Thesis Paper
on

Green Supply Chain Management Practice in Bangladesh:A Case Study on [Mahir Group]

Submitted To

Md. Masud Rana

Associate Professor

Department Of Business Administration (DBA)

Sonargaon University (SU)

Submitted By

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ID-RMBA2202026005

Program: RMBA

Major: Supply Chain Management

Department : Business Administration

Sonargaon University (SU)

Submitted for the partial fulfillment requirement of the degree of R.M.B.A in Supply Chain Management

SONARGAON UNIVERSITY (SU)

Date of Submission: 05 January, 2024

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SONARGAON UNIVERSITY (SU)

Date of Submission: 05 January, 2024

Letter of Transmittal

05 January, 2024

To
Supervisor

Md. Masud Rana

Associate Professor

Department Of Business Administration (DBA)

Sonargaon University (SU)

Subject: Submission of Thesis Report on "Green Supply Chain Management Practice in Bangladesh : A Case Study on Mahir Group".

Sir,

With due respect and utmost veneration, it is my pleasure for having an opportunity to submit the Thesis Report on**"Green Supply Chain Management Practice in Bangladesh : A Case Study on Mahir Group".**

I highly appreciate the co-operation that I have received in this regard. I put my highest endeavour to gather relevant information in line with my Thesis proposal and drew it on this report.

and will enlighten my gaps with your May I, sincerely pray and hope that you will consider my limitations and mistakes regarding drafting this thesis report constructive remarks and thus oblige me thereby.

Yours Sincerely

_____

Asaduzzaman Noor

ID-RMBA2202026005

Program: RBMA

Department : Business Administration

Sonargaon University (SU)

Preface

Today we are very much involved in the business era. Only book-based knowledge is not enough to cope with a real business environment. Effective combination of theoretical knowledge with practical experience is the key to success. Considering this, the thesis program is included in the degree Masters of Supply Chain Management (MSCM) from the Department of Business Administration of Sonargaon University (SU).

I tried my best to collect relevant and significant data as much as possible and prepare the thesis with my best effort. I regret any undue mistakes in this thesis. If the thesis do little support to any student, teacher, researcher or analyst, I may consider my effort not go in vain.

Declaration

I, Asaduzzaman Noor, a student of RMBA, Department of Business Administration, Sonargaon University, do hereby declare that the thesis report titled **"Green Supply Chain Management Practice in Bangladesh : A Case Study on Mahir Group".**is the outcome practical work on the topic mentioned above under the supervision of Md. Masud Rana, Assistant Professor, Department of Business Administration, Sonargaon University, Bangladesh.

I also declare that this thesis report is an original work and no part of this thesis has been copied from elsewhere. In addition I would also like to mention that this thesis report has not been published or submitted for being published or submitted for awarding any degree, diploma or recognition.

Sincerely Yours

Asaduzzaman Noor

ID-RMBA2202026005

Program: RMBA

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Letter of Acceptance

This is to certify that **Asaduzzaman Noor, ID-RMBA2202026005,** Sonargaon University (SU), Department of Business Administration , has completed his thesis titled on "**Green Supply Chain Management Practice in Bangladesh : a case study on Mahir Group**" under my supervision as a part of partial requirement for obtaining Masters of Business Administration Supply Chain Management in Major. This report can be accepted for evaluation.

Md. Masud Rana

Associate Professor

Department Of Business Administration (DBA)

Sonargaon University (SU)

Acknowledgement

This thesis report is the result of many people's endeavour. But at the beginning I would like to convey my gratefulness to the Almighty ALLAH for giving me the strength and the ability to finish the task within the planned time. Then I would like to express my gratitude, sincere appreciation and profound respect to my thesis Supervisor **Md. Masud Rana, Associate Professor, Department Of Business Administration (DBA), Sonargaon University (SU).** For his generous help, kind supervision and valuable guidance throughout my thesis period.

I am really very thankful **to Md. Nurur Nabi Baskor (CFO), Mahir Agro Industries Limited (MAIL)** for giving me the chance of pursuing my in such a wonderful environment. I also convey my heartiest gratitude to **Md.Mahbub Rahman Dorpon, Manager,** for an extensive journey of learning and kind cooperation in successfully completing my thesis program.

Lastly, some of the persons of **Mahir Agro Industries Limited (MAIL)** deserve cordial gratitude, they are **Mr. Md.Kamal Hossain, Mrs.Fatema akter, Mr. Imran Hasan, Mr. Md.Sojib Hossain, Mr. Md.Rakib Hossain, Mrs.Sanjida islam Oyshee, Mrs.Ena Islam, Mr. Sohidul islam, Mrs. Jinnat haq, Mrs. Miftahul Zannat, Mrs Nisher Fatema** and lastly **Mr, Kabir Ahmed** for helping me get an in-depth learning of practical aspects during the Thesis program. It would be unjust if I do not express my humble gratefulness to all the employees of this firm.

Asaduzzaman Noor

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Program: RMBA

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Abstract

The purpose of this study is to find the role of **Green Supply Chain Management (GSCM) Practice in Bangladesh : a case study on Mahir Agro Industries Limited (MAIL)**. This study attempts to fill up the gap of insufficient empirical studies, lack of theoretical framework and research based work to be used by the industry participants. Supply chain management is a major concern in many industries as companies realize the importance of creating an integrated relationship with their suppliers and customers. Managing the supply chain has become a way of improving competitiveness by reducing uncertainty and improving service. One aspect of successfully managing the supply chain requires that a company understand their logistical strategies and practices. Agro industry has a great impacts on our economy. For this reason, Agro products and supply chain management practices should be updated and systemized to smooth this broaden industry. As an thesis program, I have chosen supply chain management practices in agro industry: A case study on Index Agro Industries Limited. This industry produces poultry feed, fish-feed, and Day-Old Chicks (broiler & layer). I have performed 03 months thesis in this organization and observed productive procedure and its supply chain management.

Keywords— Agro industry, Green Supply chain, Integrated supply chain, Lead time, Agro industry, System dynamics analysis, Inventory, Raw material, SWOT analysis.

Table of Contents

CHAPTER 1: INTRODUCTION..... 12

1.1 Introduction..... 12

1.2 Objective of the report:..... 12

1.3 Scope of the Study:..... 14

1.4 Methodology of the study.....15

1.5 Limitations of the Study:..... 16

CHAPTER 2 : Organizational Profile.....17

2.1 The origin of Mahir Agro:.....18

2.2 Definitional Analysis of GSCM.....18

2.3 Overview of Mahir Agro Industries Limited:..... 19

2.4 Products of Mahir Agro Industries Limited:.....20

2.4.1 Feed Mill.....20

2.4.2 Breeder Farm & Hatchery:..... 21

2.5 Location of the projects:..... 21

2.5.1 Cost structures:.....22

2.5.2 Consumer engagement programs:.....22

2.5.3 The vibrant sales network:..... 22

2.5.4 Distribution Channel:.....22

2.6 STRATEGIC OBJECTIVES of Mahir Agro:.....23

CHAPTER 3 THEORETICAL OVERVIEW..... 25

3.1 The origin of Green Supply Chain Management..... 25

3.2 GREEN SUPPLY CHAIN..... 26

3.3 Green Supply Chain Framework..... 27

3.4 WHY CHANGE TO GREEN SUPPLY CHAIN MANAGEMENT?..... 28

3.5 BENEFITS OF THE GREEN SUPPLY CHAIN MANAGEMENT (GSCM).. 29
3.6 THE BASIC CONTENT OF GREEN SUPPLY CHAIN MANAGEMENT (GSCM).....30
3.7 Green Design..... 30
3.8 Selection of green materials..... 30
3.9 Selection of green suppliers..... 30
3.10 Green production..... 31
3.11 Green logistics..... 31
3.12 Green packaging..... 31
3.13 Green marketing.....31
3.14 Green recycling..... 32
3.15 What Drive Agor Industry To Adopt GSCM?..... 32
3.16 Implementation of Green..... 33
CHAPTER 4 ANALYSIS AND INTERPRETATION..... 36
4.1 Mahir Agro Industries Limited Green Supply Chain Management practices: An analytical review..... 36
4.2 Analysis on Green Supply Chain Management at Mahir Agro Industries Limited..... 37
4.3 Social Cause..... 38
4.4 Contribution to different sectors in 2022 (Taka in Million)..... 39
4.4.1 Contribution to Agritulture Sector:..... 39
4.4.2 Contribution to Peackiging Sector:..... 40
4.4.3 Contribution to Transportation Sector:..... 40
4.4.4 Contribution to Energy Sector:..... 40
4.4.5 Contribution to Wastage Management..... 40

4.4.5 Graphical Presentation of Contribution to Green Supply Chain Management..... 41

4.5 Khamarir Hashi..... 41

4.6 Contribution in KKF Foundation..... 41

CHAPTER 5..... 43

FINDINGS & ANALYSIS..... 43

5.1 Methodology of Analysis..... 43

5.2 Results..... 45

5.3 SWOT analysis of Mahir Agro Industries Limited:..... 47

CHAPTER 6..... 49

CONCLUSIONS AND RECOMMENDATIONS..... 49

APPENDIX..... 51

REFERENCE..... 55

LIST OF ACRONYMS..... 56

Chapter 1: Introduction

1.1 Introduction

Agriculture is the backbone of Bangladesh's economy, contributing significantly to the country's gross domestic product (GDP) and employing the majority of its population. Mahir Agro Industries Limited is a prominent player in the agro-industry sector in Bangladesh, providing a range of high-quality products and services to farmers across the country.

Founded in 1992, Mahir Agro Industries Limited has over 30 years of experience in the agricultural sector. The company's core business activities include the production and distribution of crop protection chemicals, fertilizers, and seeds. Additionally, the company offers a range of technical support and advisory services to farmers to help them maximize their yields and profitability.

Mahir Agro Industries Limited has a strong commitment to sustainability and responsible business practices. The company's operations are guided by a set of values that prioritize the safety of its employees, the environment, and the communities in which it operates.

This thesis report provides an in-depth analysis of Mahir Agro Industries Limited's operations, including its organizational structure, product portfolio, marketing and distribution strategies, and financial performance. The report also examines the challenges facing the company and provides recommendations for future growth and success.

1.2 Objective of the report:

The main objective of this thesis report is to gain a comprehensive understanding of the operations, performance, and challenges facing Mahir Agro Industries Limited. Specifically, the report aims to achieve the following objectives:

To analyze the organizational structure of Mahir Agro Industries Limited. The first objective of this report is to analyze the organizational structure of Mahir Agro Industries Limited. The report

will examine the company's management structure, functional departments, and reporting lines. By doing so, it will provide insights into how the company is organized and how it operates.

To evaluate the product portfolio of Mahir Agro Industries Limited. The second objective of this report is to evaluate the product portfolio of Mahir Agro Industries Limited. The report will examine the company's range of crop protection chemicals, fertilizers, and seeds, and assess their quality, effectiveness, and competitiveness. It will also analyze the company's research and development efforts and their impact on the product portfolio.

To examine the marketing and distribution strategies of Mahir Agro Industries Limited. The third objective of this report is to examine the marketing and distribution strategies of Mahir Agro Industries Limited. The report will analyze the company's marketing efforts, including advertising, promotions, and branding. It will also assess the effectiveness of the company's distribution channels, including its dealer network, distribution centers, and logistics.

To assess the financial performance of Mahir Agro Industries Limited. The fourth objective of this report is to assess the financial performance of Mahir Agro Industries Limited. The report will analyze the company's financial statements, including its income statement, balance sheet, and cash flow statement. It will also examine key financial ratios, such as profitability, liquidity, and solvency, to assess the company's financial health and performance.

To identify the challenges facing Mahir Agro Industries Limited. The fifth objective of this report is to identify the challenges facing Mahir Agro Industries Limited. The report will examine the company's internal and external environment and identify the key challenges and obstacles that the company faces. It will also analyze the impact of these challenges on the company's operations and performance.

In conclusion, this thesis report aims to provide a comprehensive analysis of Mahir Agro Industries Limited's operations, performance, and challenges. By achieving the above objectives, the report will contribute to a better understanding of the company and provide insights and recommendations for its future growth and success.

1.3 Scope of the Study:

The scope of this thesis report is to analyze the Supply Chain Management operations, performance, and challenges facing Mahir Agro Industries Limited and will focus on several key areas. Firstly, the report will analyze the organizational structure of Mahir Agro Industries Limited, including its management hierarchy, functional departments, and reporting lines. This will provide an understanding of the company's decision-making processes and overall strategy.

Secondly, the report will evaluate the product portfolio of Mahir Agro Industries Limited, including its range of crop protection chemicals, fertilizers, and seeds. The study will examine the quality, effectiveness, and competitiveness of these products and their impact on the company's performance. This will provide insights into the company's strengths and weaknesses in terms of product innovation and market positioning.

Thirdly, the report will examine the marketing and distribution strategies of Mahir Agro Industries Limited. The study will analyze the company's marketing efforts, including advertising, promotions, and branding. It will also assess the effectiveness of the company's distribution channels, including its dealer network, distribution centers, and logistics. This will provide insights into the company's ability to reach and engage with its target customers.

Fourthly, the report will assess the financial performance of Mahir Agro Industries Limited. The study will analyze the company's financial statements, including its income statement, balance sheet, and cash flow statement. It will also examine key financial ratios, such as profitability, liquidity, and solvency, to assess the company's financial health and performance. This will provide insights into the company's overall financial strength and ability to sustain growth.

Lastly, the report will provide recommendations for future growth and success of Mahir Agro Industries Limited. The study will identify strategic initiatives that the company can undertake to achieve its growth and profitability objectives. These recommendations will be based on best practices in the agro-industry sector and tailored to the specific needs and opportunities of Mahir Agro Industries Limited.

1.4 Methodology of the study

The method of this study will rely on secondary data sources to collect information about Mahir Agro Industries Limited. The study will gather information from a variety of sources, including company reports, industry publications, government reports, and academic literature. Using secondary data sources allows for a comprehensive and in-depth analysis of the company, as it draws from a range of perspectives and sources. The company's annual reports, financial statements, and other corporate documents will be analyzed to gain insights into its operations, financial performance, and strategic objectives. Industry publications, such as trade journals and market research reports, will provide valuable information about the agro-industry sector, including market trends, competitive landscape, and technological advancements. Government reports and academic literature will provide insights into broader issues related to agriculture, such as policy frameworks, sustainability, and environmental concerns. The study will draw on a combination of qualitative and quantitative data analysis techniques to synthesize and interpret the information gathered from secondary data sources. The use of secondary data sources provides a cost-effective and time-efficient approach to the study, as it does not require primary data collection and can be conducted remotely.

1.5 Limitations of the Study:

The limitations of this report include relying solely on secondary data sources, being limited by the time frame and scope of data analyzed, and being restricted by data availability and accessibility. These limitations should be considered when interpreting the findings and making conclusions or recommendations based on the study.

Chapter 2

A Brief History of Mahir Agro Industries Limited in Agro Industry

Bangladesh, being a small country in Asia, is gradually increasing the dimension and horizon of the agro industry.

Agriculture dominates both the landscape and the economy of Bangladesh. The country has remained largely agricultural, with nearly half the population employed in this sector. The country has invested deeply in agro-processing and livestock development with immense success that is being followed by many other neighboring countries. Mahir Agro Industries Limited (MAIL) is part of that journey.

Mahir Agro Industries Limited (MAIL), a concern of Mahir Group(MG), began operations in the year 2000. MAIL produces poultry feed, fish-feed,Day-Old Chicks (broiler & layer). Mahir Group(MG) is a business conglomerate with notable presence in Bangladesh. Initiating in the year 1977, with a heritage spanning over four decades, MG established itself as a dynamic and progressive entity in the rapidly growing economy of Bangladesh. MAIL retains services from renowned professionals to ensure quality, consistency and disaster readiness to ward off different disease related threat that has often crippled Bangladesh livestock industry. The Board, which consists of professionals with wide exposure to agriculture industry, provides policy level direction to steer the business in due course. Due to its quality of operation, the Company obtained ISO 9001:2008 certifications for poultry breeder and hatchery section. MAIL has an automated manufacturing facility for poultry feed. Such facility integration provided a powerful thrust to the breeder and hatchery operations of MAIL by ensuring the availability of quality feed. The company markets and packages its feed products under the brand name Mahir Feed and Mahir Gold Ring.The breeder Farm and Hatchery is being formed to meet the growing demand of chicken in the country. Its activity is to produce and sell Day Old Chicks (DOC) from

the hatchery unit and hatching eggs from the breeder production unit. An experienced and well-organized team of local poultry experts engaged full time for the smooth operation

2.1 The origin of Mahir Agro:

Index Agro Industries Limited, a concern of Mahir Group(MG) was incorporated in Bangladesh on 13 September 2000 as a Private Company Limited by shares under the Companies Act, 1994 having the registration no.C41289(648)/2000. The Company was converted as a Public Limited company by shares under the company Act, 1984 on 31 March, 2015. The Company has started its commercial operation on 1st July, 2004.The registered office of the Company is situated at MF Tower Plot: GA-95/C, Pragati Saroni, Gulshan-1 Link Road, Dhaka-1212. A business conglomerate with a significant presence in Bangladesh is called Mahir Group(MG). With a history spanning more than 40 years, MG established itself as a dynamic and forward-thinking force in Bangladesh's quickly expanding economy in 1977.

Combining deep ethical values with proven business performance, the company has a heritage of deep social commitment that has earned the trust and respect of its customers. Five core values- Integrity, Ethics, Excellence, Unity and Responsibility- woven into the fabric of 'Mahir Woven' and its brands are fundamental to its success. The name itself is a unique asset, representing 'Leadership through Experience'. It stands for consistent business excellence and profitable growth with a commitment to the communities it serves and adherence to high standards of corporate governance. In addition to making and selling animal feed (for cattle, fish, and poultry), Mahir Agro also raises Day-Old-Chicks (DOC). The company has established a Breeder Farm & Hatchery at Rajendrapur and a Feed Mill in Valuka, Mymensingh, to meet the nation's rising need for chicken.

2.2 Definitional Analysis of GSCM

Definitional analysis of Agro Industry in the context of Mahir Agro Industries Limited refers to examining and defining the concept of Agro Industry specifically for this company. Mahir Agro Industries Limited is a Bangladesh-based company that operates in the agro-industry sector and is involved in the production, processing, and marketing of various agricultural products, including rice, wheat, pulses, oilseeds, and spices.

In the context of Mahir Agro Industries Limited, Agro Industry can be defined as a sector that encompasses all the activities involved in the production, processing, and marketing of agricultural products, with a focus on maximizing efficiency and profitability while ensuring sustainability and social responsibility. This includes crop cultivation, animal husbandry, fisheries, forestry, and agro-processing, as well as marketing and distribution of products to customers.

For Mahir Agro Industries Limited, the Agro Industry sector is a vital part of their business operations, and their success is closely linked to the overall performance of the sector. The company's focus is on utilizing modern technology and best practices to increase productivity, quality, and profitability while minimizing the impact on the environment and promoting social responsibility. The company also places a high value on research and development to improve the quality of their products and processes.

Definitional analysis of Agro Industry in the context of Mahir Agro Industries Limited helps to clarify the meaning and scope of the term specifically for this company. It also helps to identify the key components and sub-sectors of the industry that are relevant to the company's operations, as well as the challenges and opportunities associated with each. This analysis is essential for understanding the company's strategic objectives and for developing effective policies and practices that support their growth and sustainability in the agro-industry sector.

2.3 Overview of Mahir Agro Industries Limited:

Bangladesh, being a small country in Asia, is gradually increasing the dimension and horizon of the agro industry.

Agriculture dominates both the landscape and the economy of Bangladesh. The country has remained largely agricultural, with nearly half the population employed in this sector. The country has invested deeply in agro-processing and livestock development with immense success that is being followed by many other neighboring countries. Mahir Agro Industries Limited (MAIL) is part of that journey.

Mahir Agro Industries Limited (MAIL) began operations in the year 2000. MAIL produces poultry feed, fish-feed, and Day-Old Chicks (broiler & layer). Recently, MAIL has decided to move ahead with Initial Public Offerings.

An automated manufacturing facility for poultry feed. Such integration provided a powerful thrust to the breeder and hatchery operations of MAIL by ensuring the availability of quality feed. The company markets and packages its feed products under the brand name of 'Mahir Feed'.

2.4 Products of Mahir Agro Industries Limited:

Bangladesh's economy and terrain are dominated by agriculture. With about half of the workforce involved in agriculture, the nation has remained predominately so. The nation has made significant investments in the growth of its cattle industry and agroprocessing, with great success that is being emulated by several of its neighboring nations. The journey includes Mahir Agro Industries Limited (MAIL).

In the year 2000, Mahir Agro Industries Limited (MAIL) got things going. MAIL manufactures fish feed, broiler and layer day-old chicks, and poultry feed. MAIL recently chose to proceed with initial public offerings. The operational Products of Index Agro are given bellow:

2.4.1 Feed Mill

The feed mill has been designed for successfully producing and marketing of Fish & Poultry feeds. To ensure the quality, an experienced and well-organized team of foreign and local poultry experts engaged full time for the production of the company.

Installed production capacity

- 150,000 MT annually

Actual production capacity

- 114,000 MT annually

Actual production

- 91,062 MT annually

Capacity Utilization

- 79.88%

2.4.2 Breeder Farm & Hatchery:

The Breeder Farm and Hatchery is being formed to meet the growing demand of chicken in the country. An experienced and well-organized team of foreign and local poultry experts engaged full time for the smooth operation of the company. Few notable features of Breeder Farm & Hatchery are as follows:

- A fully environment controlled house for the parent stocks;
- A fully equipped with the most modern feeding and drinking systems;
- Vaccination of each and every chicken, increase their immunity against any diseased;
- Production of both broiler and layer chicks take place in the Peter Siam incubator by means of the automatic transfer system and automatic air handle system;
- Temperature and humidity controlled environment to ensure disease free and healthy rearing of chicks.

Installed production capacity

- 30.00 Million DOC (Day Old Chicks) annually

Actual production capacity

- 30.00 Million DOC (Day Old Chicks) annually

Actual production

- 28.89 Million DOC (Day Old Chicks) annually

Capacity Utilization

- 96.30 %

2.5 Location of the projects:

Feed Mill	601/01, Block: N, Dhaka Mymensingh Road, Kathali, 09 No. Ward, Valuka, Mymensingh
Breeder Farm & Hatchery	Araisha Prasad, B.K. Bari, Gazipur Sadar, Gazipur
Hatchery	Vill: Rajghat, P.O: Durgapur, Upazila: Mithapukur, Dist: Rangpur
Breeder Farm	Dalil, Post office- Bhabanipur, Union- Bhabanipur, Sherpur, Bogura

Mahir Agro Industries Limited has no subsidiary company but it has an associate company named Mahir-Ceramics Ltd. where the company holds 24.39% shares. Mahir-Ceramics Ltd. is engaged in manufacturing ceramic tiles in Bangladesh.

2.5.1 Cost structures:

The costs are manifested as one of the lowest quartile in the industry by virtue of scale, technological and operational advantages.

2.5.2 Consumer engagement programs:

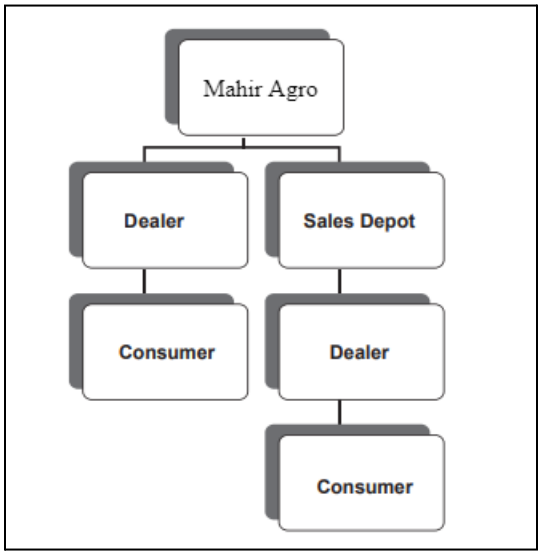
Mahir Agro Industries Limited deliver customized solutions to our customers to their utmost satisfaction even after post sale of products including outright replacement at no extra cost.

2.5.3 The vibrant sales network:

Mahir Agro Industries Limited possess one of the largest and excellent dealers network throughout the country.

2.5.4 Distribution Channel:

MAIL has established a proven distribution network all over Bangladesh. The Company appointed over 300 Dealers at various area of Bangladesh based on demand and prospective market. Distribution channel of products of the Company is as follows:



2.6 STRATEGIC OBJECTIVES of Mahir Agro:

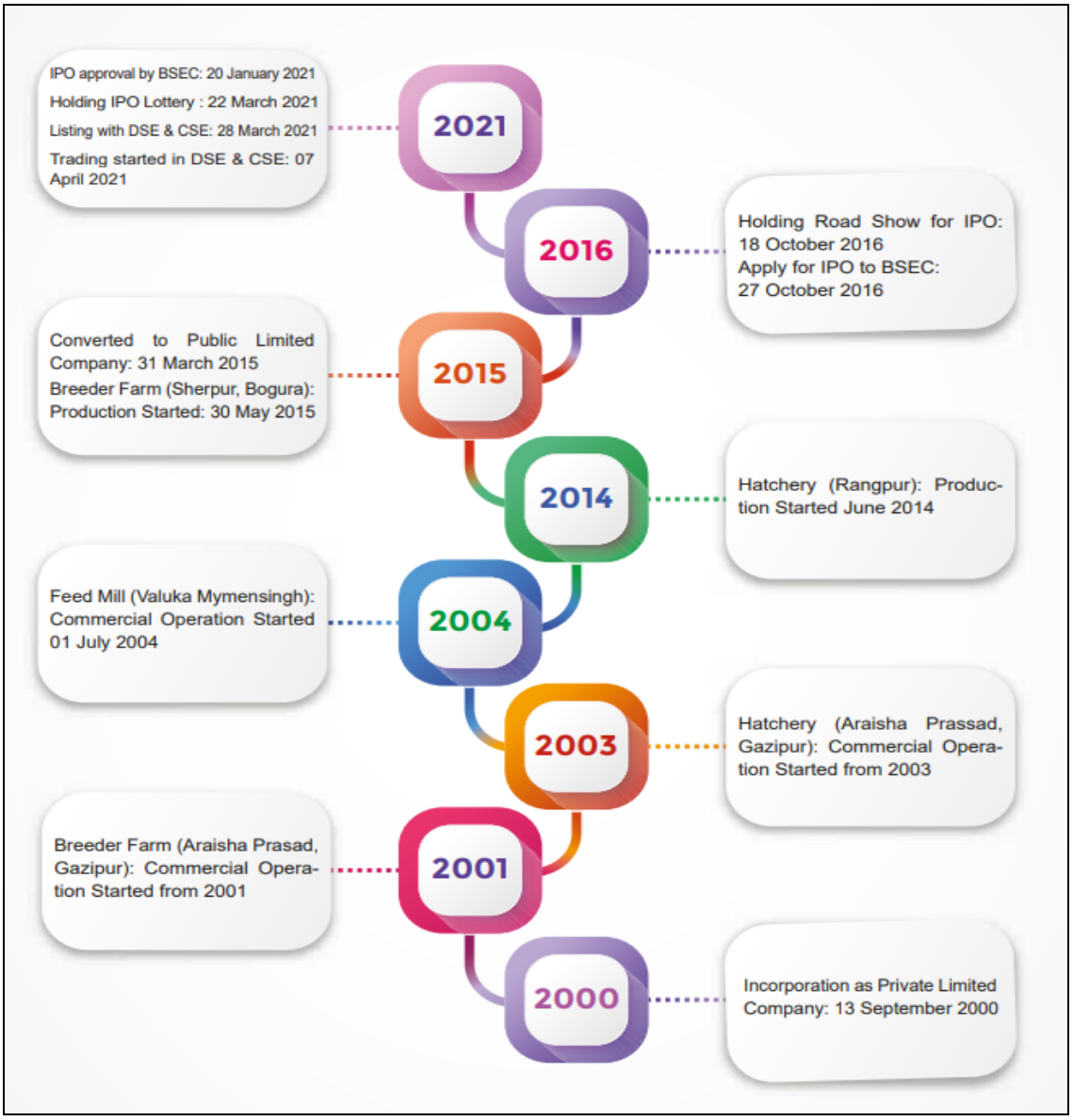
Mahir Agro Industries Limited, a sister concern of Mahir Group (MG). Mahir Group is a business conglomerate with notable presence in Bangladesh. Initiating in the year 1977, with a heritage spanning over four decades, MG established itself as a dynamic and progressive entity in the rapidly growing economy of Bangladesh.

Combining deep ethical values with proven business performance, the company built a heritage of deep social commitment that has earned the trust and respect of its customers. Five core values – Integrity, Ethics, Excellence, Unity and Responsibility – woven into the fabric of 'MG' and its brands are fundamental to its success. The name itself is a unique asset, representing 'Leadership Through Experience'. It stands for consistent business excellence and profitable growth, with a commitment to the communities it serves and adherence to high standards of corporate governance.

Mahir Agro Industries Limited maintained the following Strategic Objectives to create sustainable and profitable growth of the company:

To test every single feed ingredient as well as our finished products through our most advanced raw material analysis machine called NIR;

- Plant wise individual line/production QC (quality control);
- To follow world health organization (WHO) guidelines strictly;
- To maintain the highest level of BIO security;
- To maintain the CGMP (current good manufacturing practice);
- To provide the best breed (Lohman), which is fasting growing breed in the world;
- To setup hatcheries and breeders farms in different strategic location throughout the country; To follow the best management practices with highly standard bio security and always maintain maternal anti-body status to produce vertically transmitted disease free DOC;
- To produce high protein feed for fish that helps to increase the body growth and survival rate of cultured fish.


IPO approval by BSEC: 20 January 2021
Holding IPO Lottery : 22 March 2021
Listing with DSE & CSE: 28 March 2021
Trading started in DSE & CSE: 07 April 2021
2021
2016
Holding Road Show for IPO: 18 October 2016
Apply for IPO to BSEC: 27 October 2016
Converted to Public Limited Company: 31 March 2015
Breeder Farm (Sherpur, Bogura): Production Started: 30 May 2015
2015
2014
Hatchery (Rangpur): Production Started June 2014
Feed Mill (Valuka Mymensingh): Commercial Operation Started 01 July 2004
2004
2003
Hatchery (Araisha Prassad, Gazipur): Commercial Operation Started from 2003
Breeder Farm (Araisha Prasad, Gazipur): Commercial Operation Started from 2001
2001
2000
Incorporation as Private Limited Company: 13 September 2000

Chapter 3 Theoretical Overview

3.1 The origin of Green Supply Chain Management:

Admittedly, the consciousness of environment has increased for last some decades. More people know about environmental problems in the world, such as global warming, use of toxic substance, and decreasing in non-replenish resources.

Furthermore, the government has let out campaigns to advance this problem on people. Applying the green principles to their company, such as use of environmental friendly raw materials, reducing use of the oil petroleum power, and using recycle papers for packaging. Green principles have been expanded to many departments within the organization, including system of deliveries.

As we know, the Green Supply Chain Management (GSCM) has appeared in the last some years. This idea covers each stage in manufacturing in front to last stage of lifecycle, for example: from the product design to recycle. Not only manufacturing, but also and GSCM can get used also to the other industry sectors, such as a government, education moreover services.

Srivastara (2007) defined GSCM as association of the environment thinking in management by system of deliveries, including the product design, a material sourcing and a choice, productions, delivery of an end- product to consumers, and management the end of a life of a product after its term of useful use.

According to that explanation, GSCM relates to a wide- range of manufacture from product design to reprocess or destroy. This principal is similar to lifecycle of the manufactured goods. The product lifecycle is the idea that goods bypass through the lifecycle, similar to the human, a birth, a maturity, a death.

Moreover, product lifecycle provides degree of structure to life of goods and in that way provides direction for diverse functional efforts required to create and deliver product or service offerings (Magnon, Fawcett, & Birou, 1998). Many studies concentrate on the manufactured goods lifecycle along with system of deliveries or GSCM, for example, (Liao & Stonebraker, 2006) discussed it, the stage lifecycle variables is connected with various measurements of integration of supply chain.

3.2 GREEN SUPPLY CHAIN

According to Sean Gilbert (2001), greening the supply chain is the process of incorporating environmental criteria or concerns into organizational purchasing decisions and long-term relationships with suppliers.

Indeed, there are three approaches involved to GSC: environment, strategy and logistics. And, the concept of green productivity (GP) illustrates that for any development approach to be sustainable it needs to have a focus on environment, quality, and profitability, which form triple focus of GP (HWA, 2001).

Working with GSC means to work in the interface of those areas because the GSC is totally linked to environmental protection, which is the main objective of it; strategy because it is formulated long-term decisions and logistics because it approaches procurement, material handling, distribution, storage, material recovery and disposition.

Though some companies did not note the benefits from environmental management systems (EMS); the market will push them to improve their environmental performance. (Sarkis, 2003) says that private organizations such as Hewlett-Packard, IBM, Xerox, and Digital Equipment Corporation have introduced some form of initiative for greening their supply chains including the integration of suppliers, distributors, and reclamation facilities. Organizations are including environmental issues in their negotiation with suppliers to maintain their market share and sometimes to even just to survive (HWA, 2001).

(Gilbert, 2001) supports the idea of two types of categories of initiatives to stimulate the greening supply chain. The first involves improving coordination with supplier on environmental efforts to facilitate the development of greener or more environmentally friendly products. The second type is demanding improved environmental performance at supplier's operating facilities, such as requiring supplier to obtain ISO 14000 certification or achieve a set standard of performance.

Finally, it is very likely that one producer, which one might be the end producer, in a supply chain starts to require better environmental performance of its suppliers to attend its customer's desires through the supply chain that it is inserted.

The end producer has usually higher profit margin in the supply chain, so it is frequently certified firstly. The other point that indicates the desire of the end producer to start a GSC is because of its direct contact with customers. Other small and medium companies that make part of the supply chain do have only an indirect contact, and then they do suffer less pressure for good environmental performance from public opinion. In the same level, raw material enterprises do not act as early as the end producers.

For Gilbert (2001), supply chain greening initiatives have benefits on the level of the individual firm as well as on the national level, because for individual firms, supply chain greening programs bring distinct competitive advantages in terms of lower costs, greener products, and better integration with suppliers.

Beyond that, on the national level, greening of supply chain can stimulate markets for green products, while also creating incentives for small and medium sized-enterprises (SMEs) to adopt better environmental practices. In addition to lowering costs, Gilbert (2001) still cites that the GSC can also open new markets for companies.

Problems for greening supply chains are the reduction of flexibility by the use of fewer suppliers and organization's culture. The former is not exactly a GSC problem. It is a market phenomenon to simplify the supply chain management.

The latter is more complex because GSC involves the transference of knowledge, technology and environmental practices through the supply chain. It is necessary to choose a supplier and involve it into a program with training and integrate the same environmental philosophy in the whole chain.

3.3 Green Supply Chain Framework

Mahir Agro Indusries Limited Consultants developed a useful framework 23 that provides a structured approach that includes several of the necessary dimensions to plan and implement a successful green supply chain agenda.

In this framework, key to extracting business value lies within establishing the long-term green supply chain plan that aligned with corporate strategy and approached top-down with strong sponsorship. It also requires a strong business case for the green supply chain that highlights a prioritized catalog of targeted opportunities and a phased adoption roadmap. Finally, the

initiatives need to be incorporated with other company wide projects to ensure that one does not compromise another.

In order to effectively implement a Green Supply Chain, the strategy should be embedded in the company's Supply Chain and Operations organization, as well as part of Marketing and Sales. Corporate Communications have to connected with sustainability initiatives to guarantee, that initiative influence is informed clients, shareholders, and general public.

3.4WHY CHANGE TO GREEN SUPPLY CHAIN MANAGEMENT?

There are various factors of motivation for the companies to switch on "green" in their supply chain. Although some of the motivators are quite unclear, Wu and Dunn (1995) suggests that some organizations are simply doing this because it is the correct thing to do for the environment.

Perhaps some are more radical to environmental change, but others may not (Wu & Dunn, 1995). Studies, however, have shown that profitability and cost reduction are some of the main motivators for businesses to become "green" in the supply chain (Srivastava & Srivastava, 2006; Srivastava, 2007; Darnall et al., 2008).

Johnson (1998) argues that reverse logistics were motivated primarily by economic factors and does not concern about protecting the eco-system. Tibben- Lembke (2002) and Van Hock and Erasmus (2000) suggest that reverse logistics can only bring about profitability, reduction of waste and, advertising. Zhu and Sarkis (2004) took this idea further and argued that majority of the companies participated in the GSCM, and all agreed that GSCM practices are only about win-win relationships on environmental and economic performance.

The Mahir Agro Industres Limited, however, need to acknowledge that there are hidden values to reverse logistics (Mollenkopf & Closs, 2005). Jayaraman and Luo (2007) claims that customers, on average, return approximately 6% of the products which they buy. These products can be from plastic bottles to boxes. The organizations are able to cost-save if they can capture this 6% return from the consumers. Doing this, however, still remains in question.

Furthermore, Srivastava and Srivastava (2006) suggested a model to manage product returns. The study utilized average-life cycle of product data; past sales forecast demands to support their analysis. Semi-structured interviews to 84 stakeholders were used to triangulate the findings of the model.

Obviously, the findings shows that reverse logistics can cost-save only if done correctly. Saying this means that organizations must have a core vision to encourage Environmental Management before going any further to green logistics.

3.5 BENEFITS OF THE GREEN SUPPLY CHAIN MANAGEMENT (GSCM)

Speaking of greening the supply chain, it would be possible to think; only forbidding poisonous uses of chemical substance or reducing issue or waste to environment. However, it is much more than only simple reducing use and pollution.

Consequently, benefits are not limited only less poisonous consumption or less waste. Principles of the GSCM are able to be applied to all sectors in the organization. GSCM's effects extend to all area, both tangibly and intangibly.

Although, some researches mentioned the benefits of adopting the GSCM, such as (Stevels, 2002). He explained the GSCM's benefits in different roles of distribution, consist of environment and a society in terms of various categories: material, immaterial, and emotion.

For material the GSCM assists lower environmental load used for environment, lower rate prices for the supplier to price for the producer lower, lower cost of ownership for client, and less consumption of resources for the humanity.

In terms of unimportant, GSCM assists overcoming prejudice also cynicism for the environment, less rejects for provider, simpler to manufacture for producer, convenience and an entertainment for the clients, and the best consent for a society.

In Duber-Smith (2005), he defined ten explanations that the company must agree to accept the green: sustainability of resources, target marketing, ethical imperative, competitive and supply

chain pressures, product differentiation and competitive advantage, return on investment, adapting to regulation and reducing risk, brand reputation, employee morale, and the lowered costs/increased efficiency.

3.6 THE BASIC CONTENT OF GREEN SUPPLY CHAIN MANAGEMENT (GSCM)

So, the content of the green supply chain management is very rich, involving various segments of the supply chain. Its contents include: green design, green materials, evaluation and selection of the green suppliers, green production, green logistics, green packaging, green marketing, and green recycling.

The purpose of "Green" covers the entire product life cycle, rather than partial stages. That includes not only production but also and the delivery of raw materials, product sale, product use, and waste disposal and so on. It requires, that any aspect in a cycle of a life of a product guaranteed them "the green nature", otherwise, nobody can guarantee, that end-products – environment friendly products.

3.7 Green Design

The Green design is defined, that influence of products on resources and environment, has given complete examination, optimizing design factors, considering in general function of products, quality, a cycle of development and cost to achieve resource consumption at least and the highest environmental friendliness in all aspects of the product life cycle.

3.8 Selection of green materials

Green materials – materials with good work of use, consumption of energy, low resource consumption rate, a re- use and not- polluting on the environment throughout the product life cycle. The main concept of green materials includes the advanced nature of a material directly, safety of process of production, and reasonableness of the materials use.

3.9 Selection of green suppliers

The main factors of choosing suppliers are: product quality, price, delivery time, volume flexibility, species diversity and environment-friendly and so on. Active suppliers focus on the

improvement of environmental processes, green requirements of the supplier's products. The purpose is to reduce material use and minimize waste production.

3.10 Green production

In accordance with reality of the manufacturing system, green production plan and adopt the production technology program and process route with fewer resources and energy consumption, little environmental pollution as far as possible. The standards to reach green manufacturing include no potential safety problems, no health threats on the operators and product users, not the environmental pollution, waste recycling, waste disposal during the production process as much as possible.

3.11 Green logistics

Green logistics is defined as assessment of the negative impact on environment in the process of transport, storage, handling, packaging, distribution processing. Evaluation indicators are as follows:

Transportation negative impact on the environment is mainly expressed in transport fuel consumption, harmful gases emissions and others.

In the process of storage, whether it causes pollution and destruction for the surrounding environment.

Whether there is noise pollution such as removal process.

3.12 Green packaging

After consumers bought products, their packages are not generally useful. If arbitrary discarded, that causes both the environment pollution and waste of packaging material. Green packaging is mainly the implementation of green packaging design, optimization of the packaging structure, and reduction of packaging materials, packaging materials recycling, treatment and recycling and so on.

3.13 Green marketing

Green management is implemented during the product marketing. And it requires enterprises safeguard the ecological balance and take the green philosophy of environmental protection as guide throughout the marketing process from market research, product development, and product

pricing to promotional activities, which make the development of enterprises in line with consumers' benefits, social benefits.

3.14 Green recycling

Green recycling is an important part of the green supply chain management. After the end of product life cycle, if there is no the recovery treatment, it will be resources waste and lead to environmental pollution. After the end of product life cycle, there have a wide variety of treatment programs. The cost of various treatment programs and the value of recovery are different.

3.15 What Drive Agor Industry To Adopt GSCM?

There are several factors that drive Agro Industry to adopt green supply chain management practices, which involves incorporating environmental considerations into their supply chain operations. Here are some of the main drivers:

1. **The Government**: Actually, there is a considerable quantity of the government agencies operating a line of the guide in the world, regulation and the law. Some agencies are federal the government while some consult only in local area. These agencies and the organizations are responsible either for similar or for various problems, such as pollution, a product material, and the chemical waste.
2. **Environmental Regulations:** Increasingly stringent environmental regulations at the national and international levels are one of the key drivers for Agro Industry to adopt green supply chain management practices. These regulations require companies to reduce their environmental impact and often impose penalties for non-compliance.
3. **Stakeholder Pressure:** Pressure from stakeholders such as customers, investors, and NGOs to reduce environmental impacts is another driver for Agro Industry to adopt green supply chain management. Consumers are increasingly demanding eco-friendly products, and investors are interested in companies with sustainable business practices.
4. **Cost Reduction:** Adopting green supply chain management practices can also lead to cost reduction for Agro Industry. For example, reducing waste and increasing energy efficiency can lower operating costs and increase profitability.

5. **Risk Management:** Environmental risks, such as supply chain disruptions due to climate change or natural disasters, can have significant negative impacts on Agro Industry's operations. Adopting green supply chain management practices can help mitigate these risks and ensure business continuity.

6. **Reputation:** Finally, adopting green supply chain management practices can enhance Agro Industry's reputation and brand image. Companies that demonstrate a commitment to sustainability are viewed more favorably by consumers and other stakeholders, which can translate into increased sales and long-term business success.

In summary, environmental regulations, stakeholder pressure, cost reduction, risk management, and reputation are some of the key drivers for Agro Industry to adopt green supply chain management practices. By incorporating environmental considerations into their supply chain operations, Agro Industry can improve their sustainability, reduce costs, and enhance their reputation.

3.16 Implementation of Green

From a product lifecycle the concept, a cycle begins at product designing. According to (Srivastara, 2007), the literatures related with the green design; underline both environmentally conscious project and the analysis of a cycle of a life.

In designing of a product the designing group can change raw materials or the substances used during producing to be less poisonous, more ecological friendly. Some terminology is connected to plan for green, such as the plan for environment or EcoDesign. As an example of a green product – the hybrid car.

Because of the increasing requirement and reducing amount of petroleum, automobile manufacturers should redesign the engine which does not consume any or less gas. The hybrid cars have been developing from day to day. One article about the automobile design (McAuley, 2003), the author discussed the green plan of the car which tend to change on the advanced easy materials and less materials in the vehicle design.

In designing of a product the firm- manufacturer requires high level of cooperation with their suppliers. As an example for research concerning cooperation of the supplier- manufacturer in

EcoDesign (Stevels, 2002). He also has presented two examples of the successful green supply agenda between the manufacturer and suppliers.

In production, the company can address green via several methods to reduce consumption of a resource and energy. It is where a reuse and recycling are carried. Some papers have provided green methods such as (Duber-Smith, 2005). He has offered some methods, including reduction of consumption of energy, to process and a reuse, using biodegradable and nontoxic materials, to minimize harmful emissions, and to minimize or eliminate waste. In the Chinese sugar manufacturer Group Guitang can reduce spending and improve their financial work at use of waste from upstream as raw materials for located downstream manufacture.

As mentioned earlier, not only the manufacturer, other roles of system of deliveries has received influence from GSCM also. For the greatest retail seller in the USA at Wal-Mart there is an interesting history of acceptance GSCM to their organization. In October 2005, president Wal-Mart has transferred the company to 3 purposes: to be delivered 100 % through renewable energy; to produce zero waste; and to sell products which support Wal-Mart resources and the environment, and Wal-Mart started business strategy of sustainability to reduce dramatically company influence by global environment and to become “the most competitive and innovative company in the world (Plambeck, 2007).

Obviously, there are four basic steps to apply green supply chain. The following model – the structure of decision-making offered (EPA, 2000), and it is based on the best methods of the several companies which have successfully begun and have implemented environmental practice of the accounting. Ideally, the companies will adjust this approach that is better to satisfy to their own organizational requirements and culture. Four steps: (1) Identify expenses, (2) Determine opportunities, (3) Calculate the benefits, and (4) Decide, implement and monitor.

- Identify Costs
- Determine Opportunities
- Decide, Implement and Monitor
- Calculate Benefits

Four Basic Steps to implement a Green Supply Chain:

- **First Step:** Identify Costs. This is essential the regular review of facility or processes are conducted to determine and where important environmental costs occur. The examination enables team to later focus where the probability for significant development is greatest.
- **Second step:** Determine Opportunities. The next step is to determine which areas offer the greatest opportunities for improvement and then develop specific solution that reduces costs and negative impacts.
- **Third Step:** Calculating Benefits. The analytical exercise of calculating the costs and benefits of the various options begins. One approach to the calculation process is to conduct quantitative evaluations, which rely on empirical data, such as: Internal Rate of Return (IRR) and Economic Order Quantity calculations.
- **Forth Step:** Decide, Implement and monitor. The 4th and final step is to make a decision implement the changes, and monitor progress.

By following these four basic steps, companies can successfully implement a green supply chain and achieve their sustainability goals. It is important to note that implementing a green supply chain is an ongoing process, and companies need to continuously monitor and improve their supply chain to achieve long-term sustainability.

Chapter 4 Analysis and Interpretation

4.1 Mahir Agro Industries Limited Green Supply Chain Management practices: An analytical review

Mahir Agro Industries Limited has implemented green supply chain management practices to minimize the environmental impact of their operations and achieve long-term sustainability. The company has taken several initiatives to reduce waste, conserve resources, and minimize their carbon footprint.

For example, they have implemented an eco-friendly packaging system, which reduces the amount of plastic used in their packaging and promotes recyclability. They have also invested in energy-efficient machinery and equipment to reduce their energy consumption and carbon emissions. Additionally, they have established partnerships with suppliers who share their commitment to sustainability and have implemented environmentally responsible transportation practices.

Mahir Agro Industries Limited has also focused on reducing their water usage and improving their wastewater management practices. They have implemented a rainwater harvesting system and wastewater treatment plant to conserve water resources and minimize their impact on the environment.

Overall, Mahir Agro Industries Limited's green supply chain management practices demonstrate their commitment to sustainability and environmental stewardship. Their initiatives align with the global trend of promoting sustainability and reducing the carbon footprint of businesses.

In addition to the initiatives mentioned earlier, Mahir Agro Industries Limited has also implemented a range of other green supply chain management practices.

One of their key initiatives is to reduce their use of chemical fertilizers and pesticides. They have invested in research and development to develop more eco-friendly and sustainable agricultural practices, such as integrated pest management, crop rotation, and organic farming. By reducing

their use of harmful chemicals, they are not only minimizing their environmental impact but also producing healthier and safer food products for consumers.

The company has also implemented a waste reduction program to minimize their waste generation and promote recycling. They have established partnerships with local recycling companies to recycle their waste products, such as plastic packaging, paper, and metal. They also encourage their employees to reduce their own waste generation by promoting a culture of sustainability and providing training and education on waste reduction.

Another important aspect of Mahir Agro Industries Limited's green supply chain management practices is their commitment to social responsibility. They have implemented programs to promote fair labor practices, human rights, and community development. They have established partnerships with local communities to promote sustainable development and improve the livelihoods of local people.

Overall, Mahir Agro Industries Limited's green supply chain management practices demonstrate their commitment to sustainability, environmental stewardship, and social responsibility. By implementing these practices, they are not only reducing their environmental impact but also creating value for their stakeholders and contributing to the sustainable development of their industry and society.

4.2 Analysis on Green Supply Chain Management at Mahir Agro Industries Limited

Mahir Agro Industries Limited has implemented a range of green supply chain management practices to minimize their environmental impact, conserve resources, and promote sustainability. Here is an analysis of their green supply chain management practices:

1. **Sustainable sourcing:** Mahir Agro Industries Limited has established partnerships with suppliers who share their commitment to sustainability. By sourcing eco-friendly materials and products, they are reducing their environmental impact and promoting sustainability in their supply chain.
2. **Energy efficiency:** The company has invested in energy-efficient machinery and equipment to reduce their energy consumption and minimize their carbon footprint. They

have also implemented energy conservation measures, such as using LED lighting, to reduce their energy consumption.

3. **Waste reduction:** Mahir Agro Industries Limited has implemented a waste reduction program to minimize their waste generation and promote recycling. They have established partnerships with local recycling companies to recycle their waste products, such as plastic packaging, paper, and metal.

4. **Water conservation:** The company has implemented a range of water conservation measures, such as rainwater harvesting and wastewater treatment, to conserve water resources and minimize their impact on the environment.

5. **Social responsibility:** Mahir Agro Industries Limited has implemented programs to promote fair labor practices, human rights, and community development. By promoting social responsibility in their supply chain, they are creating value for their stakeholders and contributing to the sustainable development of their industry and society.

Overall, Index Agro Industries Limited's green supply chain management practices demonstrate their commitment to sustainability, environmental stewardship, and social responsibility. By implementing these practices, they are reducing their environmental impact, creating value for their stakeholders, and contributing to the sustainable development of their industry and society.

4.3 Social Cause

Green supply chain management is not only important for environmental sustainability, but it also has important social benefits. Here are some social causes for green supply chain management:

1. **Human health:** Green supply chain management can lead to healthier and safer products for consumers. By reducing the use of harmful chemicals and promoting sustainable practices, companies can produce products that are better for human health.

2. **Labor conditions:** Green supply chain management can promote fair labor practices and better working conditions for employees. By promoting sustainability and social responsibility in their supply chain, companies can create value for their employees and contribute to a more equitable society.

3. **Community development:** Green supply chain management can contribute to the sustainable development of local communities. By promoting sustainable practices and social responsibility in their supply chain, companies can support local economic development and improve the livelihoods of local people.

4. **Environmental justice:** Green supply chain management can promote environmental justice by reducing the environmental impact on marginalized communities. By reducing pollution and promoting sustainable practices, companies can help to create a more equitable and just society.

Overall, social causes for green supply chain management demonstrate the important social benefits that can be achieved through sustainable and socially responsible practices. By promoting sustainability and social responsibility in their supply chain, companies can create value for their stakeholders and contribute to a more equitable and sustainable future.

4.4 Contribution to different sectors in 2022 (Taka in Million)

Sectors	Contributions
Agritulture	183.7
Peackiging	38.7
Transportation	150.0
Energy	200.3
Wastage Management	16.6
Others	32.4

Source: MAIL Annul Report 2022

4.4.1 Contribution to Agritulture Sector:

Mahir Agro Industry Limited may implement sustainable agricultural practices, such as organic farming or reduced pesticide use, to promote environmental sustainability and reduce the impact on local communities.

4.4.2 Contribution to Peackiging Sector:

Mahir Agro Industry Limited may use eco-friendly packaging materials, such as biodegradable or recyclable packaging, to reduce their environmental impact and promote sustainability in the packaging industry.

4.4.3 Contribution to Transportation Sector:

Mahir Agro Industry Limited may use eco-friendly transportation methods, such as electric vehicles or hybrid vehicles, to reduce their carbon footprint and promote sustainability in the transportation sector.

4.4.4 Contribution to Energy Sector:

Mahir Agro Industry Limited may invest in renewable energy sources, such as solar or wind power, to reduce their energy consumption and promote sustainability in the energy sector.

4.4.5 Contribution to Wastage Management

Mahir Agro Industry Limited may implement sustainable waste management practices, such as recycling or composting, to reduce waste and promote sustainability in the waste management sector.

By contributing to these sectors through their green supply chain management practices, Index Agro Industry Limited can create value for their stakeholders and contribute to a more sustainable and equitable future. They can also differentiate themselves from competitors and attract customers who prioritize sustainability and social responsibility in their purchasing decisions.

4.4.5 Graphical Presentation of Contribution to Green Supply Chain Management

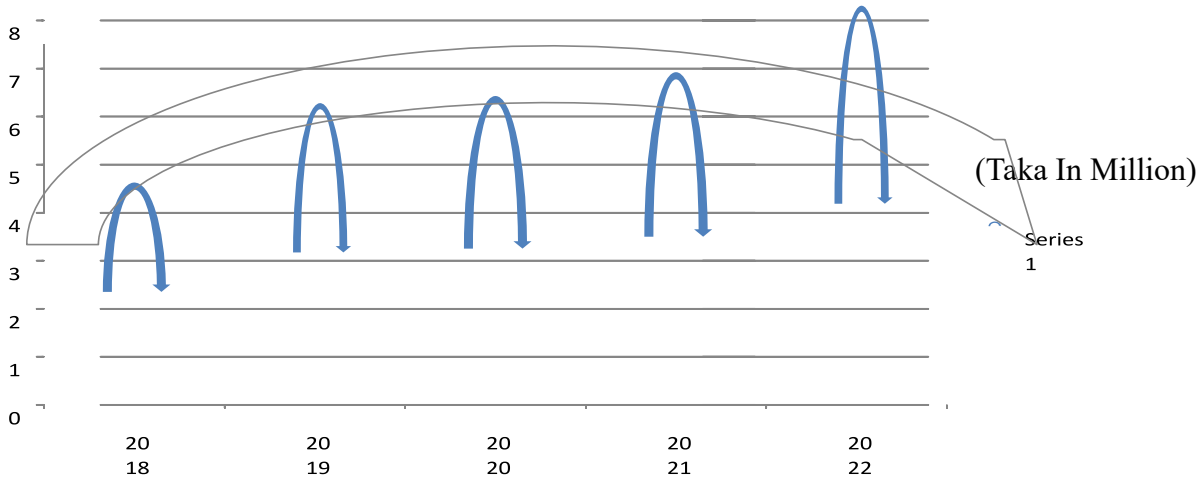


Figure: Contribution to Green Supply Chain Management in 5 years

Source: MAIL Annual Report 2022

4.5 Khamarir Hashi

This program is extremely supportive towards the cause of making farmers self-dependent. The company is selling the farmers DOC and providing them with feed on credit. In time, the company is buying back the DOC's from the same farmers. By providing such logistical and financial support, the company is creating entrepreneurs.

4.6 Contribution in KKF Foundation

The Kamrunnesa Khatun Foundation (KKF) is an independent nonprofit charity, committed to bringing about better lives for the disadvantaged people in Bangladesh. KKF works to improve the lives of the underprivileged and disadvantaged groups of people in society by providing them with the opportunity to live full and independent lives. KKF works with a vision for change- a vision to bring qualitative changes in the lives of the underprivileged, especially through supporting the access to quality education, nutritious food, safe water, shelter and sanitation for the underprivileged children all over Bangladesh. MAIL is one of the biggest contributors in various projects of KKF Foundation.

Contribution in various types of charity organizations.MAIL also donates in various other charity organizations such as different orphanages and madrasas.

Chapter 5

Findings & Analysis

5.1 Methodology of Analysis

As mentioned earlier in the report, the analysis on green supply chain management at Mahir Agro Industries Limited is based on secondary data, which includes information gathered from the company's annual reports, published research papers, industry reports, and news articles. The analysis includes the following steps:

1. Conducting a thorough review of the literature on green supply chain management practices and their benefits in the context of the agriculture industry.
2. Collecting and analyzing secondary data on Mahir Agro Industries Limited's green supply chain management practices, including its sustainability initiatives, environmental management systems, and social responsibility programs.
3. Conducting a SWOT analysis of Mahir Agro Industries Limited to identify the company's strengths, weaknesses, opportunities, and threats in the context of green supply chain management.
4. Analyzing the company's contribution to different sectors in 2022, specifically in terms of its green supply chain management practices.
5. Conducting a comparative analysis of Mahir Agro Industries Limited's green supply chain management practices with other leading players in the industry to identify best practices and areas for improvement.

The methodology used in the analysis is primarily qualitative in nature, relying on secondary data sources and analytical frameworks.

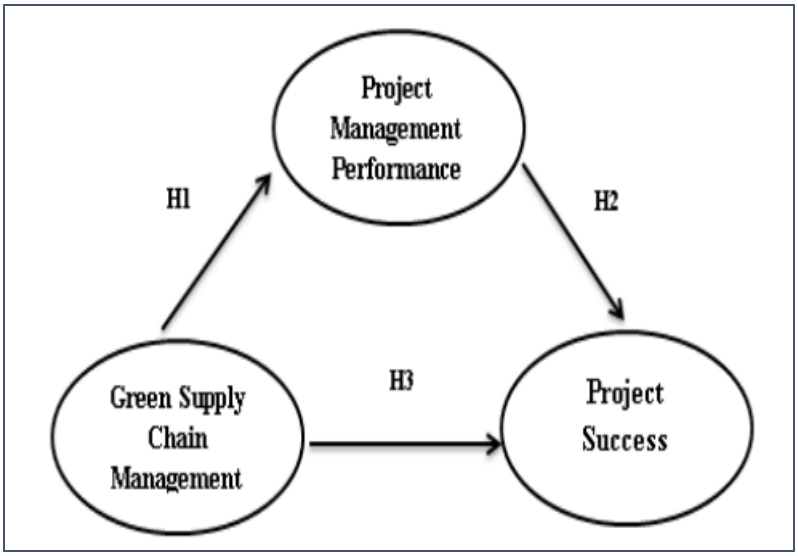


Figure 1: Conceptual Framework

Source: Compiled by the Author, 2023

The following hypotheses were developed based on the conceptual framework and same have tested for agro industry, Index Agro Industries limited.

H1: GSCM has a significant relationship with project management performance.

H2: Project management performance has a significant positive relationship with project success.

H3: GSCM has a significant relationship with project success.

Above hypotheses are chosen in order to first find the relationship between predictor and outcome variable and then validate that relationship with the causality among them.

The firms involved in largescale construction projects such as road, building, housing, construction are taken as the sampling frame. The respondents of this study are the middle level managers and professionals who work in the above mentioned construction firms. Sample was drawn randomly. The unit of analysis of this study is the project managed by an individual project manager. The reason for taking middle level managers as respondents is because middle managers are the people who act as intermediary group of employees who build up the link between top management and lower level managers. They directly connect with the suppliers and 6 customers too. Therefore, middle level managers are active participants engage in work flow management with high exposure. Thus, respondents are all the middle level Project leaders and

Five point Likert type scale is used to design the questions designed to test the variables. Questions to capture some details such as project category, time span, and project capital were designed to make it more insightful. Face to face interviews were also conducted.

5.2 Results

The reliability of each set of factors pertaining to each variable was checked using Cronbach's Alpha. The result showed all the questions assessing the relevant factors under each variable are reliable and the Cronbach Alpha value for each construct exceeds 0.7 which shows the sufficiency of the reliability of each set of factors.

This result ensures to a certain extent that the assessment of project success, green supply chain management & project management performance was consistently done. The Cronbach's Alpha increases when there are more factors under one variable and there are highly inter-correlated factors under a certain variable. To improve the reliability of green supply management as it is the main construct which is being studied, seventeen items were included. These seventeen items consist of environmental concerns exist within parties such as suppliers, customers and internal work force belong to construction sector.

With the skewness and kurtosis statistics a value is derived dividing each statistic by its corresponding standard error. This value was well within the threshold levels. This normality test was run for the standard residuals (difference of expected value & observed value) of the 7 dependent variable on the regression line fitted. Furthermore through eye inspection done on figure 2, it can be concluded that the distribution of the residuals is approximately normally distributed. This shows the ability of the independent variables to keep the dependent variable linearly on a one plane and the selected regression model fits to the dependent variables direction significantly.

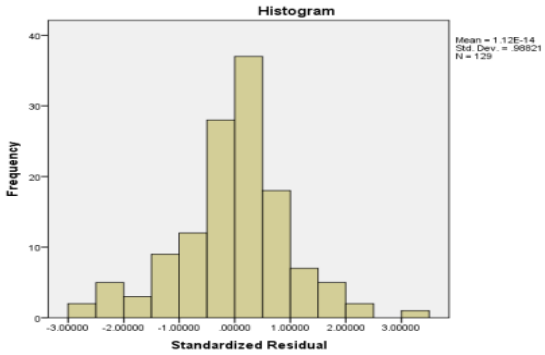


Figure 2: Histogram

Source: Compiled by the Author, 2023

The three hypotheses pertaining to the model were tested using regression lines drawn for each pair of constructs. The task was performed using SPSS. To accept the hypotheses the absolute t values needs to be greater than |1.645| at 95% confidence level at a significance of P>0.05.Table 01shows the results of the hypotheses testing. All the hypotheses were accepted.

Table 1: Hypothesis Testing by Regression Analysis

Path	Path Coefficient	One Tailed T Value	R2	P	Result
H1:GSCM→PMP	-0.269	-3.148	0.072	0.0021	Accept
H2:PMP→PS	0.400	4.920	0.160	0.0004	Accept
H3:GSCM→PS	-0.425	-5.290	0.180	0.0003	Accept

Source: Compiled by the Author, 2023

Hypothesis 01 predicted that GSCM is significantly related to PMP, the result indicated that H1 was statistically significant at P<0.05 and negatively related (path coefficient = -0.269, t value = -3.148).

Hypothesis 02 predicted that PMP is positively related to PS, the results indicated that H2 was statistically significant at P > 0.05 and Positively related (path coefficient = 0.4, t value = 4.92).

Hypothesis 03 predicted that GSCM is related with PS, the results indicated that H3 was statistically significant at P<0.05 and negatively related (path coefficient = -0.425, t value = -5.29).

GSCM explains 18% of the total variance of PS and 7.2% of the total variance of PMP is explained by GSCM.

5.3 SWOT analysis of Mahir Agro Industries Limited:

SWOT analysis is a widely used tool for understanding internal strengths and weaknesses as well as external threats and opportunities of an industry and organization. It also helps to determine the competitive position in the market. The SWOT analysis of MAIL is given below:

Strengths:

1. **Diversified product portfolio:** Mahir Agro Industries Limited has a diversified product portfolio, including fertilizers, seeds, and agrochemicals, which helps to mitigate risks and increase revenue streams.
2. **Strong distribution network:** The company has a strong distribution network, with a presence in multiple regions, allowing for wider market coverage and improved customer reach.
3. **Green supply chain management practices:** Mahir Agro Industries Limited has implemented green supply chain management practices, which allows for sustainability and social responsibility, creating value for stakeholders.

Weaknesses:

1. **Dependence on seasonal factors:** As an agricultural company, Mahir Agro Industries Limited is dependent on seasonal factors such as weather conditions and crop yields, which can lead to fluctuations in revenue and profitability.
2. **Limited international presence:** The company has a limited international presence, which limits its growth potential in global markets.

Opportunities:

1. **Increasing demand for organic and sustainable products:** The growing demand for organic and sustainable products presents an opportunity for Index Agro Industries Limited to expand its product offerings and revenue streams.
2. **Government support:** The government of Bangladesh has announced several policies and initiatives to support the growth of the agriculture sector, which presents an opportunity for the company to receive funding and support for expansion.

3. **Technological advancements:** The use of technology in agriculture, such as precision farming and smart irrigation systems, presents an opportunity for the company to improve efficiency and productivity.

Threats:

1. **Intense competition:** The agricultural industry in Bangladesh is highly competitive, with the presence of several established players, which can impact the company's market share and profitability.
2. **Volatility in commodity prices:** Volatility in commodity prices, such as fertilizer and crop prices, can impact the company's revenue and profitability.
3. **Regulatory and environmental risks:** The agricultural industry is subject to regulatory and environmental risks, such as changes in government policies and natural disasters, which can impact the company's operations and financial performance.

In summary, Mahir Agro Industries Limited has several strengths such as a diversified product portfolio and strong distribution network. The company has also implemented green supply chain management practices, which allows for sustainability and social responsibility, creating value for stakeholders. However, the company is dependent on seasonal factors and has a limited international presence, which can impact its growth potential. The growing demand for organic and sustainable products presents an opportunity for the company to expand its product offerings and revenue streams. However, the agricultural industry in Bangladesh is highly competitive and subject to regulatory and environmental risks, which can impact the company's operations and financial performance.

Chapter 6

Conclusions and Recommendations

In conclusion, Mahir Agro Industries Limited has made significant strides in implementing green supply chain management practices, which has not only improved its environmental and social impact but also created value for its stakeholders. The company's commitment to sustainability and social responsibility is commendable, and its diversified product portfolio and strong distribution network position it well in the market.

However, there are still opportunities for the company to improve its green supply chain management practices. For instance, it can consider implementing renewable energy solutions to reduce its carbon footprint further. Additionally, the company can explore expanding its product offerings to include more organic and sustainable products to meet the growing demand for such products.

In light of these observations, it is recommended that Mahir Agro Industries Limited continues to invest in green supply chain management practices and prioritize sustainability and social responsibility. The company can also consider conducting periodic audits to assess the effectiveness of its green supply chain management practices and identify areas for improvement. Finally, the company should continue to collaborate with other stakeholders in the agriculture industry to promote sustainable practices and ensure a more significant positive impact on the environment and society.

Another recommendation for Mahir Agro Industries Limited is to strengthen its international presence. The company can consider exploring new markets and partnerships to expand its global reach and increase its revenue streams. By doing so, the company can not only achieve greater financial success but also promote its green supply chain management practices to a broader audience, contributing to a more significant positive impact on the environment and society.

Another area of opportunity for the company is to leverage technology to improve its green supply chain management practices. For instance, the company can consider using blockchain technology to increase supply chain transparency and traceability. This technology can help the

company track the origin of its products and ensure they are produced sustainably, meeting its environmental and social responsibility standards.

In summary, Mahir Agro Industries Limited has made significant progress in implementing green supply chain management practices, but there are still opportunities for improvement. By prioritizing sustainability and social responsibility, investing in renewable energy solutions, expanding its product offerings, strengthening its international presence, and leveraging technology, the company can continue to promote sustainable practices and achieve greater financial success while contributing to a more significant positive impact on the environment and society.

Appendix

Appendix-1

Mahir Agro Industries Ltd.

Statement of Financial Position

As at June 30, 2019

Particulars	Notes	Amount in Taka June 30, 2019	Amount in Taka June 30, 2018
Assets:			
Non-Current Assets		**1,020,756,611**	**1,045,867,973**
Property, Plant and Equipment	4.00	895,360,662	840,012,351
Capital Work in Progress	5.00	-	108,259,351
Parent Stocks	6.00	125,395,949	97,596,270
Long Term Investments		**283,000,765**	**252,685,179**
Govt. Savings Certificate	7.00	86,821,958	80,004,958
Investment	8.00	196,178,807	172,680,221
Current Assets		**1,877,437,528**	**1,239,086,501**
Inventories	9.00	883,272,249	458,243,746
Trade Receivables	10.00	618,482,939	518,536,331
Advances, Deposits and Pre-Payments	11.00	267,684,607	162,460,765
Cash and Cash Equivalents	12.00	107,997,733	99,845,659
Total Assets		**3,181,194,904**	**2,537,639,653**
Equity & Liabilities			
Shareholders Equity		**1,756,275,842**	**1,480,531,845**
Share Capital	13.00	390,000,000	390,000,000
Retained Earnings	14.00	1,328,427,781	1,050,691,782
Revaluation Reserve	15.00	37,848,061	39,840,064
Non-Current Liabilities		**141,358,795**	**187,284,615**
Long Term Loan	16.00	90,864,342	140,828,111
Deferred Tax Liabilities	28.00	50,494,453	46,456,504
Current Liabilities		**1,283,560,268**	**869,823,192**
Current Portion of Long Term Loan	17.00	32,639,803	18,055,296
Short Term Loan	18.00	1,009,568,126	639,310,631
Accounts payables	19.00	65,485,302	80,840,913
Provision for expenses	20.00	175,867,037	131,616,352
Total Equity and Liabilities		**3,181,194,904**	**2,537,639,653**
Net assets value (NAV) per share	30.00	**45.03**	**37.96**

The annexed notes (1-36) form an integral part of these financial statements.

Sd/-	Sd/-	Sd/-	Sd/-
Chairman	**Managing Director**	**Company Secretary**	**Chief Financial Officer**

Signed as per our separate report on same date.

Sd/-
FAMES & R
Chartered Accountants

Place: Dhaka;
Dated: October 22, 2019

Appendix-2

Mahir Agro **Industries Ltd.**
Statement of Profit or Loss and Other Comprehensive Income
For the year ended June 30, 2019

Particulars	Notes	Amount in Taka			Amount in Taka
		Feed	Poultry & Hatchery	2018-2019	2017-2018
Revenue	21.00	2,843,818,411	1,482,352,304	4,326,170,715	4,324,639,506
Less: Cost of Goods Sold	22.00	2,360,902,212	1,291,886,830	3,652,789,042	3,726,262,946
Gross Profit:		**482,916,199**	**190,465,474**	**673,381,673**	**598,376,560**
Less: Operating Expenses		**144,372,546**	**58,022,436**	**202,394,983**	**204,068,084**
Administrative expenses	23.00	43,406,449	12,628,699	56,035,147	55,069,232
Selling and Distribution expenses	24.00	100,966,097	45,393,738	146,359,835	148,998,852
Operating Profit		**338,543,652**	**132,443,038**	**470,986,690**	**394,308,476**
Add: Non-Operating Income					
Other Income	25.00	6,817,000	-	6,817,000	6,817,000
Less: Non-Operating Expenses					
Financial expenses	26.00	128,123,214	29,777,315	157,900,529	97,958,525
Net Profit before WPPF and Tax		**217,237,439**	**102,665,722**	**319,903,161**	**303,166,952**
Contribution to WPPF		10,344,640	4,888,844	**15,233,484**	14,436,522
Operating Profit before Tax		**206,892,799**	**97,776,878**	**304,669,677**	288,730,430
Share of Profit from Associate		23,498,586	-	23,498,586	18,175,047
Net Profit before Tax		**230,391,384**	**97,776,878**	**328,168,263**	**306,905,478**
Income Tax Expenses		**42,796,579**	**9,627,688**	**52,424,267**	**41,723,026**
Current Tax	27.00	39,655,952	8,730,366	48,386,318	38,643,946
Deferred Tax	28.00	3,140,627	897,322	4,037,949	3,079,080
Net Profit/(Loss) after Tax		**187,594,806**	**88,149,191**	**275,743,996**	**265,182,452**
Earnings per Share	29.00			**7.07**	**6.80**

The annexed notes (1-36) form an integral part of these financial statements.

Sd/-
Chairman

Sd/-
Managing Director

Sd/-
Company Secretary

Sd/-
Chief Financial Officer

Signed as per our separate report on same date.

Sd/-
FAMES & R
Chartered Accountants

Place: Dhaka;
Dated: October 22, 2019

Appendix-3

Mahir Agro Industries Limited
Statement of Changes in Equity
For the year ended June 30, 2019

Particulars	Amount in Taka			Total Amount
	Share capital	Retained Earnings	Revaluation Reserve	
Balance as at 1 July 2018	390,000,000	1,050,691,782	39,840,064	1,480,531,845
Net Profit/(Loss) after Tax	-	275,743,996	-	275,743,996
Depreciation on Revalued Asset	-	1,992,003	(1,992,003)	-
Balance as at June 30, 2019	**390,000,000**	**1,328,427,781**	**37,848,061**	**1,756,275,842**

Mahir Agro Industries Limited
Statement of Changes in Equity
For the year ended June 30, 2018

Particulars	Amount in Taka			Total Amount
	Share capital	Retained Earnings	Revaluation Reserve	
Balance as at 1 July 2017	390,000,000	783,412,484	41,936,909	1,215,349,393
Net Profit/(Loss) after Tax	-	265,182,452	-	265,182,452
Depreciation on Revalued Asset	-	2,096,845	(2,096,845)	-
Balance as at June 30, 2018	**390,000,000**	**1,050,691,782**	**39,840,064**	**1,480,531,845**

Sd/-
Chairman

Sd/-
Managing Director

Sd/-
Company Secretary

Sd/-
Chief Financial Officer

Signed as per our separate report on same date.

Sd/-
FAMES & R
Chartered Accountants

Place: Dhaka;
Dated: October 22, 2019

Appendix-4

Mahir Agro Industries Ltd.
Statement of Cash Flows
For the year ended 30 June 2019

Particulars		Amounts in Taka	
		30 June 2019	30 June 2018
Cash Flows from Operating Activities:			
Cash received from Turnover		4,226,224,107	4,250,152,900
Cash paid to Suppliers		(3,894,044,327)	(3,565,254,511)
Cash paid to employees		(213,679,630)	(202,779,500)
Cash paid to others		(193,023,019)	(194,303,759)
Income Tax paid		(42,098,248)	(38,196,321)
Net Cash provided by Operating Activities: (A)		**(116,621,118)**	**249,618,809**
Cash Flows from Investing Activities:			
Purchase of Property, Plant and Equipment		(454,110)	(15,183,458)
LC margin for capital machinery		-	(1,242,000)
Purchase of Parent stock		(108,652,310)	(103,301,967)
Paid for Capital work in progress		-	(108,259,351)
Net Cash used by Investing Activities: (B)		**(109,106,420)**	**(227,986,776)**
Cash Flows from Financing Activities:			
Net proceeds from Long Term Loan		(35,379,262)	80,192,726
Net Proceeds from Short Term Loan		370,257,495	(84,261,686)
Financial expenses		(100,998,621)	(97,958,524)
Net Cash generated from Financing Activities: (C)		**233,879,612**	**(102,027,484)**
Net Cash inflow/ outflow(A+B+C)		8,152,074	(80,395,451)
Cash and Cash equivalents at the beginning of the year		99,845,659	180,241,110
Closing Cash and Cash equivalents at the end of the year		**107,997,733**	**99,845,659**
Net Operating Cash Flows Per Share	**32**	**(2.99)**	**6.40**

The annexed notes (1-36) form an integral part of these financial statements.

Sd/-	Sd/-	Sd/-	Sd/-
Chairman	**Managing Director**	**Company Secretary**	**Chief Financial Officer**

Signed as per our separate report on same date.

Sd/-
FAMES & R
Chartered Accountants

Place: Dhaka;
Dated: October 22, 2019

Reference

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List of Acronyms

Acronyms	Stands for
MAIL	Mahir Agro Industries Limited
GSCM	Green Supply Chain Management
CSC	Corporate Social Couse.
H	Hypothesis
AG	Agro Indistry.
SGSCMP	Sustainable Green Supply Chain Management Practice.