

A dark, atmospheric forest scene with a path leading towards a bright light at the end of the tunnel. The trees are tall and thin, with bare branches, creating a dense canopy. The light at the end of the path is a bright, glowing yellow-green, casting a long shadow on the path. The overall mood is mysterious and ethereal.

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## THE IMPACT OF GREEN SUPPLY CHAIN MANAGEMENT ON CLIMATE CHANGE: CURSORY GLANCE ON THE FOOD INDUSTRY

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### Abstract

*The study assesses and ascertains how food industries can use effective green supply chain practices to lessen the effects of climate change. Positioning the supply network and assigning strategic objectives of the study will open insights into the integration of climate change into green supply chain management in the food industry. Implementing green supply chains can result in a dynamic capability that shall enable organizations to respond to uncertain and changing business environments and sustain their position in the market. The outcome can lead organizations to work efficiently, the attainment of which can be regarded as the key to sustaining businesses and competitive advantage. The primary focus of the study is to analyze and ascertain how food industries can use effective green supply chain practices to lessen the effects of climate change.*

**Keywords:** Green Supply, Chain supply, Climate Change, Food Industry, Environment

### INTRODUCTION

The impact of climate change is being felt today by every country, as the catastrophic

climate events are already affecting hundreds of millions of our fellow human beings. Severe increases in droughts, melting glaciers, and rising sea levels are increasing food insecurity, exacerbating diseases are disrupting lives and livelihoods, and forcibly displacing people and entire communities. Urgent action on climate change must therefore be seen as a moral, environmental, scientific, and developmental imperative guided by ambition, action, and equity. In this regard, the Paris Convention adopted by 195 countries in the year 2015 enhances our ambition of nationally determined contributions without delay and achieving these ends. Raised ambition and scaled-up mitigation action are the need of the hour. The states must pursue collectively and in accordance with the principles of common but differentiated responsibilities and respective capabilities. Increasing the use of low-carbon energy sources in the global energy mix is vital, including through renewables such as wind and solar energy, whose costs continue to decline. Governments, the private sector, civil society, local authorities, and other partners are increasingly investing in smart and viable climate solutions that will achieve the transformation to a resilient and low emissions global economy. However, these investments must be scaled up. Indeed, climate action is a

profound catalyst for creating jobs and improving livelihoods worldwide. New and reinvigorated partnerships will be critical to achieving this transformation. While the Paris Agreement is a turning point for international cooperation to achieve global transformation on climate change, it is also central to our broader goals under the 2030 Agenda for Sustainable Development. Fulfilling the universal and transformative 2030 Agenda promises to deliver the future we want by eliminating extreme poverty; building peaceful and inclusive societies; empowering women and girls; increasing prosperity, and combating climate change.

The Current estimates indicate that implementing the 17 Sustainable Development Goals of the 2030 Agenda will require annual financial flows of US\$ 5-7 trillion. The implementation of green supply chains can result in a dynamic capability which shall enable the organizations to respond to uncertain and changing business environment, and to sustain its position in the market. The outcome can lead organizations to work efficiently; the attainment of which can be regarded as the key to sustain businesses and competitive advantage.

### Survey of Literature

The study intends to review past literature related to the research work and focus on addressing the research gaps, collecting data for analysis, and ascertaining how food industries can use effective green supply chain practices to lessen the effects of climate change. In the final year of the study, the data would be analyzed using statistical tools, and optimal interpretation and conclusions would be drawn.

1. Kristina Petljak (2019) -

It was being stated by above mentioned that companies in the food sector are facing drastic changes because of the increasing concern and spreading awareness among traceable consumers

in the food supply chain, raw materials and food safety, products and processes' effects on environment, and other social issues including animal welfare. Sustainable development (SD) necessitates organizations to consider both environmental and social results within their activities according to Larisa Ivascua et al., 2015. Risks such as supply chain networks in terms of operational, physical and reputational risks accredited to climate change.

2. Thomas K. Dasaklis and Costas P. Pappis, 2013

It was being stated that intensification of regulations, pressures of stakeholders and market forces are making way for the supply chains' decarbonization with evident insinuations for supply chain management.

3. Transportation, as a constituent of supply chain has an important effect on the environment- Coyle et. al., 2010; Cioca et al., 2015. Transportation is a multifaceted contributor to national greenhouse gas emissions, and can be part of the Nation's solution to the climate change challenge.

4. Beddington, 2009, 2011-World population is projected to grow to more than 8 billion in the next 20 years, accompanied by a 50 percent increase in demand for clean water and food.

5. Based on the economic objectives, a supply chain is designed traditionally (sales maximization, cost minimization) (Pinto-Varela, Barbosa-Póvoa & Novais, 2011), but environment concerns are increasing day by day and every supply chain is part of the global society (Chaabane, Ramudhin & Paquet, 2010). A supply chain should also be evaluated depending on the environmental objectives (recycling performance, carbon emissions, energy use and waste management), the social performances (quality of life, noise, etc.).

6. According to Srivastava, 2007- Green Supply

Chain Management (GSCM) is a section of the sustainable supply chain where environmental thinking is integrated into supply chain management and it includes selection of suppliers, manufacturing process, product design, transportation and warehousing and end-of-life of the product.

As industries are majorly considered about profitability, they do not implement green initiatives optimally with an aim to avoid increased costs. When standards such as ISO 14000 were introduced for businesses and environmental programmes received accreditation, it became clear that in logistics management, environmental and economic objectives are closely related.

7. Rao and Holt (2005) - if companies adopted green supply chains, they would achieve substantial cost savings and also enhance sales, exploit new market opportunities and have an increased market share to lead to greater profit margins.

Various surveys have looked at the key drivers for greening of logistics and supply chains (Eyefortransport (2007), Aberdeen Group (2008) and Insight (2008)). Some of these include:

- Cultivating public relations;
- Refining customer relations;
- Part of their corporate responsibility agenda;
- Financial return on investment;
- Government compliance;
- Increasing cost of energy/fuel;
- Attaining competitive advantage;
- Enhance flow of logistics;
- Improve corporate image; and
- Decrease logistics costs.

Supply chains of tomorrow according to Melnyk et al, 2010 must deliver varying degrees of outcomes, such as responsiveness, cost,

sustainability, security, innovation and resilience, based on the needs of the key customers. Out of these outcomes, sustainability and security, are relatively new which re-emphasize and reconfirm the significance of the drive towards green supply chains.

### **Research Methodology**

The researcher would collect information through secondary data. The secondary data is collected from different sources of journals, magazines, company websites, annual reports, internet, reports, books related to topic.

### **Research Questions**

Therefore, this research studies the integration of climate change into green supply chain management in the food industry and ponders upon the following questions;

- 1) What exactly is "green supply management," and why is it so crucial for the industrial sector?
- 2) How can the food industry's green supply chain management methods and climate change be combined to create a sustainable environment?
- 3) How well are green supply chain management and environmental issues being promoted and applied in the food industry?
- 4) How have the chosen food companies' economic and environmental situations changed as a result of implementing green supply chain management?
- 5) What are the supply chain management difficulties facing the food industry?
- 6) To what extent can nudging affect food handlers' compliance with hygiene control measures in poultry processing to avoid Campylobacter contamination?

### **The objective of the Study**

- a) To highlight an aspect of the significance and ideas of green supply chain management
- b) To restock the comparative study's food

industry by incorporating climate change into green supply chain management.

- c) To assess the degree to which environmental issues and green supply chain management are mentioned and put into practice in the operations of the food sector.
- d) To analyze in depth how adopting green supply chain management has affected the financial and environmental standing of the chosen food enterprises.
- e) To describe the food business's difficulties with supply chain management.
- f) To encourage the food industry to improve and apply its sustainable supply chain practices.
- g) To evaluate feasible water management adaption scenarios intended to lessen the detrimental

### **Scope and importance of the study**

Business world across different sectors is challenged with physical (economic and market) risks owing to climate change. The relationship of cause-effect between impacts of climate change on companies is easy to correlate (Dunn, S., 2002). The impacts of climate change refers to increased flooding and droughts, higher frequency of heat-waves, increased intensity of hurricanes, storms and cyclones and the effect on business depends on area and type of activity. Thus, such phenomena may hinder business activities, disrupt operations (transportation and production), dislocate plants and customers, decrease consumer demand and reduce purchasing power, etc. Regulations towards climate change affect energy pricing and availability, thus, creating a ripple effect throughout their entire value chain (Hoffman, A. and Woody, J., 2008). Thus this research studies the integration of climate change into green supply chain management in food industry of UK.

### **Significance of the study**

The specific purpose of the study is to integrate climate change into green supply chain management in food industry. Since food industry is one of the major sectors in the economy of any country, the role played by the said industry in effective supply chain management practices and responsibility towards climate change and preservation of the environment is huge. The major focus of the study will hence be to analyze and ascertain how food industries can use effective green supply chain practices in order to lessen the effects of climate change.

### **CONTEXTUAL DISCOURSE**

The impacts of climate change refer to increased flooding and droughts, higher frequency of heat waves, and increased intensity of hurricanes, storms, and cyclones, and the effect on business depends on the area and type of activity. Thus, such phenomena may hinder business activities, disrupt operations (transportation and production), dislocate plants and customers, decrease consumer demand and reduce purchasing power, etc. Regulations towards climate change affect energy pricing and availability, thus, creating a ripple effect throughout their entire value chain (Hoffman, A. and Woody, J., 2008).

Unsustainability is the complex problem faced by a human society that is destabilizing regional food systems' capacities due to a mix of interacting factors, such as climate change, population growth, overuse of resources, change of consumption modes, governance pressure, and problems in fair resource allocation and distribution under increasing pressure and uncertainty. Stable improvement is heavily dependent on local and international governance and investment policies and the implementation of fair economic trade rules in the globalized food and agricultural market. The 'green revolution in agriculture has not only increased agriculture but also economic growth and reduced poverty, and the fact is that it is

still patchy, exploring ways and means to reduce externalities and to focus on achieving a sustainable ratio between economic, environmental, and social objectives which is to improve understanding among experts who make decisions on or contribute to a secure food supply system.

Environmental problems that are being focused on by the general public and companies, if are not addressed on time, can lead to the extinction of mankind. The traditional way of functioning followed by companies concerning environmental activities may opine that the initiatives are not economical and presume that they would generally generate negative returns to shareholders. Many companies are still following the traditional way of functioning, which is the main reason that green initiatives have not been appropriately implemented, even in companies that consider concerns related to the environment significantly. All industries are majorly considered about profitability, and to avoid increased costs, they do not implement green initiatives optimally. The business world across different sectors is challenged with physical (economic and market) risks owing to climate change. The relationship of cause-effect between the impacts of climate change on companies is easy to correlate (Dunn, S., 2002). It is evident that the implementation of green supply chain management in any company requires additional spending leading to increased costs. Still, an important issue is if green supply chain management initiatives can be implemented at an economical cost to consider climate change.

#### **CHALLENGES IN SUPPLY CHAIN MANAGEMENT.**

The world has become like a global village with barriers falling apart because of the global movement of goods and labor. In today's global economy, a computer chip may be designed in America, fabricated in Europe, and finally assembled and packaged in Asia to be sold again in America. Currently, the various components of logistics, such as surface

transport, railways, shipping, air, commerce, and finance, are all separate entities. The Indian consumer today has access to fruit grown in Australia and China, which was unheard of even two decades ago. Even within individual countries, there is a far more extensive movement of goods and labor than before. The modern food supply industry also has a global "Supply Chain," which brings along a new set of challenges, particularly in India. For example, every day, a food supply company operating here has to deal with volatile fuel prices, increasing raw material costs, and mounting price pressure, and ensuring that materials are delivered to the factory for production and then products are sent to the customers on time. Providing prompt and economical delivery of products is a challenge in India. Unlike European or other Asian countries, we have a limited number of cost-effective and quick alternatives. Coastal waterway systems in India are still in a primitive stage. The wide Indian rail network is still unable to provide effective service to the industry. The government's initiative to invest in the development of arterial roads connecting major parts of the country has resulted in the strengthening of the road network every passing year, and so things are improving, although they are still far from optimal. The challenges in the supply chain are to achieve global optimization for conflicting objectives in the complex network of facilities and to minimize the system variations over time. The term SCM has been coined to describe the changes within SCM itself and the evolution of the processes, methods, and tools that manage it in this new "era." The concept of integrating climate change considerations into Green Supply Chain Management in the food industry is likely to increase over the coming years. Green supply chain issues and how supply chain practices may be incorporated are already well documented in academic literature.

There still exists a gap between what is suggested in the literature and what is carried out in practice. The gaps are: Considering

advances in technology and knowledge, companies have not realized the significance of innovation and the management of innovation using green supply chain practices in all parts of the organization.

- In order to promote supply chain innovations, it is essential to engage all members of the organization, including employees and managers, in research and development of implementing effective green supply chain practices in food industries.
- Issues such as high demand as well as competition at the international and supranational levels and the importance of the final customer should be prioritized by the organizations and more studies related to this issue must be conducted.
- Literature review of integrating sustainable climate change considerations into Green Supply Chain Management in the food industry is discussed. Research in the past points out the proposals indicating new paradigms in society at large. As this seems not to have been triggered yet, additional research into integrating climate change considerations into Green Supply Chain Management in the food industry is recommended for optimal green supply chain networks to be truly incorporated globally.

#### **IMPLICATIONS OF CLIMATE CHANGE ON THE FOOD**

Climate change has to be outlawed as one of the critical issues at both levels in decision-making. In the future, climate change adaptation becomes an insusceptible task for managing the food supply chain both globally and locally. In view of the consideration of the food system in a yet operative manner, it is to be focused on how food chain dynamics function as a whole instead of studying parts in isolation from one another. The pandemic disrupted global supply chains, induced panic

buying, and cleared supermarket shelves. It left perfectly edible produce rotting in fields and left farmers no choice but to gas, shoot and bury their livestock because slaughter plants were shut down. It also revealed a glaring problem: Though researchers have known for decades that climate change will roil farming and food systems, there exists no clear global strategy for building resilience and managing risks in the world's food supply, nor a coherent way to tackle the challenge of feeding a growing global population, on a warming planet where food crises are projected to intensify. "We need to make sure food is safe, nutritious and sustainable, not just for today but for the future," said Emily Broad Leib, director of the Harvard Law School Food Law and Policy Clinic. "There's growing acknowledgment that this has been something that's not been addressed in a coordinated way." Hundreds of millions of lives are at stake," said Michael Puma, director of the Center for Climate Systems Research at the NASA Goddard Institute for Space Studies. "We don't have a coordinated response to that, in the United States or globally. It's a complete vacuum." Rising competition, market globalization, and augmented importance on the orientation and experience of the consumer symbolize why the interest in supply chain management is increasing.

An effective supply chain management is regarded as an essential factor for building sustainable competitive advantage through enhanced intra- and inter-organizational relations that are the transformation and flow of the product from the raw material to the final product. Augmented awareness of the firms on the significance of environmental protection results in environmentally responsible supply chain management, i.e. amalgamation of ecological thinking along with supply chain management concepts (Andre Kreie, 2013). Ecological issues and the activities identified with the change in the point of view towards nature have a significant direct effect on the legislation of numerous nations. The new, ever more grounded pressure as solicitations and



legal acts has been put on the organizations that are frequently, in regards to various business aspects, the primary triggers of business activities with a negative effect on the environment.

Performing business activities in accordance with environmental security cannot be observed only on the level of a company, but rather other companies have to be considered as well, i.e., the individuals from the supply chain. The organizations are confronted with the solicitation to guarantee environmental adequacy of the products on their way from the raw material through the creation and lastly to the market, which incorporates all individuals and activities of the supply chain. Expanded awareness to the organizations and other interest groups on the significance of environmental protection prompts environmentally capable supply chain management, i.e., to the incorporation of ecological thinking within the conventional idea of supply chain management.

The response to the challenges of the modern methods of doing business, retailers look for in the individuals from their own supply chain, and through the closer participation of all the chain individuals, they scan for the conceivable outcomes of propelling their business activities. Because of the variations in the role and noteworthiness of the retailers in the supply chain, there has been more, despite the fact that yet a lack of research on the retail supply chain. Environmentally responsible business activity is not an objective an organization can accomplish all alone. Instead, it requires the regular activities of different individuals in the supply chain. Green business suggests the presence of a key "player" that has the force in the supply chain and the motivation for the acquaintance of green activities in with the supply chain, on the store level, just as in the supply chains. If not packaged and delivered correctly, food may spoil. Hence transportation and packaging play a vital role in the food industry. Activities such as stock, freight, and

material movers, who move materials manually; packagers and hand packers, who pack bottles and other products as they come about the production line; and machine feeders, who feed materials into machines and remove goods from the end of the production line.

#### **MERITS OF GREEN SUPPLY CHAIN MANAGEMENT**

Logistics is the incorporated administration of the many activities required to move products through the supply chain. The primary aim of logistics is to co-ordinate the activities such that it meets customer necessities with least expenses. As concern for the environment rises, organizations must assess the expenses of logistics related principally with environmental variations, climate change, air contamination, vibration and mishaps. Green logistics means efforts to examine manner of diminishing these externalities and achieving a more sustainable harmony between economic, environmental, and social objectives. Hence, Green supply chain management is important for companies functioning in the present world and can be defined as the "alignment and integration of environmental management within supply chain management" (Klassen and Johnson, 2004).

Due to continuous globalization and innovative changes, organizations are inevitably required to respond quickly to the fast-changing competitive environment (Conti, 2013). According to Hervani et al. (2005) and Srivastava (2007), GSCM practices are considered material management, green purchasing, green manufacturing, green design, reverse logistics, and green distribution/marketing that refer to the environmental integration of supply chain management with consumers' end-of-life management. Various surveys have looked at the key drivers for the greening of logistics and supply chains (Eyefortransport (2007), Aberdeen Group (2008), and Insight (2008)). Some of these include:

*i) Cultivating public relations; ii) Refining*

*customer relations; iii) Part of their corporate responsibility agenda; iv) Financial return on investment; v) Government compliance; vi) Increasing cost of energy/fuel; vii) Attaining competitive advantage; viii) Enhance logistics flow; ix) Improve corporate image, and x) Decrease logistics costs.*

Supply chains of tomorrow, according to Melnyk et al., 2010 must deliver varying degrees of outcomes, such as responsiveness, cost, sustainability, security, innovation, and resilience, based on the needs of the key customers. Out of these outcomes, sustainability and security are relatively new, which re-emphasize and reconfirm the significance of the drive towards green supply chains. According to Melnyk et al. (2010), supply chains with the sustainability outcome objective have the following design traits:

- a) Visibility/transparency throughout the supply chain to ensure that all members are aware of threats or opportunities;
- b) Greater emphasis on the Three Ps (product design, process, packaging);
- c) Integrated supply chain planning and management, in recognition, that design must begin with resource extraction and end with product disposal/renewal;
- d) Use of broader performance measurement systems and measures (total cost of ownership, triple bottom line);
- e) Extensive supplier prequalification and assessment to ensure that the “right” suppliers are selected and that they understand what is required;
- f) Extensive use of audits and certification standards throughout the supply chain (ISO 14001); and

- g) Introduction of systems for product take-back (reverse logistics) and marketing waste.

#### CONCLUSION

The scope of research cannot be made more comprehensive by covering all the commercial sectors in the country. The study has drawn an interpretation that the integration of climate change into green supply chain management in the food industry is expected to be used for the food industry. Due to time constrain, a comprehensive analysis has not been carried out in the said article. Better results can be obtained if sufficient time is invested in conducting the research. The study aimed to integrate climate change into green supply chain management in the food industry. Since the food industry is one of the major sectors in the economy of any country, the role played by the said industry in effective supply chain management practices and responsibility towards climate change and preservation of the environment is enormous. The study is based on secondary data that collected from different sources journals, magazines, company websites, annual reports, the internet, reports, books related to the topic, etc. The study's findings indicate that there are issues with food safety communication, which are a reflection of the company's food safety culture. Farmers' good decisions on pesticide selection should be understood by some mechanism. In order to support farming hygiene practices and enhance dairy safety in supply chains, it is also necessary to consider the reasons, frequency, and severity of postharvest losses. It is also necessary to create crucial quality points and develop (communication) tools in this regard. The study suggests that initiatives should be taken to understand the determinants of heritage food and its essential risk factors, as well as to conduct risk-based assessments of chemical control methods in the context of a global supply chain. Identification of crucial quality points for food companies and supply networks is necessary. It is vital to enhance food

quality through supply chain partnerships. Creating a diagnostic to evaluate the sustainability of the food supply to help in sustainability governance.

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