COP28

Mitigating climate change risks in agriculture trade: Time for action at COP28

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The COP28 United Nations climate summit takes place against the backdrop of heightened alarm over the failure of the global community to meet climate targets and increasing evidence of the negative impact and economic costs of climate change on food production, food trade and food security. Evidence is growing on the interlinked relationship between climate, food systems and human health, and leaders at the World Climate Action Summit side-event at COP28 are expected to conclude a landmark declaration that recognizes the "indisputable links between food systems, agriculture and climate change." On the first-ever Trade Day (December 4), COP28 will cast light on the role trade in goods and trade policy can play in bolstering and accelerating the clean energy transition to climate-resilient agriculture and food systems with vastly reduced emissions. Greenhouse gas (GHG) emissions are the key factor driving climate change, and all economic sectors must reduce emissions. This includes agriculture, food systems and agriculture trade, which are not only particularly vulnerable to climate change, but are also responsible for about one-quarter of global GHG emissions.

Emissions are generated across the entire agriculture trade value chain, ranging from land use, production, refrigeration, transportation to food processing. Methane (CH_4) is the major source of GHG accounting for 65% of agriculture emissions, with two-thirds of those emissions coming from agricultural production. Emissions stem largely from livestock production (enteric fermentation), the decomposition of stored organic matter in manure, and from crops, such as rice cultivation, which involves flooding fields and creating anaerobic conditions in the soil. Nitrous oxide (N_2O) accounts for 30% of agriculture emissions and is emitted mainly through the application of nitrogen fertilizers and manure to the soil, as well as through the natural processes of nitrification and denitrification in the soil. Carbon dioxide (CO_2) accounts for about 5% of agriculture emissions, mainly emitted through combustion of fossil fuels for energy use on farms, such as for machinery, transportation, heating and cooling, and from the decomposition of plant residues and organic matter in the soil.

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The role of agriculture and agriculture trade in climate mitigation

The role of agriculture and agriculture trade in climate mitigation goes beyond climate science. It includes appreciating important differences and nuances between the different sources of emissions, evaluating economic and technical feasibility of various mitigation pathways, preferences for food supply and land use, and notions of fairness and justice. Achieving emissions reduction in agriculture and food systems is challenging as food is increasingly consumed further from producer regions. When calculating agricultural emissions and devising mitigation strategies, it is important to consider emissions as an inextricable part of trade. A recent landmark study looked at the environmental impact of food trade and estimated the carbon footprint of "food miles" by applying a global multiregional accounting framework. Food miles focus on food transportation and reflect the distance travelled by food items from production to consumption to highlight the environmental impact (i.e., energy use or emissions). The study calculates food mile emissions as tonne-kilometres (tkm) and looks at transport distance, food mass and type of transport with the relevant emission factor (rate at which a particular vehicle releases CO_2 into the air). To calculate total food system emissions in food trade, the study also included food production and land-use-change emissions. The study found that emissions from the global food system roughly amount to 15.8 gigatonnes of carbon dioxide equivalent ($GtCO_2e$), translating to 30% of global GHG emissions. For the broader food supply chain with trade, global food miles equate to about 3.0 $GtCO_2e$, which is higher than previously thought. Transport accounts for 19% of total food system emissions. In particular, transport of fruit and vegetables contributes 36% of food miles emissions – almost double the amount of GHG emissions released during their production. These findings highlight the importance of encouraging and promoting more locally produced food items and integrating environmental protection targets in food systems.

In an upcoming study, IATP looks at production and trade of cereals — maize, wheat and rice — which together account for the largest share of global staples and over 60% of global food calories. Almost 20% of global calories consumed are provided by food trade. We note that there is a high degree of concentration in global food production and exports, especially of cereals, among a handful of countries. The top 3-5 exporters in each of the three crops dominate world markets with the top three exporting countries accounting for 64%for maize volumes, 57% for rice and 45% for wheat. By comparison, the cereal-importing countries are more diverse. Such concentration in food production presents challenges for food importers due to potential supply volatility and the effects of climate change on major producing countries, such as the United States and Brazil.

Changing diets resulting in rising emissions

Emissions are largely dependent on a country's consumption patterns and agricultural emission intensities from production relative to their trading partners. Studies find considerable differences between production-based and trade-adjusted emissions accounting approaches particularly with respect to major agricultural exporters and importers of meat, dairy and rice.

At the regional and country level, major agriculture food producers, exporters and importers like Europe, Asia, Latin America and Oceania have sizeable emissions reflected in both exports and imports, including intra-regional trade. The production of meat and dairy, two highly traded commodities, contributes the largest share of emissions for most regions, particularly in Europe, Oceania and North America. In Asia, rice cultivation is a major source of export emissions, given the significance of rice to the region. In recent years, due to rising incomes and shifts in dietary patterns across regions such as Asia, demand has grown for meat which in turn leads to increased demand for and emissions from other food groups, like soybeans and corn, which are major components of animal feed. FAO reports that global emissions from enteric methane and manure increased by 4% and 5%, respectively, between 2015 to 2020.

Recommendations for reducing agricultural trade emissions

Prioritizing solutions to reduce emissions from agriculture and food trade is critical. We highlight and recommend the following to government policy makers and climate negotiators:

- **Incentivize a climate-adapted and healthy diet-based food system towards 2050 in line with the FAO's recommendations and locally determined needs.** We advocate for more localized food systems that prioritize nutrition, environmental sustainability and the livelihoods of farmers as the major drivers of food production and consumption. This model is opposed to high-input industrial agriculture driven by major corporations, which results in significant soil degradation and loss of biodiversity. We must reconcile the need to create strong health and environmental protections while working with trade partners to protect the rights to food and a clean environment. Globally, existing approaches based on intensive industrial agriculture to provide cheaper commodities for trade have led to more consumption of obesogenic processed foods and refined carbohydrates. These products have replaced traditional and more nutrient-rich foods, leading to health issues, such as obesity and other non-communicable diseases. IATP advocates for food production and consumption that supports local nutritional needs. This may mean more plant-based diets, including fruits, vegetables, pulses and some indigenous cereals, such as millet and sorghum. This approach to diet requires a policy shift away from support for cheaper processed cereals. At the country and regional level, food system reforms should be informed by country and crop-specific studies that examine links between climate variables and staple food production in specific locations.

- **Improve domestic and regional food value chains to bring food production closer to consumers.** Major food importers, such as China, Egypt, Ethiopia and Nigeria, have made strides in strengthening their domestic food production. More localized food production and regional sourcing create shorter value chains and reduce some, though not all, risks of supply disruption. It also reduces GHG emissions related to transportation of food over long distances.

- **Explore agroecological-based strategies that identify high-yield, biodiverse and low-emission pathways for specific agricultural production systems.** To enhance productivity, countries have turned to biotech solutions using climate-adapted cereal varieties that are resistant to pests and drought. Agroecological production is supported by the U.N. FAO as a critical approach to sustainability that can help overcome the economic, social and ecological crises now facing the global agri-food trading system. Agroecology provides a foundation to shift global food systems, production and food trade away from the system of industrial and intensive agriculture with high input usage that is predominantly concentrated and controlled by multinational companies. With its focus on localized food systems, agroecology is a means to promote trade in healthier food, improve agricultural sustainability and revitalize local communities through uplifting livelihoods of farmers. Achieving this transition involves in part re-imagining the World Trade Organization (WTO) rules and related bilateral, regional and multilateral liberalization agreements that have a significant impact on agricultural production, trade and consumption. These rules shape agriculture in areas such as market access, export competition and domestic governmental support, which in turn influence specialization in production systems (replacing diversity with monocultures of cheaper food) and food trade. The transition involves repurposing financial support for agriculture towards sustainable agriculture and support for necessary infrastructure, inputs and extensions services for agroecology. Lastly, localization of food under agroecological principles is a means to de-risk food security from the anthropogenic climate-related volatility in global food trade. This includes mitigating the recent trend of rising international prices for food and staples, as well as inputs like fertilizer. Achieving the above state policy objectives and reforms is challenging, as opposition to sustainable food systems initiatives including the European Union (EU) Green Deal, the Farm to Fork (F2F) and Biodiversity Strategies has demonstrated.

- **Reduce food loss and waste throughout the value chain.** Reducing food loss and food waste is critical to tackling climate change, food insecurity and for more sustainable use of natural resources. We currently produce more than enough food to

feed the world's population. However, about 14% of global food production (valued at $400 billion per year) is lost post-harvest before being sold, while another 17% of food is wasted during the retail process and by consumers. Food loss and waste account for between 8-10% of global GHGs. Investments in policy, industry, on-farm and infrastructure interventions are critical to address food loss and food waste. These include improved supply management, harvest, post-harvest and food handling systems, recycling and modified consumer behavior. As with GHG emissions, more localized food production and shorter supply chains can help mitigate food loss and food waste.

Conclusion

The move at COP28 to elevate the discussion of the indisputable links between food systems, agriculture, trade and climate change is welcomed and timely. It is important for government policymakers, the food industry and consumer organizations to redouble their joint efforts to address the challenges we have highlighted in creating healthy, environmentally sustainable and more localized food systems with shorter supply chains that help address emissions across the food value, especially in areas like transportation. which accounts for a considerable share of food system emissions. To reduce the emissions footprint of the food system, we must reduce production of products like beef that are major contributors to GHG emissions and emphasize more environmentally sustainable alternatives. While some countries and regions are making strides towards these objectives, they continue to face resistance along the way from big agriculture.