

A Few Thoughts on Water Pricing in Agriculture Products Trade**Iram Jamalⁱ**

The next stage of agricultural trade policy may need to ask: how much water was required to produce it, what kind of water was used, where that water was taken from, and what was its value to the producing region? Bringing these questions into agricultural accounting could help make virtual water a practical instrument for balancing trade, livelihoods and long-term water security across

A ton of rice can cross a border in a truck or ship, but the water used to produce it remains where the crop was grown. This simple observation is becoming increasingly important as food production, international trade and water security become more closely connected. The concept of virtual water helps makes this connection visible: it refers to the water used in producing a commodity that is effectively transferred when that commodity is traded. For countries and regions dependent on agriculture, this raises an environmental and economic question: when agricultural products are traded, should the value and scarcity of the water used to produce them also be reflected in economic decision-making?

The question is particularly relevant around the Bay of Bengal, where rice is fundamental to food systems and rural economies across eastern India, Bangladesh and Myanmar. These regions share monsoon systems, but they do not share identical production conditions. Rainfall, irrigation, groundwater dependence, agricultural productivity and market access vary across locations. Consequently, the water implications of producing and trading a tonne of rice can be very different even when the commodity itself appears identical in the marketplace.

The global scale of this hidden transfer is substantial. Chatham House reports that virtual water trade in food and agricultural products roughly trebled between 1986 and 2022, reaching around 2,800 cubic kilometres, with agriculture accounting for about 65 per cent of global virtual green- and blue-water trade. International trade can generate water savings when production shifts towards areas with relatively favourable conditions or higher water productivity. However, aggregate water savings do not necessarily mean that water use is sustainable at the local level. A production region may be exporting food while simultaneously experiencing water depletion or increasing water stress.

This distinction is central. Virtual-water trade can be beneficial when a water-scarce region imports a water-intensive commodity instead of using its own scarce resources to produce it. IWMI illustrates this through wheat imports into the Middle East and North Africa, where producing the same quantity domestically would require very large quantities of water. Virtual-water trade can also provide flexibility during unexpected production shocks: Sri Lanka, for example, became a major virtual-water importer during years of unusually low rainfall in the late 1990s.

But the relationship between water availability and trade is not as straightforward as the theory of comparative advantage might suggest. IWMI points to countries such as Pakistan

and Syria, where water resources are under pressure but water-intensive commodities have nevertheless been exported. Economic strength, infrastructure, agricultural specialization and trade access can influence virtual-water flows as much as natural water abundance. The result is that the countries exporting water-intensive commodities are not necessarily those with the greatest water security. This is particularly important because the environmental cost of production is often geographically separated from the consumer. A consumer may see the price and quantity of rice in a market, while the depletion or opportunity cost of the water used to produce it remains largely outside the transaction. Chatham House notes that when the value and scarcity of water are not reflected in prices, trade can contribute to water depletion even when it yields global water savings. It therefore argues for policies that better reflect the true economic, environmental and social value of water.

This provides a basis for reconsidering how agricultural commodities are valued. At present, the price of rice incorporates factors such as land, labour, seeds, fertiliser, energy, transport, processing, market demand and government support. The water used in production may indirectly affect the price through irrigation and energy costs, but its scarcity value is generally not visible as a distinct component. This does not mean that every litre of water should simply be given a uniform monetary price. Rather, it suggests that the water footprint of a commodity could be accompanied by an assessment of the economic value of the water used.

Such an approach could begin with a simple distinction between green and blue water. Green water is primarily rainfall stored in the soil and used by crops, while blue water comes from surface water and groundwater. Their economic implications are not necessarily the same. A tonne of rice produced predominantly from rainfall in an area with adequate water availability cannot be treated in the same way as a tonne produced through intensive groundwater extraction in a stressed basin.

The next step, therefore, could be to develop a monetary virtual-water value for traded agricultural products. Rather than introducing an immediate tax, policymakers could calculate the physical water footprint of a commodity and then estimate the scarcity or opportunity value associated particularly with its blue-water component.

The purpose would initially be accounting and disclosure. A water-intensive commodity would not automatically become undesirable, nor would a higher water footprint automatically justify a higher consumer price. Instead, the monetary estimate would reveal a resource cost that is currently difficult to see in conventional trade statistics. This could support a new way of thinking about water-adjusted comparative advantage. The relevant question would no longer be only where rice or another food commodity can be produced most cheaply. It would also be where production can take place without imposing excessive pressure on scarce water resources. Such information could inform agricultural subsidies, procurement decisions, export strategies and investment. Chatham House specifically identifies subsidy reform, water-footprint disclosure, supply-chain due diligence and greater cooperation between producer and consumer countries as important policy directions.

For the Bay of Bengal region, the approach could be developed progressively. First, countries could improve measurement and reporting of green and blue water footprints for major traded crops. Second, water scarcity and opportunity costs could be incorporated into valuation rather than applying a single uniform water price. Third, the information could be disclosed alongside conventional commodity indicators. Finally, governments could use it to design incentives for water-efficient production and more responsible agricultural trade.

Such a framework must, however, recognise distributional concerns. Water-intensive agriculture supports farmers, employment, food security and export earnings. A sudden price-based intervention could therefore affect both livelihoods and consumers. IWMI's discussion is important in this respect: changing what countries produce and how they trade must also consider the local economies that depend upon water-intensive commodities and the unequal capacity of countries to benefit from global trade.

The objective should consequently not be to discourage agricultural trade or to place a blanket monetary charge on water embedded in food. It should be to correct an information gap. If water is an essential economic input into agricultural trade, its scarcity and opportunity cost should at least be visible when production and trade decisions are made. This requires cooperation beyond individual supply chains or national ministries. Chatham House calls for coordinated policies across agriculture, trade, environment and other sectors, with sustainability measures adapted to the circumstances of producer countries and greater international cooperation. For the Bay of Bengal, this opens the possibility of developing a regional approach to virtual-water accounting for major agricultural commodities, particularly rice.

The water behind a traded commodity does not disappear when the commodity changes hands. It remains in the landscape from which the crop originated, together with the benefits and pressures associated with its use. Making that water visible does not require treating water as an ordinary market commodity. It requires recognising that water has an economic value, and that this value can vary with scarcity, source, and local conditions.

The next stage of agricultural trade policy may therefore require a broader question than simply asking what a commodity costs. It may need to ask: how much water was required to produce it, what kind of water was used, where that water was taken from, and what was its value to the producing region? Bringing these questions into agricultural accounting could help make virtual water a practical instrument for balancing trade, livelihoods and long-term water security across

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