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India, Climate Volatility

The Impact of High-Emission Food Subsidies on Global Warming in India

India has faced a long history of challenges, from colonialism to its caste system and overpopulation. With ever-increasing industrialization, an even more pressing problem has emerged: global warming. Global warming is impacting India in a variety of ways, including melting glaciers in the Himalayas, rising sea levels on its coastline, and an increase in flooding, its most common natural disaster. Unless we halt the dire consequences of global warming, India's more than 1 billion residents will be especially vulnerable to catastrophe.

India is a developing country with a rapidly growing economy. A large number of people work as farmers, although urban jobs are common, too. Poverty is significantly more widespread in India than in most developed countries, with 13.4% of Indians having an income below the international poverty line (World Bank Group "Poverty"). However, India's economy is more stable and healthier than many other developing countries' economies.

Religion plays a crucial role in many Indian lives, as it can dictate social status, wealth, and job opportunities. Nearly 80% of Indians are Hindus—and often vegetarian. Other prominent religions are Muslims (14.2%), Christians (2.3%), and Sikhs (1.7%, Kramer).

Unfortunately, India is contending with many problems that make it especially vulnerable to global warming. Accounting for 17% of the world's population, India is the second most densely populated country in the world, averaging 464.15 people per square kilometer (India Population 2021). This makes it harder for people to evacuate during natural disasters, and it forces people to live in less safe areas, since there is not enough land for everyone. Additionally, its caste system is detrimental to those born into a lower caste, which makes it much harder to earn a living (Joshi). Impoverished people are more vulnerable to the effects of global warming, without the resources to prepare supplies, choose a less exposed job, or live in safer areas. Lastly, colonialism has left a negative mark on India, as it was only recently liberated from British rule in 1947. Britain plundered $45 trillion from the Indian economy in today's monetary value over its 89-year rule, as well as heavily controlled the government (Chadhury). India's economy now stands to lose an additional $35 trillion over the next 50 years if global warming is left unchecked (Masterson).

In addition to exacerbating existing problems, global warming brings new problems to India. Firstly, global warming has upset the regular patterns of monsoon season, posing dangers to crop yields and people (World Bank Group "India"). Of course, flooding directly threatens nearby residents. Additionally, rising sea levels could submerge port cities home to 28 million people (Awasthi), due to India's proximity to the Equator, 7,500 miles of coastline, many unplanned cities, and heavy usage of reclaimed land ("Rising Tides").

What is more, India is facing problems from having too little water. Numerous Indian farmers require seasonal meltwater from the country's 10,000 glaciers (Roy). With glaciers permanently melting, farmers are getting less meltwater to grow their crops, thus increasing poverty and food insecurity ("Melting Asia"). Additionally, heavy droughts also threaten crops ("India: Climate Change Impacts"). Together, heavy droughts and rising temperatures will make Indians more vulnerable to food shortages.

One of the largest causes of global warming is food production, which is responsible for about a quarter of total emissions worldwide (e.g., 26% of total emissions worldwide in 2015, Ritchie, et al). This includes land usage, food distribution, and production processes. Livestock farming accounts for three-

fourths of those emissions (Haq). Decreasing the environmental impact of food production can stem the effect of global warming in India—and globally.

Because everyone needs to eat, it's important to scrutinize the impacts of different crops and farming methods. For example, lamb releases around 92 times as much carbon dioxide per kilogram of food as nuts (Ritchie). Looking at those foods with the highest impact on the environment, meat and dairy typically emit more carbon dioxide than plant-based foods, and red meat usually has a larger environmental impact than white meat and fish (Ritchie). It follows that both food producers and consumers should make educated choices about what to produce and eat.

Consequently, a good way to slow global warming is to shift production away from high-emission food products. Some protein-rich alternatives to meat and dairy products are tofu, soybeans, nuts, seeds, lentils, peas, and beans (Cleveland Clinic). Each of these alternatives release less than 3 kg of emissions per 100 grams of protein on average—compared to nearly 50 kg for beef (Ritchie). For example, a non-vegetarian meal with mutton emits 180% as much greenhouse gases as a vegan meal (Bhatia). In fact, the U.N.'s Food and Agriculture Organization (FAO) found that current model for industrialized livestock production is unsustainable in its resource requirements and environmental impact (Castel, et al). By growing and consuming more sustainable foods, we can significantly decrease the environmental impact of our dietary habits on countries like India.

Acting as a global model, many citizens in India have environmentally friendly diets. Vegetarianism is still pervasive throughout India, and the overwhelming majority of Indian adults restrict meat in their diets in some manner (Corichi). The country is the world's largest producer of pulses and spices, as well as the second largest producer of rice, wheat, and fruit (Calder). Although many Indians eat globalized diets that include meat, sugar, and high-fat foods, millions continue to eat traditional diets emphasizing fruits, vegetables, and pulses (Green). This traditional diet tends to have a smaller carbon footprint.

Although a logical assumption, it's still remarkable how a meta-analysis of studies of the environmental impact of human diets on planetary health (Fresán and Sabate) shared by the U.S. National Institutes of Health confirms earlier findings from the U.N.'s Intergovernmental Panel on Climate Change (IPCC) that shifting current dietary patterns to vegetarianism and veganism **could reduce greenhouse gas emissions by half** (IPCC "Climate Change"). Simply put, the fewer animal products in a diet, the more environmentally sustainable it is.

India serves not only as a global model for healthy diets but also for lower agricultural subsidies. Indian farmers typically receive government subsidies in the low hundreds, a stark contrast to the higher subsidies in many other countries. For example, in 2015, the United States provided subsidies averaging nearly $8,000 per farmer. But just a year prior, India provided subsidies merely averaging ₹27,100 rupees, or approximately $417 USD, per farmer ("Rich Nations Should Reduce Trade"). And the average from year to year in India is even lower, at $250 per annum per farmer ("India's Subsidies to Farmers Very Low"). Meanwhile, the U.S. subsidies are not the only high subsidy. In fact, the United States gives below the global average of 12% of farmer's incomes (Calder). The U.N. Development Programme has found that redirecting subsidies would help 500 million smallholder farmers globally by levelling the playing field with industrial producers (Carrington "Nearly"). Although low subsidies are not the only reason, it is part of the explanation for India's relatively low emissions compared to its population. Despite India containing 17 percent of the global population, it only emits 6 percent of greenhouse gases worldwide (Climate Links). With these numbers, it is obvious that combating climate change in India is a global responsibility.

Large subsidies in other countries are also directly harming Indian farmers by flooding their markets with cheaper, subsidized products. Farmers are often outpriced by products from more generously subsidized countries, which can result in local farmers and smaller producers being forced to sell their products at a

loss or even stop farming (Calder). These local farmers could have produced the food much more efficiently (Sewell). Subsidies end up having a much larger negative impact on Indian farmers' incomes.

Additionally, subsidies have other negative impacts on consumers around the world. As confirmed by the CDC in the *Journal of American Medical Association*, we know that subsidies increase production and consumption of those products (Aubrey). Yet fruits and vegetables are often under-subsidized, which encourages unhealthy diets in both developing and developed countries (O'Neill Hayes). In America, for example, less than one percent of the sum used to subsidize meat and dairy products is allocated to support the production of fruits and vegetables (Sewell). People in developing countries often eat diets containing an abundance of low-nutrition staples, and people in developed countries often eat diets containing an abundance of meat. Three billion people cannot afford a healthy diet (Carrington "Nearly"), and a large part of this is due to low-nutrition foods being over-subsidized to the point where low-income families cannot choose healthier options to eat. People may feel that subsidies lower the price of food, but their tax dollars are paying for high-emission meat and dairy production and advertising—an industry making $250 billions a year (Sewell).

To combat global warming, governments can encourage healthier, more environmentally sustainable diets by decreasing or altogether removing high-emission food subsidies. Every year, the equivalent of $540 billion USD are distributed by numerous agencies across the globe as agricultural subsidies, and the largest sources of greenhouse gas emissions typically correlate with the largest subsidies given (Carrington "Nearly"). These subsidies are very impactful, as seen in countries like the United States, where taxpayers subsidize nearly double the menu price of their meat. Rather than going to small farmers, these subsidies are typically taken by large industrials groups who are also producing the highest emission products (Carrington "Environment"). By decreasing high-emission food subsidies, both food producers and consumers will have more motivation to make environmentally sustainable food choices.

There are helpful ways that money can be distributed while both helping the environment and struggling farmers. Governments could repurpose subsidies to help fund farmers who practice environmentally friendly techniques like silvopasture, agroforestry, and low-carbon agriculture. This has been shown to have an impact as large as $30 dollars ROI every dollar spent (Ding). What's more, this money incentivizes farmers to take better care of their land by improving soil and water quality, which helps ensure the long-term stability of their farm.

Shifting dietary habits on a global scale is a huge effort but of pressing and critical significance as every person faces the point of no return in addressing climate change. Given the magnitude of the change needed and the policy-setting involved, governments and international bodies should lead this effort.

As the largest international body in the world, the U.N. is focused on solving international problems related to farming through its Food and Agriculture Organization (FAO "Climate Change Food"). The U.N. has also set halting global warming as one of its top priorities (U.N. "Climate Change") and provides guidance to both developing and developed countries. Importantly, the U.N. has identified more than $470 billion USD in global food subsidies to be harmful to people's health and the planet—an astounding 90 percent of global food subsidies (Carrington "Nearly"). The U.N.'s 2021 climate change report again confirmed that the biggest food subsidies go to the greatest sources of greenhouse gas emissions such as beef and milk—and are playing a central role in worsening the planetary crisis (FAO, UNDP, et al). This report describes the shifting of such subsidies as "a wake-up call" and "a game changer" to improving the environment and supporting a healthier diet.

Agencies such as the U.N.'s FAO and IPCC have already provided the rationale for governments to act immediately. Yet some of the world's most powerful governments such as the United States and China vacillate on policy, while India's current government argues it cannot afford to cut greenhouse emissions at the rate of wealthier, industrialized nations (Menon).

An ideal spearhead to end high-emission food subsidies be the European Union. In 2021, the EU voted for €387 billion, or approximately $457 billion USD, to go toward agriculture subsidies (Boffery). With discretion for such large amounts, the EU could lead the way in promoting more environmentally friendly solutions to support food production. If the EU took action, then it would likely serve as a valuable large-scale use-case for other countries to follow, due to both the size and influence of its supply chain decisions. Lastly, with Europe's 10 percent of the global population emitting almost one-fifth of global greenhouse gas (Tiseo), they have a responsibility to countries such as India with a much lower emission rate per capita.

Fortunately, the EU has already shown a willingness to press for environmentally sustainable improvements to agriculture. It is encouraging carbon farming, a strategy that includes reforestation, anti-erosion farm designs, conservation of important wilderness, and wetland restoration (EU European Commission on Climate Action). Redistributing some or all of the E.U.'s agriculture subsidies away from high-emission food production would directly and significantly address the climate crisis.

The EU committed about $600 billion USD to climate change for its 2021–2027 budget (EU Directorate-General). It sounds like a lot. But it is pretty close to the $436 USD billion it will spend on agricultural subsidies during the same period, a third of the EU's budget for this period (Melander)**.** This comparison makes it evident where removing environmentally harmful food subsidies could make a difference. The EU could lead the way in promoting more environmentally friendly solutions to support food production in its next budget cycle. If it removes subsidies for high-emission food production, then both food producers and consumers will need to make more environmentally sustainable and healthy food choices. Although it failed to align its subsidies with EU climate change targets for the next few years (Carrington "Nearly"), another critical opportunity comes with the next budget cycle. The supporting science and harmful subsidies have been identified by the U.N.; but people across the planet need to provide the EU with the political will to act as a model for other governments.

As smaller examples, countries such as New Zealand have already begun to implement policies to decrease or eliminate subsidies with positive results (Calder). It's important to note that New Zealand is a developed country with an economy that heavily depends on farming. However, decreasing subsidies has had a positive impact on the country's economy. Although New Zealand had subsidized a whopping 30 percent of farmers' incomes beforehand, they ended all their farm subsidies in 1984. Twenty years after New Zealand implemented this, farm output has increased by 40 percent. What's more, only around one percent of farms went out of business during the same time period (Calder). Pushing back against widely held but incorrect assumptions, decreasing or eliminating subsidies positively impacts the economy, even without taking into consideration that the money can be used to fund other efforts, such as slowing climate change.

More recently, England has been writing legislation to phase out billions of dollars of subsidies, one of the largest changes in government subsidization—a change that both farming and environmental groups support (Carrington "Environment"). These funds will be redistributed to encourage greener agriculture, fund innovations to improve farming, and restore ecological damage. By 2028, England will completely phase out £1.6 billion pounds, or approximately $1.9 billion USD, in subsidies. This change could be transformative. Around 70% of England land is used for agriculture, and farming is the biggest cause of biodiversity loss in England (Carrington "Environment"). By redistributing subsidies, England could counteract biodiversity loss while still encouraging cheap, innovative agriculture.

Even though India does not have significant subsidies to reduce, it has still shown a willingness to lead efforts to reduce the environmental impact of farming. For example, the Indian government supports the Zero Budget Natural Farming initiative and is working to implement it with 6 million farmers by 2024 (University of Reading). This grassroots movement aims to help replenish soil nutrients with natural ingredients, which helps preserve farmland and reduce the environmental impact of farming (University

of Reading). Even countries that cannot reduce subsidies as much as New Zealand or England have are willing to take steps to decrease their environmental impact.

Although reducing greenhouse emissions may require trillions of dollars, more optimistic estimates suggest that it may take as little as $300 billion to stabilize the climate (Adler). This sum is well within the range that large governments and international bodies already approve annually for food subsidies. And as we are now seeing on a daily basis, the toll of climate volatility on our planet and humanity would be much more costly.

The EU's allocation in its next budget cycle is one very critical step that could help India—and the planet—at a critical juncture for humanity. It could set a crucial precedent for all countries to reallocate subsidies from high-emission food products to investments that promote sustainable agriculture and a cleaner environment.

As I have discussed, climate change will a large impact on India. However, no country can avoid its consequences. All around the world, global warming is creating an erratic climate, causing volatility to every aspect of life, submerging land, and increasing temperatures—and ultimately undermining humanity's stability. By 2050, unless we reform our food subsidy system, we will be unable to feed a population of 10 billion (Carrington "Nearly")—the current estimate of our population at that date (Ding). Meanwhile, the time to address climate change, as agreed by hundreds of leading scientists and by 195 countries, is simple: "now or never" (U.N., "Climate Report"). Decreasing high-emission food subsidies is crucial to both halting climate change and ensuring that our world can feed everyone in it.

The U.N.'s most recent IPCC report confirms we must limit global warming to 1.5 degrees now ("Climate Report"). With the right policies—already supported by scientific information—the report asserts we can reduce greenhouse gas emissions 40 percent to 70 percent by 2050. The latest report from the U.N Food Systems Summit spells out that repurposing harmful subsidies is "a game changer" in addressing poverty, hunger, malnutrition, *and* global warming (von Braun). As the global food system is currently operating, the U.N. estimates it is causing $12 trillion in damage a year (Carrington "Nearly").

So there's a clear next step for the EU's budget approval process. And the U.N. can keep prioritizing this message by fighting misconceptions about subsidies and getting farmers onboard for this critical effort. Finally, individuals can advocate for their governments to decrease high-emission food subsidies while assessing their own diets.

In conclusion, despite being a model of environmentally sustainable dietary habits, India is highly vulnerable to the impacts of climate change. Climate-related problems like those in India exist all around the world, which is why we must all take responsibility to combat them. One way to do this as countries and as individuals is to eat and grow more environmentally sustainable food, which requires shifting funds away from the production of harmful, high-emission food products.

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