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RESPONSIBLE CONSUMPTION AND PRODUCTION IN THE FOOD SUPPLY CHAIN: A CONCEPTUAL FRAMEWORK

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Abstract: Increased globalization and a growing world population have a boundless influence on the sustainability of supply chain, particularly within the food industry. The way food is produced, processed, transported, and consumed has a great impression on whether sustainability is attained throughout the whole food supply chain. Due to the complications that continues in coordinating the members of food supply chain, food wastage has increased over the past few years. To achieve sustainable consumption and production (SCP), food industry needs to be coordinated and to have their views reflected in an optimized manner.

From production to consumption related to food supply chain there are many parameters such as resources, packaging, waste management, etc. are prerequisite to be taken into account for sustainability. The aim of this study is to determine the parameters that affects sustainable food supply chain and the measures to overcome the wastage in food products.

Index Terms - Supply chain, Production, consumption, challenges, Measures

I. INTRODUCTION

A food supply chain describes the processes that comprise of production, processing, distribution, consumption and disposal of food from a farm that ends up on our tables. In order to make food supply chains justifiable and in particular the consumption and production areas, the players in supply chain (Producers, Wholesalers, Retailers & Consumers) have to be coordinated.

Owing to globalization, food supply chains are rising because of larger quantities of food production are required to feed the population. So, attention should be brought to the environment in relation to supply chain management is called sustainable supply chain management (SSCM).

In order to accomplish SSCM it is important to understand the food supply chain's changing needs, the concept of sustainable consumption and production (SCP). Sustainable consumption and production are nothing but about doing things more and better with minimum loss. Production and use of products and services should be in a manner that is socially beneficial, economically feasible and environmentally benign.

Food and agricultural systems have changed a lot and it has affected both consumption and production patterns. Food loss starts mainly in the production stage, in harvesting or processing and significant amounts of food waste occur at distribution, retailer, and consumer segments. Almost half of the total food wasted is due to the fact that producers, retailers, and consumers abandon food that is still fit for consumption and as a result, food wastage happens on all stages in the supply chain.

II. REVIEW OF LITERATURE:

Murphy and Adair (2013), focused their work on the sustainable supply chain management in the food sector and they pointed out that the food sector is under increasing pressure to embrace more sustainable programs and receives greater attention from consumers and media.

Smith (2008), presented a paper on the topic of developing sustainable food supply chains. The paper was also a contribution to the opportunities to engage consumers and to highlight the importance of cooperation among food manufacturers, retailers, NGOs, and governmental and farmers' organizations.

Garnett (2013), explores further problems, challenges, and solutions in connection with the food supply chain. The problem of the environmental impact of the food supply chain is addressed and it is divided into three main categories: production, consumption, and socio-economic challenges.

Pagan and Lake (1999), presents some of the ways the food supply chain – and hence consumption and production – can be made more sustainable through the application of technology, greater resource efficiency, better understanding of consumer demand, and consumer education

III. REASONS FOR FOOD LOSS IN SUPPLY CHAIN

There are number of challenges existing in food supply chain network. Few are perishable food, weak links between channel members, number of small stakeholders etc. Food supply chain needs to be agile, adaptive and efficient in order to avoid losses. Supply chain inefficiencies in the food sector is due to various reasons,

- **Intermediaries:**

Intermediaries are middle-men who act as a connecting link between producers to consumers. If there is interruption in this supply network it leads to mistrust and also lowers the product quality.

- **Perishability:**

Food is highly sensitive to environmental conditions and if it is not stored properly, it can spoil or degrade in quality. This could lower its value and it increases the possibility of health risk to consumers, which puts a high burden of safety on food vendors.

- **Uncertainty:**

Food supply chains are highly vulnerable to external factors and it gives rise to risk of stock outs and harm margins.

- **Complexity:**

For food and agricultural products supply chains are exceptionally complex, because raw materials might be grown in one part of the world, processed in another, and combined with other elements somewhere else. This raises the issues and complications in the supply chain visibility.

- **Lack of traceability:**

Traceability is the ability to track the food product through all stages of the supply chain. Today consumers want to know where all products and their ingredients come from. Having and sharing authentic information from each and every step of the food supply chain will help to enhance food safety, strengthens brand integrity, and increases customer loyalty.

- **Inadequate communication between parties:**

Fragmented information and lack of communication can have a major impact on the food supply chain. This is because there are several middlemen involved in the chain which have little to no knowledge of one another's actions. Deprived communication causes errors, ineffectiveness, excessive waste, and can lead to mistrust among suppliers and their customers.

IV. MEASURES TO REDUCE FOOD WASTAGE

The following are some of the measures to be followed by both producers and consumers to control wastage in production and consumption.

- **Smart shopping**

Buying required food items in bulk will be convenient in many aspects, it may lead to buy more food than the actual need that lead to food waste. To avoid this one can, make a point to use all the food stocked at home before going for new purchase. The consumer can also make a list of items to be purchase based on their requirement, the same will help to reduce impulse buying and reduce food waste as well.

- **Storage of Food**

Based on the type of food item the storage differs, improper storage leads to considerable amount of food waste. Consumers should be aware about the storage ways of food items; the storage instructions can be given in the packaging of the food items. Many consumers are not aware about the storage ways of different food items such as fruits and vegetables, the same will lead to premature ripening and eventually, rotten produce. Some food items should not to be refrigerated and they need to be kept at room temperature. The producers must follow proper storage measures and take steps to create awareness among the consumers about the storage of different food items.

- **Save Leftover**

Leftover of food items are more common in many houses, the leftover food is often forgotten and then thrown away when it goes bad. Everyone has to take it has their responsibility to save leftover food items. The leftover food can be refrigerated and can be used the next day. Everyone have to make it a habit to store the Leftover food in a glass container, rather than in an opaque container so that it will be remembered.

- **Keep the Serving Sizes in Check**

Health is more important than any other thing and the dynamic wealth of one's life is health. One should make sure their quantity of intake of food within a healthy range, it also reduces food waste. Everyone should think twice about disposing the leftover food into trash, because food waste has a major impact on the environment. Being more mindful of how hungry actually are and practicing portion control are great ways to reduce food waste.

- **Improve packaging**

In manufacturing sector packaging plays a significant role in protecting and preserving food throughout the supply chain. Improper packaging will lead to likelihood of food spoilage. Manufacturer can provide clearer expiration date, offer better cooking/freezing instructions and make it easier to dispense food without compromising the remaining unused food in the packaging.

- **Provide better consumer education**

The manufacturer can help the consumers to reduce food wastage through creating awareness among the consumers. Food manufacturers can be vocal about the problem of food waste and provide practical tips to the customers to reduce food waste. The consumer education can be provided on preserving the food, controlling portions and other practical suggestions.

- **Improve the accuracy of forecasting**

Forecasting the future demand for the product plays an essential role in determining the quantum of raw material to be purchased for production. Inaccuracy in forecasting the demand leads to excess purchase and wastage of raw material. With better and more accurate forecasting techniques, food manufacturers can plan for appropriate quantity of raw materials to be purchased and avoid wastage of raw materials.

- **Equipment maintenance**

Equipment breakdowns can result in significant food loss and waste. The organization can invest in some food processing maintenance contract. The routine maintenance of Plants and machinery in the production unit will reduce the waste in the long run.

V CONCLUSION

The food that we eat is grown, reaped, and then it was transported from one place to another. In warehouses it is sorted, packed, and stored until it can be sold and transported to the final destination. Traders purchase, produce in bulk and then they sell this produce to supermarkets, retailers, and wholesalers. If there are interruptions in this system and the food produced cannot be sold fast enough, it goes off and is thrown out. This leads to loss in profit to farmers, traders and wastage of all of the resources that went into growing the food, including the precious water and energy resources.

As described in the introduction one important part of achieving SCP is to decrease the food wastage and each member of the supply chain have to take necessary steps to reduce loss and wastage. There is no sustainable consumption without sustainable production and vice versa and these two facts go along and together in order to contribute to sustainable development goals.

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