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Improving Food Security in India: Reducing Waste by Improving Infrastructure

“While India and other developing nations struggle to feed all the population, it’s an irony that this much of food is wasted and not a lot of people know about this.” (ACT on the FACT) Many people know there is hunger in the world, but most people either don’t know why or just assume people are too poor to buy food. Not many people realize the amount of food that is wasted throughout the entire world. A survey was done in the United States to determine the amount of food waste in retail stores. The anchor that publicized the report was completely clueless about the amount of food wasted in the United States, much less all the millions of tons of food wasted in India. (Ground Reality)

There are lots of causes for the enormous amount of food that is wasted each year in India. Some of the many reasons include poor storage and distribution facilities. Inadequate storage infrastructure is the main cause. There is a lack of refrigerated storage, transportation, and distribution, poor roads, harsh weather, and just all around corruption. (Food Wastage in India Is a Problem) The inefficiencies are outrageous and waste reduction and prevention needs to be a higher priority. (Sustainable Approaches) No person should have to go hungry simply because an inefficient system. Human life cannot be compared to money, time or quality of proper facilities. (Food Wastage in India Is a Problem) “Without adequate infrastructure to store and transport crops, enormous amounts of food are lost on the way from farms to consumers’ tables.” (Sustainable Food Waste Prevention Strategies)

“The congestion in infrastructure makes it very challenging... Cold chain is the most important... It is critical to improve the cold-chain infrastructure.” The cold chain portion is composed of companies with cold storage facilities. “A lot has to be done by the government; for example, road connectivity from ports is poor... Then you have to have a transportation outlet. Western Europe may be a very good example for India, where the highway system and railway system is very efficient. When you have that many people as in India, it represents a challenge and an opportunity.” (How to Solve India’s Huge Food Wastage) It’s a challenge to feed all the people and have enough employment, but also great economic opportunities to bring in businesses, companies, and more jobs. “A reliable, efficient delivery system ensures quality, enhances the reputation of the product and pays economic dividends... the ability to move products is a value-added service that plays a key role in the company’s success... In that sense, transportation itself is like a commodity moving up and down with supply and demand.” (Nebraska Pork Producers Association) Cold chain companies constitute 85 percent of the market, while only 15 percent is transportation services. In 2010, there were 25,000 perishable transportation vehicles. Of these, 80 percent were used for milk which left only 5,000 vehicles to move all other produce in India. “If the projected growth in food production becomes a reality and cold chain industry investments are not made, the current food waste scenario will only become worse.” (THE FOOD WASTAGE & COLD STORAGE) More vehicles for transportation would reduce quite a bit of the current distribution problem. Reefer trucks with refrigerated trailers to haul produce would cause less spoilage overall.

Poor roads and rail links reduce efficiency, especially in the more remote parts of the country. (Sustainable Approaches) Many farmers do not have the efficient means to transport their crops, which is necessary to ensure food quality for consumption. The majority of roads are not paved and it takes time to travel cross-country. There needs to be super highways connecting cities and also a robust railway system. “Quality agriculture may begin in the field, but it continues on the road, the rail and the water.” (Nebraska Pork Producers Association)

India is the world's third-largest producer of apples. When the apples are transported they are packed in thin wooden crates in unrefrigerated trucks over poor roads. Higher quality boxes, better roads and refrigerated transport would highly reduce the amount of damage done to the fruit during transportation. When the apples arrive at small local markets they are so badly bruised that the prices lower significantly. (THE FOOD WASTAGE & COLD STORAGE) The lack of reefer trucks for adequate transportation also adds to the production costs and increases losses. These price cuts keep the farmer from being able to make a profit. Without any profit, the farmer struggles to pay the costs of next year's crop. This is just a continued cycle that keeps spiraling down.

Food is not just wasted in one place in India. It is wasted throughout the entire country and from a variety of regions and areas of the community. Waste could be avoided if government-run programs designed for millions of tons of grain for low-income families each year would not have widespread inefficiency and corruption. (Sustainable Approaches) Many times the food is not distributed correctly or efficiently. Government programs are expensive and can cause debt. It takes a lot of food to provide for the millions of Indians who are starving in poverty. When the products supplied for the program are wasted before they get to the people in need, it makes for a very expensive and avoidable trash can. Parties, weddings, restaurants, hotels, supermarkets, households, and warehouses are some of the other areas where food is wasted. (India Wastes 44,000Cr)

The huge amount of food waste has countless effects on the country. There are 250 million people or more who go to bed hungry each night in India. (India Wastes 44,000Cr) Other sources estimate this number of people to be even higher. More than 850 million people in developing countries were undernourished in developing countries throughout the world. (Food worth Rs 58k Crore) One-third of these people are hungry, starving children. (The Horror of Wasting Food) Many have chronic malnutrition or lack of nutrients that has negative repercussions mentally as well as physically. Mental and physical growth stunts will not help India to lift its people out of poverty. In 2012, about 7 million children died because of malnutrition and hunger. (ACT on the FACT) Health of adults also deteriorates which causes work capacity and productivity to be reduced. (THE FOOD WASTAGE & COLD STORAGE)

“India immediately needs to take a strong stand on this glaring issue of lack of food storage facilities and proper infrastructure. A new study says that 21 million ton of wheat goes to waste in the country every year. Note here that when food is wasted, natural resources and human labor goes along with that waste; it is not simply just food. Take into account the time and money wasted into growing that food. For example, it takes about 1,000 liters of water to produce one liter of milk.” (Food Wastage in India Is a Problem) If just five liters of milk are wasted, 5,000 liters of water that was used to produce it are also wasted. India is one of the world's largest milk producers. The cold component is better managed in the milk chain because it is more organized. Lots of work and money has been put into the dairy business; therefore, it is a successful and growing industry. (THE FOOD WASTAGE & COLD STORAGE)

India is one of the world's largest producers of fruits and vegetables, but also one of the top countries of food waste. (Emerson Study) As much as 20 to 40 percent of food grown in India spoils before it gets to the consumer according to reports. (Sustainable Approaches) Of all food that is bought 20 percent is thrown away. (India Wastes 44,000Cr) People could benefit from the excess food. More organizations need to follow in the footsteps of Annakshetra, which is a nongovernmental organization that distributes excess food to the needy. It was first set up to collect leftover food from celebrations and to reduce hunger. It also decreases the carbon footprint made and multiple problems could be resolved. The hungry would get food and nourishment, less food would be wasted which in return causes other resources such as water, time and labor to be wasted, less greenhouse gases would be emitted from decomposing foods, and landfills would not be filled with wasted food. (Sustainable Food Waste Prevention Strategies)

Thirty percent of India's fruits and vegetables spoil due to lack of storage facilities. (India Wastes 44,000Cr) Fruits and vegetables make up 70 percent of the total produce wasted but contributes to 40 percent of the economic loss as fruits and vegetables are not very expensive. (India Ahead of China in Wasting Food) Meat only accounts for four percent of food wastage but makes up 20 percent of the economic cost of wastage. (India Ahead of China in Wasting Food) Meat is expensive and therefore a smaller amount wasted puts a bigger dent into the amount of money wasted because it is more expensive. "This equates to 65 million tons of wasted food due to post-harvest handling and lack of storage, which otherwise could have been money in farmers' pockets or food on the table." (Indian Solar Invention)

The prices of food have spiraled in recent months and the country's economy is completely falling apart, all because of "India's inability to preserve what it produces". Since India has such a crumbling infrastructure, many global companies look elsewhere for places to invest despite the many consumer opportunities available in India. Having a solid or even improved infrastructure would bring business into the country. It would create jobs and employment for countless more people.

The fact that India wastes so much of its produce means that it is also low on exporting these products. (How to Solve India's Huge Food Wastage) This will not help the state of their economy at all. Cereals, pulses, fruits and vegetables are wasted during both pre and post-harvest times. (India Ahead of China in Wasting Food) The actual worth of money that goes to waste each year in India is 58,000 crore which translates to millions of tons of food wasted each year. (ACT on the FACT)

Tons of food-grain rots in ill-equipped warehouses every year. (Sustainable Approaches) The Indian government has 75 million tons of grain on its hands after last year's production. (Food Wastage in India Is a Problem) It has only the facilities to store 63 million tons in state-run warehouses whereas other countries such as China have more than double that in storage space. China has 150 million tons for food storage. (Food worth Rs 58k Crore) Millions of crops may be left out in the open, exposed to the weather and rodents, or may have only a waterproof sheet for cover as a makeshift warehouse. (Food Wastage in India Is a Problem)

Currently there are 6300 cold storage facilities in India. This amount needs to at least double in order to decrease food waste and keep up with production. Of the present cold facilities, about 60 percent are located in just four states. The term cold facilities in India does not necessarily mean refrigerated, however. Cold facilities could just mean an air conditioned room. Many warehouses simply store the produce on shelves or in bins of an air conditioned room. (THE FOOD WASTAGE & COLD STORAGE)

Effects on the country and its economy are endless. Price instability causes a continuous, vicious cycle. This can cause farmers to let fields full of crops to rot because of unexpected plummets in prices from overproduction. Some potato farmers dumped their potatoes in the street as a protest against government inaction. (Sustainable Approaches) There is more than enough food produced in India to feed its entire starving population, but the government is not doing much to assist in the proper storage or distribution of food. A new study by the Institute of Mechanical Researchers revealed "the quantity of wheat wasted by poor storage is equal to the entire production of wheat in Australia." (The Horror of Wasting Food)

Food grain production has increased slightly in the last couple years, which is great, but it creates another problem. Storage space and facilities are not increasing at the same rate as the grain production. This means more food to be wasted because of lack of improper quantity of amenities to store it. (Food Wastage in India Is a Problem) No longer is there just inefficient and proper storage facilities; there is a shortage of space to store the grain and other food products. (The Horror of Wasting Food)

Another problem in India is the scale on which farmers own and produce. Farmers only have several acres instead of several hundreds of acres which prevent them from purchasing efficient technology and

equipment. (Sustainable Approaches) There is no machinery to help with the planting or harvesting of crops. They do not have the equipment to produce mass amounts of produce efficiently, therefore, they only produce and sell small amounts. The farmers have only a small limited profit because they produce on such a small scale. It becomes a brutal, continuous cycle. They are stuck in the mud in a sense and they cannot get out. This causes some foods, such as rice, to have a very high price. India uses an estimated 230 cubic kilometers of fresh water each year to produce food that gets wasted in the end. (India Ahead of China in Wasting Food)

A few entrepreneurs and researchers have begun to approach the challenges of reducing food waste and improving efficiency, but it is a slow process. (Sustainable Approaches) Although India is one of the top producing countries of the world, India is in the top wasting countries of the most food globally also. With solely India and China, 1.3 billion tons of food is wasted each year. (India Ahead of China in Wasting Food) That is enough food to feed every person in China one ton of food. A lot needs to be done in order to improve. It can be done but will take lots of time, effort, money, and innovative ideas to do so.

One example is a waste-to-energy start-up company that is working to convert food waste into renewable energy to power the city street lights. Gangotree Eco Technologies Company is headed out of Pune which is a city of over three million people. Gangotree is working with Pune's municipal officials to convert food waste into renewable energy to be used as power for the city street lights. This is using proprietary methods of conversion but the business is growing rapidly. The company leader believes that Pune could be a waste-free city in a matter of just a few years and is deliberately working to achieve that goal. (Sustainable Approaches)

Many companies have not invested in waste reduction or cold storage because costs are rising. The costs of real estate for a building, energy, and uneven distribution of facilities have scared many away. The cost of initial investment for a cold storage facility in the United States only requires half the funds comparatively as if it were in India. Land prices are increasing along with equally expensive electricity bills. (THE FOOD WASTAGE & COLD STORAGE)

A solution found that detoured these setbacks is dried food. Three Indian graduate students came up with a simple yet innovative technology that attends to key shortages which many rural Indians are faced with- food, electricity, and income. The three students developed the Solar Conduction Dryer. This invention dries fruits and vegetables by converting the sun's energy to a renewable energy source which will enable farmers to preserve and sell their food for a higher price. This will reduce spoilage by extending the shelf life and retaining the nutritional value of the food. This will allow farmers to earn more money also. One of the inventors commented that it will benefit those farmers and fishermen with poor access to electricity. Many people are without electricity; therefore, this solar power will allow them to get useable energy from the sun. (Indian Solar Invention) The dryer can also be used for fish or whatever food is needed and will be sufficient when dried.

New technologies of solar powered cold storage facilities with separate chambers to hold different products that each has controlled temperature gauges are needed. A remote to enter the type of produce being stored would change the temperature and atmosphere of each chamber. The concentration levels of gases would be maintained depending on the type of product. As the kind of product is entered into the remote, the conditions of the chamber would automatically change based on a pre-set for each type of product. This would increase shelf life and ensure the freshness and quality of the produce. Just entering into the controller the type of produce being stored would simplify and hasten the process for workers, unskilled especially. (THE FOOD WASTAGE & COLD STORAGE)

India is ahead of China in wasting food items which has a dramatic effect on natural resources. (India Ahead of China in Wasting Food) Food, water, energy, labor, and time are all wasted together when edible items are thrown away. Every bite of food thrown away, know that someone else in the world is

hungry. (Food Waste in India Is a Problem) Somebody else desperately wants even just a couple bites of what someone just took for granted and tossed in the garbage can to go rot in a landfill. As Pope Francis said, “We should all remember, however, that throwing food away is like stealing from the tables of the poor, the hungry! I encourage everyone to reflect on the problem of thrown away and wasted food to identify ways and means that, by seriously addressing this issue, are a vehicle of solidarity and sharing with the needy.” (The Horror of Wasting Food)

“We need to act on the fact of food wastage in India to keep this country from falling apart... About 20 percent of what we buy in urban India ends up being thrown away.” (ACT on the FACT) Unless everyone realizes the extremities of food waste and the importance of stopping it, it will go on and continue to have effects on those who suffer from it. (The Horror of Wasting Food) Urban areas in India are increasingly wasting more food. Recently even up to 35 percent of all food wasted in India is in urban areas. (ACT on the FACT)

All of India’s food waste puts a toll on the environment. Rice has a huge environmental impact because it releases methane, a strong global warming gas, when it decomposes and organic matter is immersed in paddy fields. (India Ahead of China in Wasting Food) Rice is not the only wasted food letting off greenhouse gases though. All food that gets to a landfill has to decompose sometime, and when it does, it lets off gases. Carbon dioxide and methane are just a couple of the gases emitted from rotting food that consumes landfills.

There is extreme water waste from agriculture because of food waste also. Water gets used to produce food that just gets thrown away in the end. There are 79.2 million people in India are located in poor, rural communities. “Their livelihood depends on agriculture and other natural resources.” (Indian Solar Invention) Two-thirds of all families in India have ties to the agriculture industry. Manpower and electricity lost in food processes as well as deforestation is also becoming a larger problem. Food production all the way from harvesting to transporting to cooking and serving at the dinner table all take major efforts. Lots of hours of hard labor, trees being cut down for farm land, electricity for processing, time for transport and the list goes on and on for what is needed in order for anyone to eat on any given day, anywhere, at any time. It is just a mean, unending cycle that can’t seem to be broken.

Many farms are very small and consist of multi-generation families. On average about six people live in a household: two kids, parents, and grandparents. The majority struggle to get by, barely making ends meet, much less having insurance or any such thing. They are self-sufficient and most do not have much of an education at all. The average Indian attends school for five years compared to the American average of 12 years of school. Education is free but it has done “little to attract or retain students.” (How to Solve India’s Huge Food Waste)

All farm work is done by manpower which creates countless barriers for the farmers. The family and sometimes close friends do the planting and harvesting by hand. The average farm in India is only several acres compared with the several hundred I most developing countries which makes it difficult for farmers to invest in more efficient technology to cut the amount of time and labor. (Sustainable Approaches) A typical farm in India is 1.37 hectares or about 3 acres. Machinery for planting and harvesting would reduce the amount of time and labor put in which would reduce the costs for consumers while increasing the supply available. One-third of all Indian people live in less space than US prisoners. (33% of Indians)

Commonly the people in India eat fish, lamb, and poultry depending on the region. Many meals consist of tomatoes, cucumbers, eggplant, unleavened bread, rice, and bananas. Half of the Indian population is vegetarian due to religious beliefs. There are .07 doctors to every 1000 people currently. Having paved roads, refrigerated transportation and storage means, easily accessible means of transportation, and modern technology throughout the industry would be very beneficial. India would reap the benefits of having an improved efficiency in infrastructure throughout.

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