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The Global Food Supply Chain is Broken. Here are Some Best Practices Used to Fight the Challenge

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There is enough food in the world for everyone to lead a healthy and productive life but roughly 14% population of malnourished. What is the missing link in food security that we have yet to figure out? What is the current scenario of global hunger? Where does most food wastage occur? What are some of the more successful methods being used by governments and corporations to reduce food wastage?

Understanding the Problem: Defining Hunger and Food Insecurity

Zero Hunger is the second goal on the list of seventeen Sustainable Development Goals (SDGs) of the United Nations. The goal, according to the UN is to end all forms of hunger and malnutrition, ensure access to "safe, nutritious and sufficient food all year round", have climate resilient agricultural systems in place, and double agricultural productivity by 2030. These goals, while ambitious, are achievable. However, it will require coordinated international effort and a fundamental re-think of how the global food supply system works. This article paints the status of global hunger, the challenges we face in our food supply chain, and look at some of the best practices adapted by government and private sector to tackle food insecurity.

While the concept of hunger is straightforward, it is challenging to come up with metrics to define global hunger. Quantifying hunger in a meaningful way is as difficult as it is important. A World Bank article titled "More to do on measuring hunger",

published in 2014, highlights the scope of this problem. By varying the experiment design, the researchers were able to reach vastly different estimates for hunger levels in the population: the lowest estimate being 19% with the highest estimate at 68%. This is a challenge for policymakers who need accurate data so that they can direct resources according to the severity of the problem in their jurisdiction.

The Prevalence of Undernourishment (PoU), a metric used by the Food and Agricultural Organization (FAO) since 1999, cannot be calculated at an accuracy over 95%, with the actual margin likely higher. This is an inadequate level of accuracy for the goal of zero hunger. In 2019, FAO intrudes the Food Insecurity Inexperience Scale, an eight-item module that aims to quantity people's experience of hunger. Although true validation is near impossible, the metric has compared favorably to other established indexes. The data produced by this method have successfully been used by countries like Burkina Faso and St. Lucia to produce their own estimates of food security.

Some organizations have also defined hunger in terms of calories of food available per day. Action Against Hunger, a US-based non-profit that works to eradicate world hunger defines the problem is having access to fewer than 1800 calories of food per day. Unite for Sight, another non-profit defines it as having access to fewer than 2100 calories of food per day, a figure that the US Department of Agriculture agrees with.

Global Access to Food: Current Scenario (From FAO Report)

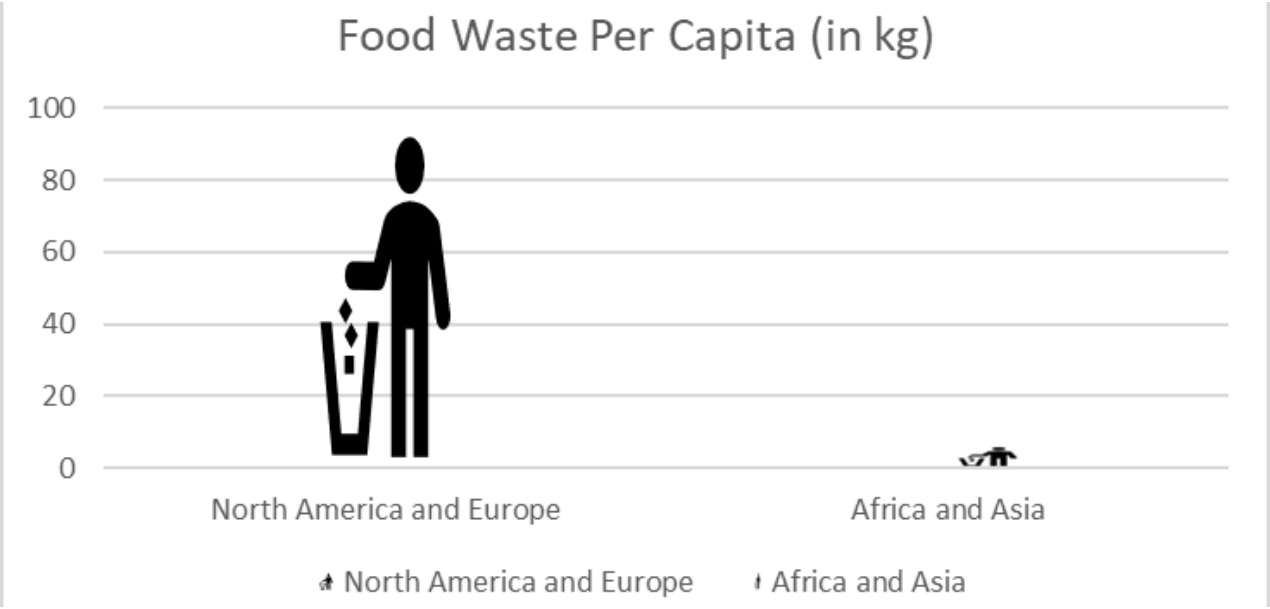
Following a steady decline in the level of undernourishment since 2005, global hunger is on the rise again. It is estimated that about 10% of the world's population, or up to 811 million people go hungry every day, with up to 48 million people facing emergency levels of hunger. To further exacerbate the problem, Ukraine, a country responsible for over 16% of the world's corn supply, has been drawn into an armed conflict. Asia was the only region to see a decline in food insecurity levels in 2021 when compared to 2020 figure. However, this figure is still considerably higher than pre-2014 levels. Northern [AS1] [A2] America and Europe have the least food insecurity, while Africa's food insecurity, already the most insecure, has increased by 13.5% from 2014 levels.

There also exists a gender gap between men and women when it comes to food security. Across all regions, women experienced higher food insecurity compared to men. This gap was further pronounced after the coronavirus pandemic, where women were more severely affected by the loss of economic opportunities and access to food. Every continent except for Africa saw a decline in food insecurity for men but an increase for women when compared to 2020 figures. In Africa, food insecurity increased for both genders.

[AS1]Can we word this sentence on a positive note? Something along the lines of - 'Asia was the only region to see an improvement in food security' instead of 'decline in food insecurity'. There's double negative words in the sentence

[A2]Food security and insecurity is defined differently and not as exact opposite to each other. I am not sure it would be accurate to change this. I realize this is a double negative but I think if we are to include this fact, it has to be this way.

Food Wasted by End Consumers by Region



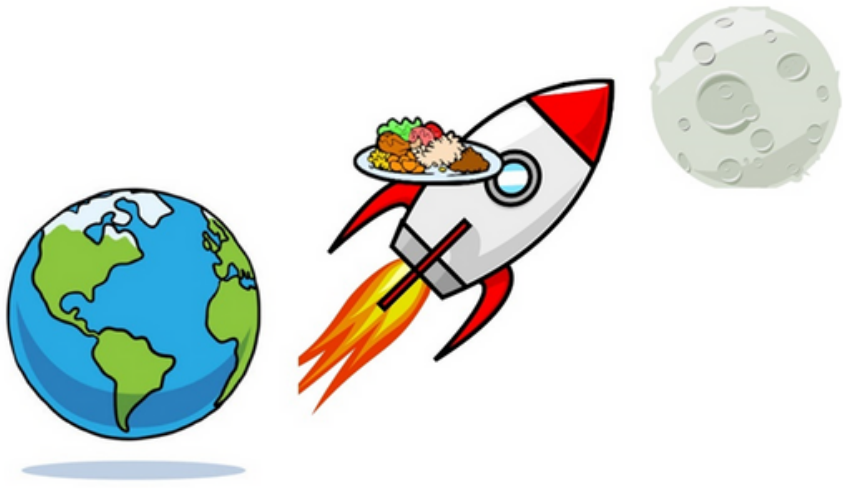
Consumers in developed economies tend to waste ten times as much food when compared to their counterparts in the developing world.

Figure: About 1.4 billion hectacres of land is wasted in landfills pertaining to food waste. To put that in context, that is the area equivalent to twice the size of Australia.

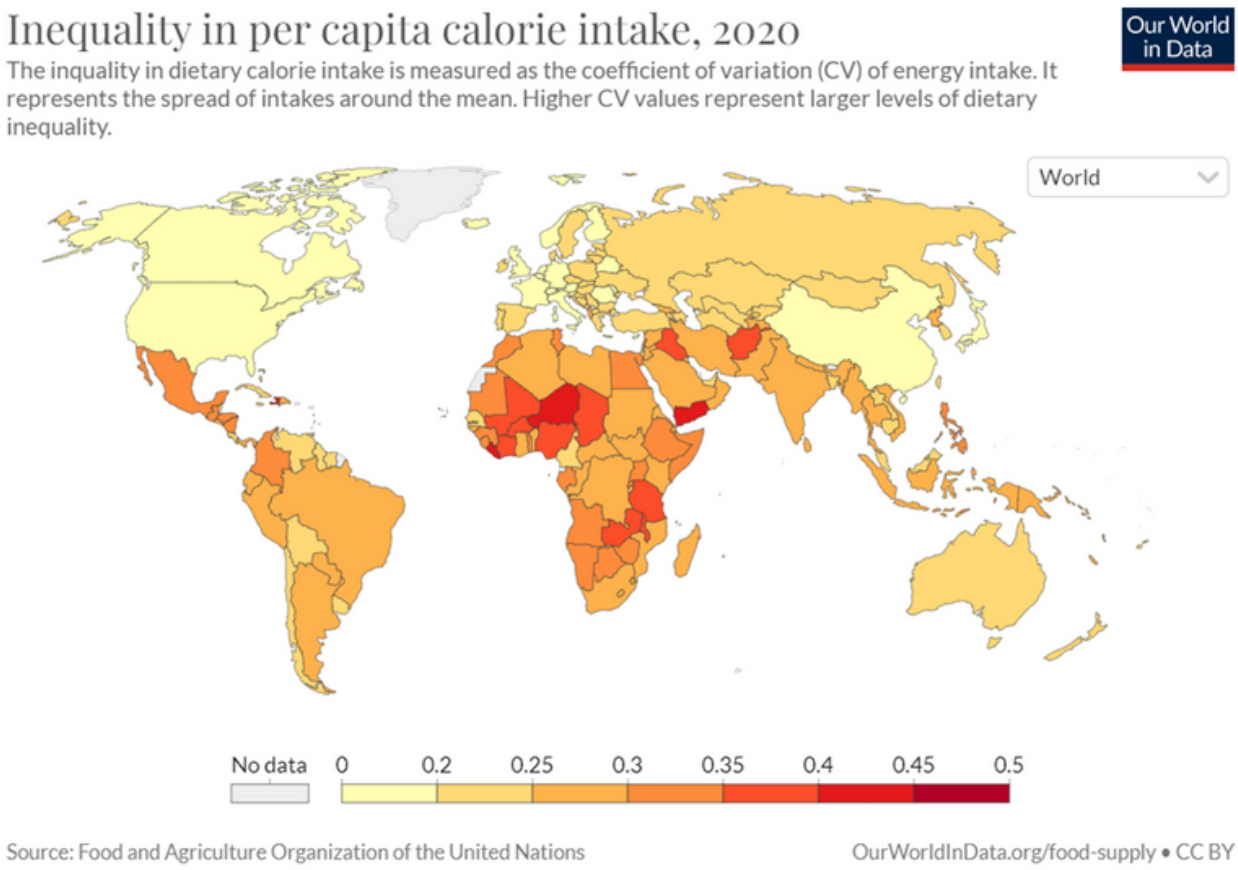
Figure: The world food program estimates that about 1.3 billion tons of food is wasted annually. That is equivalent to twice the amount of rice harvested in India annually

How Many People Can be fed by food currently being wasted?

The total food wasted in Earth is enough to feed around a billion people. The losses amount to almost a trillion dollars, with the industrialized nations accounting for more than two-thirds of that amount.



Each meal in the USA travels, on an average of 1500 miles. To put that into perspective, the distance travelled by food eaten in one year is equivalent to a journey to the moon and back.



Why is Hunger Still a Global Issue?

The sad fact about hunger is that the problem is not a result of shortages in production. Currently, the world produces more than enough food to feed everyone. Food loss, contrary to food waste, towards the early stages of the supply chain. The United Nations Environment Program hypothesizes that "Even if just one-fourth of the food currently lost or wasted globally could be saved, it would be enough to feed 870 million hungry people in the world." An interesting point of note is that while most of the waste in developing regions occurs at the production stage, in developed countries it occurs towards the end of the supply chain. The UN estimates that about 14% of global food production is lost before it even reaches the market. Charities like Save Food Initiative put this figure as high as 33%.

Storage and Transport Issues

Inability of farmers to safely store food is one of the biggest challenges to food security. In India, about 40% of produce is lost because of inability to store food safely. The problems range for lack of cold storage facilities to inadequate processing capacity. In developing countries, farmlands tend to be remote, with inadequate infrastructures like roads and processing plants. Further, poorer countries tend to have smaller fragmented farms. This makes it economically not feasible for large private investments as farm produce tend to rely heavily on economies of scale for profitability.

The Want for Aesthetically Pleasing Food

Aesthetics plays a big role in food being consumed. A 2017 report ordered by the House of Commons in England reports that as much as 25% of fruits and vegetables are not considered for purchase by consumers because they look “wonky.” Changing this stigma can reduce food waste by as much as 15%. Consumers need to be aware that aesthetically “imperfect” food is suitable for consumption. Purchasing “ugly” food is also likely to be easier on the pocket, as most retailers discount this type of produce.

Economics: A Major Driver of Food Loss

Food loss is function of many factors and farm economics is among the most critical ones. Factors like labor cost and availability, the market price of the produce, retail standards, and competition all play a role in determining food loss even before the produce leaves the farms.

Overproduction of a single type of crop can mean a crash in market price of that produce, making it unprofitable for farmers to harvest their yield. Countries like Nepal frequently face farm labor shortage, resulting in declining production and yield of important food crops like rice and paddy. The UK reported that £22 million worth of harvest was wasted because of labor shortages.

While it may be tempting to produce food is mass quantities, excess production of the same crop falls victim to the invisible hand of the market. Cases of price crashes like the one seen by Indian tomato in 2017 or the one seen by potatoes in 2021 Canada can strongly discourage farmers from future cultivations.

Fighting Food Wastage: Best Practices

So, what can we do to reduce food waste? Individual responsibility is key and obviously very important. However, to fight waste on a larger scale, collective effort is needed. Here are some best practices adopted by governments and corporations to fight food waste:

Rethinking Expiration Dates

Legislation is key to tackle food waste. While almost every country has legislation regulating food in some way or the other, these laws should reflect the changing times, technology, and attitude towards food. Perhaps the place where biggest change is regulations relating to expiration dates. Governments are starting to realize that “expired” does not mean unsafe for consumption. In fact, France has banned the use of expiration dates on certain food items. Denmark has also made it legal to sell expired items so long as it is clearly labelled.

Developing countries, however, are yet to follow suit. In countries like India and Nepal, selling expired food is illegal and subject to fines and even criminal proceedings. There is also stigma against the consumption of expired goods. Surveys conducted in the US show that anywhere between 80 to 90 percent of consumers waste perfectly good food just because the food has expired. That equates to $400 worth of produce thrown out per person.

Make Food Labels Meaningful

If you are confused by the various “best before,” “use by,” “sell by,” “expiry date,” “freeze by,” and a hoard of other terms used by food manufacturers to label their food, you are not alone. In a 2018 study conducted in India, over 57% of the consumers did not understand food labels completely while 40% understood the labels only partially.

To further add to the mayhem, there is no internationally agreed upon definition on what each of these terms mean. This is a major problem as 80% of the world's population is dependent on imported food. Standardizing these labels and having internationally shared meaning will be a significant step towards the prevention of waste arising from the misunderstanding of the various dates.

Making it Expensive to Waste Food

While buying more food that you need is obviously expensive, making it costly to throw the waste can be a great incentive to reduce excess. In late 2014, the Korean government introduced a "pay as you trash" incentive. According to this law, residents would be charged for their waste on a per kilo basis. German restaurants have also implemented fines against guests who waste food. Spain and Italy have also started to introduce fines against supermarkets that waste food. Other jurisdictions would do well to imitate these types of legislations.

Making it Expensive to Waste Food

To secure access of food to everyone, technology will play a crucial role. Use of big data and artificial intelligence is already helping supermarkets make more accurate predictions about the quantity they need to order to minimize waste. Progress in farm technology, seed yields, use of GMO crops, and other innovations are not only aiding the increase in production, but it is also helping for a more efficient supply chain. Charities in countries like India and Ireland are using mobile apps to facilitate the collection of surplus food.

Minimum Price Guarantees and Farm Subsidies

To stabilize farm prices, the government in India practices a “minimum support price (MSP)” for certain crops. If the market price falls below these limits, the government then purchases the crops at MSP. These incentives allow farmers to harvest “extra” to account for the possibilities of a poor harvest without having to worry about price crashes in the market. Almost every country on the planet has some sort of subsidy made available to farmers, ranging from soft loans to direct cash injection, crop insurance, and a purchase of crops at price above fair market value. These mechanisms are useful in incentivizing production amidst climate change and increased threat of pest and disease.

Vertical Farming: A Way to Shorten the Supply Chain

Vertical farming is the practice of producing agricultural produce in vertically stacked layers in a controlled environment. First envisioned in 1999, this method makes a more efficient use of critical resources like land, fertilizer, water, and pesticide. Studies have shown that vertical farms consume 70-95 percent less water when compared to traditional farms and can provide up to 20 times higher yield for the same land area. The climate-controlled nature of this farming practice also means that harvest is less susceptible to changes in weather.

Vertical farming can be the missing link to shorten the currently exuberant distance between production centers and consumption centers. Because vertical farms can be run indoors, without the need for much open space, it can be the ideal solution for large cities. A point to note here is that vertical farms are efficient only for high efficiency high value crops like lettuce and strawberries. Grain crops like corn or paddy are not suited for vertical agriculture owing to their low tonnage and high energy consumption requirements.

Food Waste Reduction: A Case of The Baltimore Convention Center

In March 2018, in partnership with WWF, The Baltimore Convention Center tried a series of new steps with the aim of reducing food waste. The center used a combination of data and cultural shift to achieve this goal. First, they collected information about portion sizes, waste per person, and other relevant information to understand the problem better. They also sourced their produce locally, putting an emphasis on consumption of produce that were in season.

Another highlight was a competition among four chefs to make use of leftover food from a banquet to create new dishes. Repurposing, innovation, and use of technology were central to their efforts. They also partnered with FIltaFry, an oil recycling company to recycle the oils used in their fryers. This saved them over 2,700 gallons of oil.

Despite these best practices however, some food waste is inevitable. They discovered that a portion of the wasted food is suitable for farm animals, so they partnered with a local farm business, leading to a more efficient food cycle. Food that was not fit for any form of consumption was turned into fertilizer. Additionally, the convention center also organized a conference with guests from the local government and the local hospitality industry.

Food Waste Reduction: A Case of Good Legislation

In 2016, France became the first nation in the world to ban supermarkets from throwing away food that is still suitable for human consumption. The law, which passed without opposition in the French senate required supermarkets over 400 square meters in size to sign donation contracts with charities. It also banned the deliberate destroying of edible food. The law additionally places the burden of safe storage and distribution foods on the charities. It further simplifies the process of donating brand label items.

France has always been at the forefront of legislation against food waste. In 2012, the Waste Management Enforcement Law restricted the amount of organic waste French businesses could throw into landfills. The country has ambitious plans to halve food waste by 2025. Current laws are working. Food donations have gone up by 20% according to French government. These laws have also triggered awareness campaigns against food waste at the local level.

Conclusion

Food waste is a global problem, and a strong collective worldwide effort is needed if the goal to reach zero-hunger by 2030 is to be achieved. Food insecurity impacts the most vulnerable communities. The biggest challenges in food security are not of production, but of adequate supply chain infrastructure. There is a clear difference between developing and developed countries when it comes to food waste. The loss in developing countries is usually a result of inefficient production processes, a lack of adequate storage facilities, and an unavailability of transport infrastructure to move food from production centers to consumption centers. Food waste in developed countries tends to occur towards the end of the consumption cycles: retailers and consumers.

Cultural stigma also plays a huge role in the creation of unnecessary waste. There is a need for a reset in terms of how we think about food aesthetics and labels if we are to reach the goal of “zero hunger” by 2030. Clever legislative actions like forcing food producers and retailers to partner with charities and food banks to distribute produce they cannot sell has seen success in countries like France and Spain. The “pay as you waste” model, whereby consumers and industries are forced to pay waste management fees as per the amount of waste they produce has also seen success. However, like with any legislation, lawmakers should carefully consider local implications and adapt the laws to fit local infrastructural and cultural requirements.

There is a need for a public-private partnership and a shift in attitude towards food in order to reach a world with zero hunger and zero waste.