

Carbon tariffs and fertilizers: Wrong fit for purpose

One of the most vexing issues in international climate debates is how to balance each country's ambitions and responsibility. Clearly, all nations need to pull out all the stops to reverse the deepening climate crisis. This will necessitate much more ambitious actions by governments to drive transitions away from fossil fuels and highly emitting production of industrial goods and to do so in a way that serves the interests of workers and consumers fairly. It also means serious changes in how we produce the commodities we need to live, including food.

The role of industrial agriculture in contributing to climate change has come into sharper focus in recent years. There is increasing attention to methane emissions generated by [meat and dairy](#) production, as well as rising carbon [emissions from deforestation](#) and other land use changes resulting from the expansion of livestock and agricultural production. For the climate, it is not only the amount of meat and dairy production that matters, but also how it is produced.

Large scale production of crops for food, feed and biofuels has become increasingly dependent on the use of synthetic fertilizers that also generate significant emissions. Nitrogen fertilizers generate nitrous oxide (N_2O), which are estimated at [about 6%](#) of global greenhouse gas emissions using carbon dioxide (CO_2) equivalents. But these emissions have an outsized impact on global warming. According to the [U.S. Environmental Protection Agency](#), "Nitrous oxide molecules stay in the atmosphere for an average of 114 years before being removed by a sink or destroyed through chemical reactions. The impact of 1 pound of N_2O on warming the atmosphere is almost 300 times that of 1 pound of carbon dioxide." Global [N₂O emissions have increased 30%](#) since 1980, with two-thirds of that increase coming from agriculture. Emissions from fertilizers result both from the overapplication of fertilizers by farmers around the world and from the production process itself, which utilizes substantial energy from fossil fuels.

Efforts are underway in many countries to improve fertilizer production processes, so they are more efficient and less emitting. But should public policy be directed to produce fertilizers with lower emissions, or to change from fertilizer intensive farming systems toward agroecological systems that use fewer fertilizers altogether?

These issues could be debated at the upcoming Conference of Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC), where countries will make commitments to reduce emissions in many sectors, including in agriculture. Those aspirations, however, could be undermined by enforceable trade commitments at the World Trade Organization (WTO) and the web of bilateral and plurilateral



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free trade agreements that are designed to facilitate flows of goods, services and investments regardless of the climate or social impacts. In the gap between expanding climate ambitions and outdated global trade rules, the EU has stepped in with a new proposal for a Carbon Border Adjustment Measure (CBAM) to create a patch for domestic producers.

If companies in one country are pursuing ambitious plans to reduce emissions, whether in industry or agriculture, that transition could result in higher prices, creating incentives to import from countries with lower standards and cheaper prices or to shift production to those countries. These shifts in sourcing or production due to the cost of emission reductions measures are called carbon leakages. The extent to which leakages happen in general is unclear, but if they happen, the effectiveness of the national emissions reduction policies could be reduced or eliminated altogether.

In July, the European Commission (EC) launched its plans for a CBAM to address potential leakages in the trade of a few industrial goods, including fertilizers. In the U.S., Democrats have introduced draft legislation for “[polluter import fees](#)”. In both cases, the idea is to ensure that domestic producers who are trying to transition to cleaner production methods are not undermined by cheaper imports with higher emissions.

CBAM BASICS AND CONTROVERSIES

While the idea of Carbon Border Adjustment Measures has been around for years, the EC proposal is the first to offer details. The [Commission submitted its plan to](#) the European Parliament in July 2021. The Parliament will discuss and possibly amend it moving forward. The 291-page document covers a few highly emitting industries: steel, electricity generation, cement, aluminum and fertilizers. It covers direct emissions from those sectors, not the emissions embodied in goods using those inputs, at least for now. This means that fertilizer imports are covered, for example, but not the crops produced from those fertilizers. Taken together, those sectors represent [94% of EU industrial emissions](#). [Europe imports](#) substantial electricity from Switzerland, Russia and Ukraine; cement from Belarus, Colombia, Turkey and Ukraine; steel from China, Russia, Turkey, the U.K. and Ukraine; and nitrogen fertilizers from Russia, Egypt, Algeria, Trinidad and Tobago, Ukraine and Morocco.

The EU proposal for a CBAM is tied to its Emissions Trading System (ETS). Under that system, companies receive allowances for a set level of emissions, with the permitted emissions levels declining over time. If a company produces fewer emissions than the limits established under the allowance, it can trade the allowances with other companies with higher emissions. The CBAM proposal would require foreign companies exporting the targeted goods to the EU to pay a fee based on plant level emissions and tied to the [current cost of carbon in the EU](#), about €56 per ton as of September 2021 (about US\$65 and expected to rise over time). The actual fee would be reduced if the exporting company is already paying carbon taxes or subject to programs similar to the ETS in their home countries. The idea is that this would level the playing field for domestic companies with higher costs resulting from plant modernization or other emission reduction measures.

EU companies in the sectors included in the CBAM currently receive free emissions allowances, which were supposed to help shelter those industries from carbon leakages. Carbon Market Watch has reported on the [extent to which those industries have profited](#) from the free allowances and related mechanisms, which have also reduced incentives to make substantial emissions reductions. CBAM was supposed to be an alternative to the free allowances, but instead, after heavy pressure from industry, those free allowances would be phased out as the CBAM is phased in over a ten-year period beginning in 2026. This would also reduce incentives for trading partners to make changes quickly, since the first three years would just be a reporting period, with the CBAM fees phased in over the next decade. [Agnese Ruggiero](#) at Carbon Market Watch comments that, “The Commission is doing things backwards. A CBAM that opens the door to free allowances beyond 2030 [the EU’s target date for a 55 percent reduction in emissions] is worse than having no

CBAM at all. Such an exemption would let large polluters completely off the hook and send a very negative signal internationally.”

U.S. proposals for a carbon border fee are at an earlier stage of development. The Fair, Affordable, Innovative, and Resilient Transition and Competition Act (or FAIR Transition and Competition Act, which has been [introduced in the Senate](#) and House of Representatives), provides one possible approach. It would set in motion a process “to account for [the cost incurred by U.S. businesses to comply with](#) laws and regulations limiting greenhouse gas emissions.” The bill would initially cover natural gas, coal and petroleum, as well as steel, cement, iron and aluminum (and goods made up of 50% or more of those inputs).

Importers would pay a fee equivalent to the cost of those regulations. While it is limited to a few sectors, the bill would establish a process to gather data on costs from various U.S. agencies (including the Department of Agriculture), leaving open the possibility of including agricultural inputs or products in the future. It would exempt Least Developed Countries, countries that have laws to limit greenhouse gases that are at least as ambitious as those in the U.S. and countries that do not impose border carbon taxes on U.S. goods. The ideas raised in this bill represent one approach to a CBAM in the U.S.; others could well be raised in the future.

The EC plan is designed with an eye toward avoiding conflicts at the WTO, but it is unclear whether it would be legal under current rules on discrimination against importers. [Article XX of the GATT](#) allows for exceptions to “protect human, animal, or plant life or health” or when they are related “to the conservation of exhaustible natural resources”, as long as it is clear that environmental protection — not protecting local industry — is the main objective. Clearly, any CBAM is about both objectives. The current proposal to phase out free emissions allowances for covered sectors as the CBAM is phased in could create additional trade protection for those goods depending on how that transition unfolds.

Developing countries, especially [middle-income countries like China, South Africa and India](#), have expressed “grave concern regarding the proposal for introducing trade barriers, such as unilateral carbon border adjustment, that are discriminatory and against the principles of Equity and CBDR-RC [Common but Differentiated Responsibility-Respective Capabilities].” While the EU CBAM proposal would primarily affect nearby countries, many of them middle or high income, those exports are also important to some smaller economies. Production and export of fertilizers to the EU, for example, accounts for 2-5% of Senegal’s entire GDP. ([EC proposal](#), page 196).

Many European civil society groups, such as [Carbon Market Watch](#), the [Institute for European Environmental Policy](#) and [GermanWatch](#), while raising concerns on a CBAM

How are synthetic nitrogen fertilizers produced?

The EC’s proposal for a CBAM would include ammonia, urea, nitric acid and certain other fertilizers that together fall under the umbrella term “nitrogen fertilizers”. Some 78% of the air we breathe contains nitrogen, as N₂. Plants use other forms of nitrogen, including nitrate (NO₃) and ammonium (NH₄). Microbes in the soil operating independently or with decomposition, leguminous crops or manure also break down nitrogen into forms that are usable by plants.

Synthetic nitrogen fertilizers, on the other hand, are created using the Haber-Bosch process, which combines nitrogen in air and hydrogen in natural gas under pressure, using high temperatures and iron as a catalyst to create ammonia. Ammonia can then be used to create nitrogen fertilizers. The process uses considerable energy and generates high emissions. A [study of U.S. fertilizer plants](#) found that they emit more than 100 times more methane than self-reported estimates by industry. Efforts to modernize production and reduce emissions involve utilizing renewable energy sources and increasing the energy efficiency of the process.

For more information, including on alternative fertilizers, see: Wagner, S. C. (2011) [Biological Nitrogen Fixation](#). Nature Education Knowledge 3(10):15.

generally, insist that any revenues generated by a CBAM be used to finance climate transition in developing countries, either directly to affected industries or more generally to the Green Climate Fund or similar international funds. Both the EC plan and the U.S. proposal would hold onto those funds to finance domestic climate costs, although the U.S. proposal would direct some funds to develop new climate technologies. Without a major increase in international climate funding and the loosening of trade rules on technology transfer (which both the EU and U.S. have generally opposed), it is hard to see how developing countries can transition to cleaner production.

CBAM AND FERTILIZERS

The inclusion of fertilizers in the EU CBAM is intended to support efforts to make production more energy efficient. The trade association [Fertilizers Europe](#) insists that it needs the protection from lower cost imports to make that transition, asserting, “Due to its high trade and energy intensity and the fact that fertilizers are relatively simple products the sector is well suited for CBAM. We are therefore glad to see that the MEPs explicitly recognised fertilizers among other energy intensive sectors as most suited for the new mechanism.” It is worth noting that “trade intensive” means both that imports make up nearly 30% of production, and that 21% of fertilizers produced in the EU are exported to other countries (see Figure 1).

Figure 1: EU Fertilizer production and trade

Annual fertilizer consumption	EU installations covered in CBAM
EU: 11.3 million tons	Ammonia: 29
Global: 107.7 million tons	Nitric acid: 34
Trade patterns	
Imports as a share of domestic production: 29.5%	Exports as a share of domestic production: 21.3%
Main sources of imports	Russia: 32%; Egypt: 21%; Algeria: 21%; Trinidad and Tobago: 7%; Ukraine: 5%

Sources: European Roundtable on Climate Change and Sustainable Transition, Border Carbon Adjustments in the EU: [Sectoral Deep Dive](#) 2021, p 36; Sources of imports from EC Proposal for a Regulation of the EU Parliament and of the Council establishing a carbon border adjustment mechanism, 2021, p. 151.

Large-scale farmers, on the other hand, are more skeptical. In a March 12, 2021 [press release](#), Copa & Cogeca, which represents European agribusinesses and producers, insists that existing trade protections are sufficient and that, “If a border adjustment mechanism were to be added to this, the price of fertilisers would skyrocket, further increasing the cost of agricultural production in Europe, while making the use of imported food more competitive and attractive.”

Fertilizers represent a substantial share of farmers’ costs of production. According to data from the [EC’s Agri-Food Data Portal](#), between 2015 and 2019, fertilizers averaged 39% of total specific costs (i.e., input costs excluding labor and overhead). Of course, the use of fertilizers, and therefore costs, vary considerably among EU countries and even within countries, depending on the crops, climatic conditions and production practices, but in any case, it is a significant expense. It is worth noting that Copa & Cogeca is fighting hard against mandates to decrease fertilizer use under the EU Farm to Fork targets.

Companies that would normally export fertilizers to the EU might decide to divert sales to other countries without such fees. In an email exchange with the author, Peruvian agricultural economist Daniel de la Torre Ugarte comments that this could perversely lead to a surge of fertilizers dumped on developing countries, potentially inducing farmers in those countries to use more synthetic fertilizers rather than seeking more sustainable alternatives. On the other hand, he noted that, “[fertilizer prices have skyrocketed](#) over the last year. Although the long-term trend is not clear, in the short term these high fertilizer prices may put at risk farmers’ income and farm production.” The World Bank figures he cites indicate that price hikes are

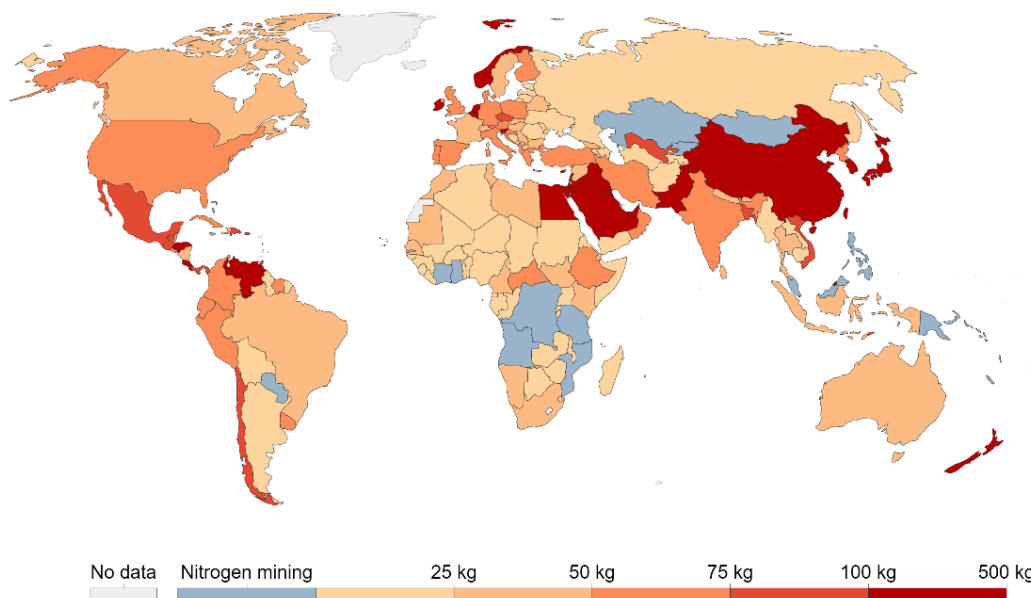
especially high for diammonium phosphate, which would likely not be included in a CBAM. Those price hikes are likely driven by currently high prices for natural gas, one of the key components in fertilizer production. This highlights the vulnerability of farmers who are dependent on unstable international markets for those imported chemical inputs.

Increasing prices would better reflect the true environmental costs of chemical fertilizers, even beyond greenhouse gas emissions. Fertilizers are often overapplied, particularly if they are cheap. In addition to generating nitrous oxide, the overuse of fertilizers results in runoff that pollutes water systems and undermines biodiversity and human health. Based on research by [Paul West](#) that calculated the differences between nutrients applied to soils and those removed in the crops when harvested, Hannah Ritchie found that nearly [two-thirds of applied nitrogen fertilizers are not even used by crops](#). As indicated in Figure 2, the extent to which this happens varies by country and region. Both the EU and U.S. apply much more fertilizer than is used by the crops.

Figure 2

Excess nitrogen per hectare of cropland

Amount of excess nitrogen per hectare of cropland. This is the difference between nitrogen inputs, and amount harvested in crops.



Source: West, Gerber, Engstrom, Mueller, Brauman, Carlson, Cassidy, Johnston, MacDonald, Ray & Siebert (2014). Leverage points for improving global food security and the environment. <i>Science</i>. OurWorldInData.org/fertilizers • CC BY

The EU’s Farm to Fork strategy sets out a series of goals to increase the sustainability of food production, including reducing nutrient losses by 50% along with decreasing the use of chemical fertilizers and manure by 20%. This would be accompanied by increases in production of organic agriculture, which would also reduce the use of chemical inputs beyond fertilizers. While this program has resulted in some reductions, the [EU Food Policy Coalition](#) notes that implementation of the Nitrates Directive “has been generally poor, with advice lacking on the adoption of sustainable practices allowing for reduced fertilizer usage.” Coalition members call for a new program of public support to agriculture that prioritizes agroecological practices that diversify production, strengthen soils and drastically reduce the use of synthetic inputs such as fertilizers, among other goals.

BETTER OPTIONS FOR TRADE, CLIMATE AND AGRICULTURE

While reducing emissions from fertilizer production is necessary, it is not a sufficient step towards transformative change to create resilient food systems. The CBAM proposal, which could facilitate more energy efficient production of fertilizers in Europe, seems analogous in some ways to programs to the transition to [so-called clean coal](#). Even the “greenest” coal is orders of magnitude more polluting than alternative renewable energy sources. Even if modernized fertilizer production is more energy efficient compared to imports, the point should be to reduce the overuse of synthetic fertilizers drastically and transition to farming systems that reduce emissions and other forms of environmental harm while increasing resilient production of healthy foods.

One of the factors driving overuse of synthetic fertilizers is that they seem cheap, and their application demands little management attention by farmers. Increasing public support for agroecological solutions, while simultaneously raising taxes or other fees on agrochemicals would contribute both to lowering emissions and enhancing production. Those kinds of programs can be advanced through domestic regulation (such as the EU Farm to Fork strategy) or agricultural support such as EU Common Agriculture Policy (CAP) initiatives to reward farmers who adopt longer and more diverse crop rotation schemes that strengthen the soil and enhance both production and biodiversity. Current initiatives for so-called precision farming reward farmers for targeting fertilizer use instead of creating incentives to move away from those synthetic inputs. International collaboration on experiences in the EU and elsewhere, as well as development assistance to facilitate those transitions globally, is also important.

The U.N. Committee on Food Security’s High-Level Panel of Experts recently completed a comprehensive review of [Agroecological and Other Innovative Approaches](#) for Sustainable Agriculture and Food Systems that Enhance Food Security and Nutrition. Reducing fertilizer use is one component of a comprehensive approach. The report found that agroecological solutions that utilize organic fertilizers such as compost and legumes “can provide a natural source of nutrients, improve soil structure and water retention, enhance soil biological activity and sequester carbon. They can release nutrients more slowly and over a longer period of time than mineral fertilizers. Management practices, such as introducing legumes and other green manure crops in crop rotation, as intercrops or as cover crops, can contribute significantly to nitrogen fixation and phosphorus mobilization” (page 85).

Decisions on a CBAM, whether in the EU or U.S., or in multilateral forums like the WTO, will likely come down to the specific industrial goods included in each proposal. The inclusion of fertilizers in the EU proposal could be a foot in the door for broader inclusion of agriculture in such a mechanism down the road. In general, it opens the wrong door. The impacts of highly emitting production resulting from land use change, meat and feed production and overuse of fertilizers deserve their own responses that are developed in consultation with civil society and governments in all of the countries involved. While we might transition out of coal, we will not transition out of food. How food is produced, where it is produced, whether farmers are fairly compensated for their production, as well as how to achieve those goals while creating climate resilience, are the central questions. Trade rules must support those transitions rather than continue to create roadblocks. Well-developed technical proposals already exist to reduce risks and volatility in food supplies, whether from unstable prices or climate change. Those ideas could be starting points for discussions that include farmers and consumers from the Global South and North alongside governments.

Once those goals and a more inclusive process are front and center, the focus of trade talks on agriculture and food systems could build on more relevant questions, including:

- **PREVENTING THE USE OF TRADE RULES THAT THREATEN LEGITIMATE MEASURES TO TRANSITION TO FAIR AND SUSTAINABLE AGRICULTURAL PRODUCTION.** This could start with the expansion and clearer definition of the general exceptions to protect human health and the environment in Article XX of the GATT to prevent challenges to renewable energy programs or plans to modernize fertilizer or other input plants. This could form the basis for a broader [Peace Clause](#) banning challenges to such actions at the WTO for a specific time and pave the way for a permanent [Climate Waiver](#) at the WTO, as well as in bilateral or plurilateral trade deals.
- **REMOVING TRADE MECHANISMS THAT ALLOW CORPORATIONS TO SUE GOVERNMENTS OVER PUBLIC INTEREST LAWS AND PROGRAMS.** [Investor State Dispute Settlement](#) mechanisms have already been used to challenge government initiatives on land use, food production, fertilizer production and water pollution. Companies should bring legitimate challenges to local judicial systems rather than relying on this unfair end run on democratic decision making.
- **ALLOWING COUNTRIES TO SHELTER GOODS NECESSARY FOR SUSTAINABLE DEVELOPMENT, FOOD SECURITY AND RURAL LIVELIHOODS FROM DUMPING.** IATP has documented the [extent of agricultural dumping](#) — exporting farm goods at prices below the cost of production — and the problems it creates for farmers in the Global North and South. Language already exists at the WTO to address those problems, including Special Safeguard Mechanisms that allow governments to raise temporarily raise tariffs when markets are unstable. While multilateral action will take time, governments could, as a starting point, agree to suspend tariff reductions in bilateral trade deals on those essential goods.
- **REDEFINING THE KINDS AND LEVELS OF PUBLIC SUPPORT NEEDED TO SUPPORT A CLIMATE TRANSITION IN AGRICULTURE.** This could start with revisions of rules on public support for synthetic fertilizers and instead agreeing to repurpose subsidies to support agroecology or food stocks programs. The current [Peace Clause on India's rice stocks](#) program could be a starting point in this case.
- **MODERNIZING CORPORATE-LED APPROACHES TO AGRICULTURAL SCIENCE AND AGROECOCLOGY.** Too many trade agreements, especially at the bilateral level, protect corporate investments in agricultural biotechnology rather than fostering creative innovations that bring scientists and farmers together to find solutions that enhance food production, biodiversity and rural livelihoods. A starting point would be to encourage the use of [the precautionary principle](#) in setting such standards, and to dismantle requirements in trade agreement that countries ratify [UPOV-91](#), a treaty that bans sharing of protected seeds.

The imperative to transform food and farm systems to meet the climate emergency must be met by a parallel shift in trade rules that also respects and redresses the differing situations in the Global South and North. The CBAM patch is an inadequate response to that challenge.