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## **A FALSE SHORTAGE: FOOD WASTAGE IN INDIA AND THE NEED FOR RESOURCE MANAGEMENT REFORMS**

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### **ABSTRACT**

While debates persist on whether India can become a food bowl for the world, with its large capacity for production and agriculture, the developing country also possesses some of the largest percentages of food wastage. With many starving, India's food and ration distribution system has proven partially or wholly insufficient to meet the needs of the world's largest democracy. There is thus a need for sustainable resource management reforms that provides for effective implementation to meet the long-term goals of reducing or removing hunger, as well as of crop sustainability such that the needs of future generations can be met. This paper will analyze the existing systems and policies for food distribution, scholarly literature on resource management, and statistics on food production and shortage to establish that it is not production but rather distribution and management systems that must be properly remedied. By doing so, the paper establishes that it is in fact a 'false shortage', and provides basic policy recommendations for future structural development of new systems.

**Keywords:** Food wastage, Food supply chain, Resource management, Food distribution system

### **INTRODUCTION**

As per the Food and Agriculture Organization (FAO), food wastage is defined as "wholesome edible material intended for human consumption, arising at any point in the food supply chain (FSC) that is instead discarded, lost or degraded" (Gustavsson et al., 2011). These losses occur in different steps in the food stage such as harvesting, storage, material handling, processing, distribution and finally consumption. There are multiple reasons for these losses including improper handling, threshing, and improper packaging. Food wastage not only causes thousands of people, and in a country like India, tens of thousands of people to go hungry, but also affects food security, the economy, and the environment in a highly negative manner, due to the fact that there is a large amount of energy and resources that are utilized in the FSC that is now lost (Gustavsson et al., 2011). Specifically, a key concern is the wastage of natural resources as well

as energy resources in the harvesting and processing stages, that leads to further carbon dioxide emissions and other greenhouse gasses, worsening the situation with climate change. No group of people is affected more in this regard than the farmer and the rural stakeholders. To meet the global food demand for increasing population, not only must the food production be considerably increased but also that the causes of food waste are addressed (Halloran et al., 2014).

While debates persist on whether India can become a food bowl for the world, with its large capacity for production and agriculture, the developing country also possesses some of the largest percentages of food wastage. With many starving, India's food and ration distribution system has proven partially or wholly insufficient to meet the needs of the world's largest democracy. There is thus a need for sustainable resource management reforms that provides for effective implementation to meet the long-term goals of reducing or removing hunger, as well as of crop sustainability such that the needs of future generations can be met. This paper will analyze the existing systems and policies for food distribution, scholarly literature on resource management, and statistics on food production and shortage to establish that it is not production but rather distribution and management systems that must be properly remedied. By doing so, the paper establishes that it is in fact a 'false shortage', and provides basic policy recommendations for future structural development of new systems.

## **BACKGROUND**

According to National Horticulture Database 2014, India is the second largest producer of fruits and vegetables next to China. India produced 88.97 million metric tonnes of fruits and 162.98 million metric tonnes of vegetables during 2014, which constitutes around 12.6% and 14% of the total world production of fruits and vegetables respectively (Handbook on Horticulture Statistics, 2014). Further, as per the FAO of the UN, around one third of the global food produced for consumption is wasted and lost, nearly 1.3 billion tonnes, costing the world economy about \$750 billion each year (Gustavsson et al., 2011). Annually, close to `31 million (70-75%) of waste is dumped into open landfill sites. Globally, India currently ranks seventh in terms of overall food wastage agricultural produce, poultry and milk (Thacker, 2018). As the country with the second largest population in the world, with 22% of people under the poverty line, it is clear that a fully functional and efficient welfare system, with adequate food distribution, is extremely crucial (Thacker, 2018). However, the FAO estimated in "The Stage of Food Security and Nutrition in the World, 2017" report that 190.7 million people are undernourished in India - 14.5% of the population (Gustavsson et al., 2011). To bring this to comprehension, that is a population more than three times the size of the UK's entire population, making India the country with the most number of undernourished people in the world.

However, despite these frightening statistics, the UN estimates that more than 40% of India's food production is wasted, discarded, damaged, or lost, costing India more than 1 lakh crore rupees every year (Gustavsson et al., 2011). A majority of this wastage in India occurs prior to packaging, due to problems and insufficiencies in the infrastructure and transport of the country - while the government and its related departments have looked into this crisis, attempting to find investments and remedies for the situation, the issue persists. There is a need for a more holistic reform with better technology to reduce the wastage that occurs. With respect to a more specific and regional idea of food wastage, it is seen that India's capital city, Delhi, generates 9000 metric tonnes of food waste per day, which is dumped in landfills, where India's largest landfill is located in East Delhi -- 70 acres wide and containing nearly 12 million tonnes of waste, reaching a height of 50 feet (Goswami, 2018). Further, as per the BMC, Mumbai, another metropolitan city, generates nearly 9500 tonnes of solid waste -- of this, 73% is food, fruit, and vegetable waste, where the landfills in the city are many times taller than five storey buildings (Goswami, 2018). About 21 million tonnes of wheat rots in India every year -- this is equal to, or sometimes larger than Australia's total annual production (Goswami, 2018).

## **DISCUSSION**

The primary challenges with reducing food wastage and preventing the ongoing crisis from escalating lie with the management of fresh food supply chains. This is an intricate web of systems and activities, which due to its complexity has led to multiple problems through time. With the rise of recent concerns of public health, food safety, food quality, demand and price variability, and the limited lifetime of these products, there is a need for revised system. Food, specifically fruits and vegetables, are perishable and have a short shelf-life, due to which inventory management becomes crucial (Beshara et al., 2012). Apaiah and Hendrix (2005) proposed a methodology for designing efficient food supply chains and identifying problems in supply chains - which if implemented could be largely beneficial in a country such as India. It is important to realize the crucial element of supply chain design, where one of the critical parameters of fresh produce fruits and vegetables is that their short shelf life results in their degradation very quickly -- there is a need for appropriate transportation as a part of resource management, with the correct environmental and hygiene conditions during this time (Nasim, 2011). Further, the loss of food items is due to the organic nature of the existing supply chain design in India, with greater challenges from an integrated management perspective. An effective supply chain would manage the interactions between these systems such that there is increased food quality, reduced wastage and greater profitability.

Keeping profit in mind is an important element, specifically with respect to farmers and various intermediaries include cold storage and transport services. Waste reduction is ultimately the

principal factor in achieving sustainability of the food supply chains (Kaipia et al., 2013).

Carter and Rogers (2008) proposed the triple bottom line for sustainability. They argued that a firm has to do well in the areas of economy, society and environment to achieve sustainability and that sustainability should be part of an integrated strategy for managing the firm. It is hence important for systems in India to look into different models that could better analyze the flaws that exist - including Interpretive Structural Modelling (ISM) techniques (Nasim, 2011). The major contributors to food waste in the supply chain are processing waste, lack of cold-storage facilities, process contamination, improper packaging, transportation losses, higher inventory due to poor forecasts (Papargyropoulou et al., 2014).

When these inefficiencies in the fruits & vegetable supply chain are addressed leading to the minimum loss of food from harvesting to the point of consumption, it has enormous economic, social and environmental benefits. There is a lack of studies on food wastage along the food supply chain (Mena et al., 2011). It is, thus, important to study the elemental interactions between different stages of the supply chain, as well as the government leadership and politics in India which has resulted in marginal betterment yet a continued high prevalence of food wastage. Studying the system can lead to more efficient decision making (Nasim, 2011).

## **POLICY RECOMMENDATIONS**

India's complex food chain is subdivided into various elements, departments, and small scale stakeholders. It is in coordination and management between these individuals that there is a large gap which exists. The infrastructure connecting these systems is weak, and the different kinds of stakeholders (farmers, wholesaler dealers, manufacturers, retailers, transport services, cold storage owners) all operated isolated from one another with their own practices (Thacker, 2018). Further due to the lack of demand forecasting, farmers attempt to sell what they produce in the market quickly without proper coordination with other systems. The primary policy recommendation that can be provided in this regard is that there is data integration, financial flow management, supply-demand matching, collaborative forecasting, information sharing, goods movement synchronization through efficient transport scheduling, mimicking the method of practice in MNCs, private corporations and other high technology industries which are very profitable. These best practices should find their way into food supply chains.

Moreover, there is a need to minimize the wastage through cold storages by practicing advanced cold chain logistics through the use of "technology improvements in data capture and processing, product tracking and tracing, synchronized freight transport transit times for time compression along the supply chain and supply demand matching" (Halloran, et.al). The integration of different levels of the supply chain must be performed by the government and ministries in

parallel with concentrated efforts to weed out unnecessary bureaucratic barriers and corruption at various levels of hierarchy and supervision in food distribution and ration services. Supported by IT tools and software, the different kinds of sectors - agriculture, fisheries, horticulture and aquaculture - must work in cohesion with transport, packaging, and storage companies, as well as retailers wholesalers and caterers who are the last stage of the supply chain (Thacker, 2018). The value added at each level of the chain by new ownership, distributors and packers must be kept in mind, with profitable approaches being taken to the food distribution system such that the need for understaffed and underserved bodies, corruption, and wrong practices is weeded out.

Finally, as consumers, it is important that the government initiates sustained campaigns and marketing for the reduction of food wastage in corporations, institutions and even at the lowest societal family unit. This must be done with incentives added, perhaps through the organization of coordinated food drives that collect waste food from large institutions and redistribute or repurpose them as required. Further, there is a need to limit the excessive number of third party transport and logistics providers in the supply chain, keeping it to just the core organizations and services which provide efficient infrastructure with minimal wastage.

## **CONCLUSION**

This paper has traced the notion of food wastage and reviewed the statistics, data and scholarly literature around both the analysis of food wastage in developing countries such as India, as well as models and methods to remedy its existence. Aside from critically analysing the different stages of the food supply chain and considering the various barriers that exist to food security in the country, policy recommendations have been made for effective resource management, and reducing the wastage of food. These include scenarios where the government can set up food collection drives and services where they collect food from every source, and set up a shelter where the hungry people can come and feed themselves for free or at a subsidized rate (Thacker, 2018), as well as the need for removing the negative influence of corruption and excess bureaucracy at every step of the complex and intricate supply chain.

Further, the paper discussed the importance of coordination between various stakeholders of different sectors with other parts of the supply chain, such that there is minimal wastage of food which has a low shelf-life, high perishability, and ease of degradation. With these initiatives, the paper hopes to inform future scholars, policymakers and educators to bring to the foray the large food wastage crisis that exists in the country, and to create public discourse to provide solutions to the problem, and remedy it at the earliest at the national level.

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