
Ghana are International Ship and Port Facility Security Code (ISPS) compliant,
any further measure that ensures an integrated security system for the entire
maritime sector is thus good news. Since the bulk warehousing system is an
attempt and a further boost in dealing with potential acts of terrorism, it must be
embraced and adopted. This, again, fits into the overall objective of the Port of
Tema in becoming a safe haven and a preferred choice in the sub region.

It is of interest to state that, critics of change will focus their argument on the
initial huge financial outlay needed for the acquisition of facilities and
equipments. The fact that the bulk warehouse and handling system does not
allude to the concept of unemployment reduction, would also be criticised. Also the reliability and extended life cycle of equipments would be questioned due to frequent breakdowns, unplanned spare parts procurement programmes and high cost of maintenance.

It must rather be said that the return on investment in the long run will be enormous, and of much benefit to the country. Also, savings made from the new system of handling could be used to develop other equally important and potentially viable sectors of the economy, which will help stimulate economic growth. There could, therefore, be the transfer of labour to these potential sectors of the economy. This is more an aspect of labour redeployment, which is an important element of economic growth and development.

Since the benefits to be derived from the bulk warehouse and handling system are obvious, its adoption is recommended. This will help reduce drastically the cost of warehouse and shipping operations of COCOBOD. It will also help meet the requirements of customers and thus help to satisfy them.

5.3 RECOMMENDATIONS

With major buyers and grinding companies opting for bulk cocoa, as revealed by the study, it is recommended that COCOBOD takes advantage of the shift towards bulk, to satisfy the needs of its customers.
This also has the added advantage of helping to reduce the cost of procurement of jute sacks. Expenditures on the procurement of jute sacks could be used to finance other important programmes of COCOBOD. It is, therefore, recommended that COCOBOD takes advantage of bulk warehousing of cocoa in order to reduce the cost on jute sacks and rather enjoy the benefits revealed by the study.

With the increasing freight rates as a percentage of the FOB price as revealed by the study, it is recommended that COCOBOD takes advantage of the benefits of economies of scale derived from bulk shipment of cocoa. This is because more tonnage is shipped in bulk per TEU (bulk in containers) and in mega-bulk. Charges on demurrage and dead freight which are regular features of conventional handling would drastically be reduced with the adoption of bulk shipment.

Upon the basis of the findings and conclusions drawn from the study, the following strategies are also recommended towards the implementation of the bulk warehousing management system, suggested in the study:

1. That Project or Technical Teams be constituted to work and recommend on the human capital, technical and financial aspects of the bulk warehousing project. The teams could consist of the following:

   • Financial and Investment Team
• Civil and Structural Engineering Team
• Equipment and Machinery Team
• Human Capital and labour related issues Team

2. That workshops and seminars on organisational change and restructuring is organised to prepare workers for the change.

3. That COCOBOD enters into development, investment and financing collaborative discussions with financial partners, to finance the project, if it cannot solely bear the burden.

4. That COCOBOD works in close collaboration with GPHA in the implementation of the project. This is because GPHA is also undertaking a massive port development. There is, therefore, the need to synchronize the two development projects to derive the desired results of improving port performance.

5. That COCOBOD studies the experience of Unicontrol Commodity Ltd., to help guide in the adoption of the bulk warehousing management system.
REFERENCES


95


London: LLP.


London: Prentice Hall.
APPENDIX 1:

INTERVIEW GUIDE FOR A CASE STUDY ON THE ADOPTION OF A WAREHOUSING MANAGEMENT SYSTEM: THE CASE FOR BULK COCOA WAREHOUSE

PERSONAL DATA
1. Institution of work:

2. Position/Status:

SUBJECT DATA
1. How long have you been associated with cocoa handling?
2. In what capacities have you been associated with cocoa handling?
3. What are the major systems of cocoa warehousing used by COCOBOD?
   a. ..............................................
   b. ..............................................
   c. ..............................................
4. What are the advantages of the systems of warehouse mentioned above?
   Advantages
   a. System A ..............................................
   c. System B ..............................................
   c. System C ..............................................
5. What are the modes of shipment of cocoa?
6. Why are the modes of shipment adopted?
7. Which of the modes of shipment is mostly used?
8. Why is this mode of shipment mostly used?
9. What are the current trends in terms of volume and frequency of shipment?
10. Who determines the mode of shipment of cocoa?
   a. Buyer  b. Shipper  c. Producer

11. What is the effect of the various modes of shipment on shipping documentation?

12. What is the effect of the systems of warehousing on the quality of cocoa exported?

13. How profitable, in terms of cost savings, are the systems of warehousing?

14. What effect do the warehousing systems have on vessels turn-around time?

15. What is the effect of the warehousing systems on the Forward Sales Policy of Cocoa Marketing Company?

16. Which of the warehousing systems do you think would help meet the objectives of the sales policy?

17. How does the warehousing system meet the objectives of the sales policy?

18. What kinds of stevedoring operations are adopted during loading of vessels under the various warehousing systems?

19. Which system of warehousing in your opinion would help solve COCOBOD's storage problems?
APPENDIX 2:
SCHEDULE OF MEETING

1. The Principal Shipping Officer
   19th June, 2007.
2. The Principal Trader
   19th June, 2007.
3. The W.P.O. Manager, CMC.
   20th June, 2007.
4. The Senior Shipping Manager, CMC.
5. The Deputy Executive Director, QCD.
6. The Deputy Managing Director, CMC.
   26th June, 2007.
7. The Marketing Manager, CMC.
   28th June, 2007.
8. The Manager, SGS, Tema.
9. The Stevedore Manager, GPHA, Tema.
10. The Area Manager, CMC, Tema.
11. Regional Manager, QCD, Tema.
12. The Deputy Chief Executive (Ops), COCOBOD
13. The Regional Manager, QCD, Takoradi.
14. The Area Manager, CMC, Takoradi.
15. The Stevedore Manager, GPHA, Takoradi.
16. The Operations Manager, Unicontrol Commodity.
17. The General Manager, Unicontrol Commodity.
18. The Managing Director, Supermaritime, Rotterdam.
19. The Managing Director, Global Haulage Company,
Picture 1: Bags of Cocoa packed in Vessel's hold
Picture 2: Bags of Cocoa stacked on pallets
Picture 3: Raw Cocoa beans stored in bulk
Picture 4: Loading bulk Cocoa into a vessel via conveyor belt.
Picture 5: Slitting bagged Cocoa into a vessel

Picture 6: Slitting bagged Cocoa into a vessel
Picture 7: Loading bulk Cocoa into a vessel via conveyor belt

Picture 8: Bulk Cocoa in a vessel's hold via conveyor belt
Picture 9: Stevedores slitting bagged Cocoa into a vessel

Picture 10: Stevedores slitting bagged Cocoa into a vessel
Picture 11: Stevedores slitting bagged Cocoa into a vessel

Picture 12: Stevedores slitting bagged Cocoa into vessel
Picture 13: Bagged Cocoa about to be slit into vessel

Picture 14: Laid Cocoa bags ready for slitting into the vessel