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Changing a Legacy: An Economic, Political, and Psychological Approach to Fighting the Global Food Crisis

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"The Coming Food Crisis" read as a headline on The New York Times on March 26, 2008. This relatively short article briefly touched upon increasing food prices, growing population and consumption levels, while implicitly exposing through its interactive comment section -a feature rarely seen on articles- the crude reality that the least developed countries would be facing a decade and a half after this headline was typed. A user, whether you consider his comment sensitive or not, wrote on the comment section about the benefit that the increase in food prices would bring to the United States in general as a country, concluding his short four-sentence comment with the following statement: "Yet for the rest of the world I fear more famine and starvation."

A RIGHT TO FOOD

Fifteen years ago, a global food crisis was becoming visible with food price indexes indicating rising prices and satellites documenting shocking droughts and destructive floods in remote areas. Back then however, climate change's scarring was experienced from a third-person perspective, which could be very much defined by Adam Smith's use of the term sympathy in The Theory of Moral Sentiments, where the world in general was not immediately experiencing what farmers in exposed areas were feeling, rather they just conceived how being in that situation would make them feel, as the previously mentioned comment in The New York Times article reflects; a seemingly empathic statement that most

probably left the author's mind a couple of hours later

Today, climate change is impacting every human being at different levels ranging from the warmest winter in New York City's history to major droughts in the outskirts of Somalia.

Article 25 of the Universal Declaration of Human Right states that "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food [...]"; other international organizations, such as the International Covenant on Economic, Social, and Cultural Rights explicitly recognize "the fundamental right of everyone to be free from hunger." As obvious as it may sound, the right to food means that food must be available, accessible and adequate, as stated by the UN Centre for Human Rights.

Whether you prefer to call it ambition or greed, previous generations have exploited natural resources and emitted enormous amounts of pollution that our generation today must deal with by paying the principal plus the increasing interest on a debt incurred decades ago.

These levels of pollution that have been reaching the atmosphere for decades have now led to a global food crisis. Projections for future global yield of maize and wheat, which make up about 30 percent of daily caloric intake in regions such as Africa and Central America, indicate a significant decline attributed to greenhouse gas emissions. Both of these crops play a crucial role in achieving food security being that nearly 950 million metric tons of maize and 700 million of wheat are consumed annually.

Achieving this food production locally has proved to be increasingly hard, and importing these crops, among others, can be costly and subject to global events that may disrupt the supply chain, as did COVID-19 and the War in Ukraine. The FAO predicts that in order to ensure food security for a predicted population of 9.6 billion people by 2050, a 60 percent increase in food production must take place to meet demand.

WHERE AI COMES INTO PLAY

Currently, the amount of money from developed nations allocated to food aid is about six times higher than what is destined to agriculture research (see Figure 1 in Annex).

Although food aid is beneficial, it is a temporary solution that makes developing nations dependent on donations from developed states that are not guaranteed to go on forever, being that climate change is a threat everywhere. It is therefore necessary to allocate resources and create an international agreement that prioritizes the investment on and development of AI.

"Predictive modeling" is a solution that speeds up plant breeding through an artificial intelligence software that processes the genome sequences of crops along with environmental data. This is a potential solution that allows researchers to visualize what farms will look like in the future through data, allowing them to identify the optimal combination of place and crop. Although still in its early stages, predictive modeling has already allowed farmers in Ethiopia to detect where there was going to be a disease outbreak in order to take preventative measures, allowing them to efficiently allocate their resources and make use of these resources' full potential to harvest crops.

PROPOSED POLICY FRAMEWORK

Although much damage has been done to the environment, there are actions policymakers can take to increase the chances of successfully achieving food security by 2050. For the purpose of this essay, the three proposed policies that I present to mitigate the problematic legacy left by previous generations are the following:

1. *Cash Transfer Program:*

given the uncertainty that farmers have to endure year to year in terms of rainfall levels whose irregularity leads to entire seasons of droughts or be it the case of extremely high temperatures that cause blazing fires, I propose a cash transfer program to be implemented by national governments that collects funds, for example through an additional tax on certain crops whose growth is susceptible to rainfall levels, and put these resources into a fund that acts as a type of index insurance for farmers. The proposed cash transfer program would be more efficient than index insurance for certain conditions and cases however, since a cash transfer program would not incur burn or borrowing costs, as well as losses from farmers who were affected and yet the trigger was not breached for the index insurance's standards. Under the cash transfer program, farmers would file a claim in years where rainfall levels did not allow for crop production so that they can receive compensation for the income lost from not being able to grow such crops, and by filing the claim once the drought has taken place, the government agency in charge of the transfers can analyze and compare real time data with farmers' testimonies, taking asymmetric information out of the equation.

2. *International Cooperation Agreement on AI for Agriculture:*

the second Sustainable Development Goal of the United Nations aims at ending hunger, achieving food security, and improving nutrition and promoting sustainable agriculture by 2023. Because the SDGs are political goals and not legal rules, they can be conceptualized as a subset of existing intergovernmental commitments, where some degree of adherence on either side is required to combine both approaches and achieve sustainable development. This is where my second proposal comes into play, incorporating international politics and the role of international organizations to act as a liaison and enforcement mechanism to help advance the SDG of achieving food security, specifically through the collaborative support of AI research, development, and use for sustainable agricultural purposes, such as is the case with "predictive modeling" technology. Governments should emphasize the compromise of developing an ethical and sustainable use of AI for agriculture through their own relevant research and investment centers, and sign an international cooperation agreement under the UN. The main obligations that should be incorporated in such a treaty include peaceful and ethical use of AI, exploration and development in the interest of promoting international cooperation and understanding, for AI not to be used as a war weapon targeting agriculture, and state parties to the treaty should be held responsible and internationally liable for damage to another state party.

3. Incorporate Conversation on Sustainable Diets into the Debate:

it is key to have a communication channel that serves to convey to the public the

definition of a sustainable diet and the importance of reducing meat consumption to bring down greenhouse gas emissions. This highly important conversation can be initiated through short, yet eye-catching advertising campaigns or interactive data visualization examples shown on educational material for schools, TV, radio, and social media, with the latter platform having an enormous potential for reaching young audiences through influences who are vocal about and educated on climate change.

By using the marketing and psychological principle of repetition for recognition, constant, yet unique communication about sustainable diets will eventually cause a shift away from unsustainable food consumption.

POTENTIAL RISKS

Some risks that could be associated with the implementation of the proposed solutions are the following:

1. Corruption and moral hazard leading to misuse or depletion of cash transfer program funds, thus preventing farmers from getting compensated, or on the other extreme; moral hazard acting as an incentive for farmers to rely on the cash transfer, creating an incentive to not farm their crops or initiate events that could look as natural disasters. In order to prevent these misuses of resources, tailored incentives, strong regulation and monitoring from third-party actors will be necessary.

2. Ethical concerns, including data ownership and intellectual property issues could arise, which according to the European Parliament Resolution on AI, individuals responsible for the development or operation of AI have legal responsibilities of actions made by AI technologies, which is why any development towards achieving food security through AI needs to be grounded in international law and be consistent with various international legal instruments. Such instruments include the UN charter, the Universal Declaration of Human Rights, and the Rio Declaration on Environment and Development.

CONCLUSION

In order for AI to best play its role in fighting the global food crisis, the international community needs to agree on the same terms, rules, and objectives under international law. The following international organizations are ones that have the ability and authority to monitor the use of AI in agriculture: the Codex Alimentarius Commission (Codex) is the only international organization that develops food standards by bringing together scientists, technical experts, government regulators and international consumer and industry organizations. The Food and Agriculture Organization (FAO) of the United Nations considers that rules are fundamental for encouraging investment, facilitating the operation of markets and setting norms for responsible behavior. The FAO has a Legal Office that formulates regional and international legal instruments, provides legal advisory to member countries, and works with other departments to develop international guidelines that promote the realization of the right to food. Finally, the World Health Organization (WHO) monitors pathogens in food and

addresses food safety issues along the food production chain. This monitoring process is essential in an interconnected world where food trade is a driving economic factor, and therefore the Codex, FAO, and WHO are key in the development of the technology suggested in this paper.

The worst legacy that generations before ours left is undoubtedly climate change, which has now evolved into a global food crisis. Nevertheless, those same generations are the ones that provided us with the tools to construct the technology that will be necessary for future generations to survive. Such technologies have built a path for AI implementation in agriculture, which seems to be one, if not the only sustainable option to achieving food security by 2050.

Now, more than ever, existing programs, international bodies, and online platforms designed once by our predecessors offer a unique opportunity to combat the global food crisis today.

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