CHAPTER 3

TRADE

The Free Flow of Goods and Food Security and Nutrition

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KEY FINDINGS

- Trade can contribute to the four key requirements of food security—food availability, access, utilization, and stability of supply.
- By encouraging production in areas with a comparative advantage in agriculture, trade raises countries' incomes and provides access to better prices on the world market.
- Limiting trade would result in high prices in land-scarce countries, depressed food prices in land-abundant countries, and lower real incomes in both.
- Trade in inputs, commodities, and ideas can boost agricultural productivity and increase sustainability by facilitating diffusion of technology and spurring innovation.
- The institutional framework for international trade has helped countries take advantage of opportunities for food exports and imports.
- Nutrition can be improved by open trade, which can provide better access to a diversified food basket, including greater diversity of products and suppliers and reduced volatility of supply.
- Real risks associated with trade opening include increases in inequality, negative impacts on health, increased energy use, and environmental damage.

KEY RECOMMENDATIONS

- Support trade opening with active policies and strong institutions to guarantee cooperative behavior and coordination.
- Design policies to address challenges or externalities associated with trade using the assignment principle—targeting the policy to the immediate source of the problem.
  - Address inequality and price volatility with safety nets and investment in human capital. Smart policy solutions will protect consumers and producers with direct support.
  - Address environmental impacts with resource management policies. Overexploitation of resources or loss of biodiversity are best managed by mainstreaming good management into production, rather than limiting trade.
  - Address overnutrition with education and other policies directly targeting consumption. These are more effective than banning or limiting trade in calorie-dense foods.

The benefits of international trade are embedded in our everyday lives, our meals have been shaped by globalization, and many farmers profit from export markets for their products. Global improvements in food and nutrition security under an open and inclusive trade regime have contributed to falling levels of undernourishment, better nutrition and greater dietary diversity, and overall economic development. Trade contributes to the four key requirements of food security—food availability, access, utilization, and stability of supply. Over the last 40 years, the share of food, measured in calories, crossing an international border rose from 12.3 percent to over 19 percent.[1] But in today's climate of skepticism about globalization, with long-standing trade agreements such as the North American Free Trade Agreement (NAFTA) under threat, the benefits of trade may be forgotten as negative impacts are emphasized by advocates of trade barriers and self-sufficiency. In this chapter, we examine the links between trade and food security, drawing on evidence from history and economics and from the available data.

For most of history, people depended on local food production from traditional producers. Quite typical were the regions of India, isolated by the high costs of traditional transport and dependent upon local supplies of staple foods.[2] Farmers relied on long-established farming practices, but were at risk of famine when the rains failed.[3] When the railways arrived in India, between 1870 and 1930, transport costs were reduced by a factor of about five, making trade in food feasible. Incomes rose as Indian regions with more or better agricultural land began exporting food and those with an advantage in other goods began to import food. Food supplies became more stable, sharply reducing the incidence of famine.[4] This story has been repeated in many different places and periods. International trade provides similar benefits, so why are challenges to international trade agreements on the rise? Let's first summarize the benefits for food and nutrition security of liberalizing trade with a focus on agriculture before addressing some of the challenges linked to open trade.

AGRICULTURAL TRADE, FOOD SECURITY, AND DEVELOPMENT

International agricultural trade is necessary to allow for both population growth and economic development. A world reliant on traditional agriculture

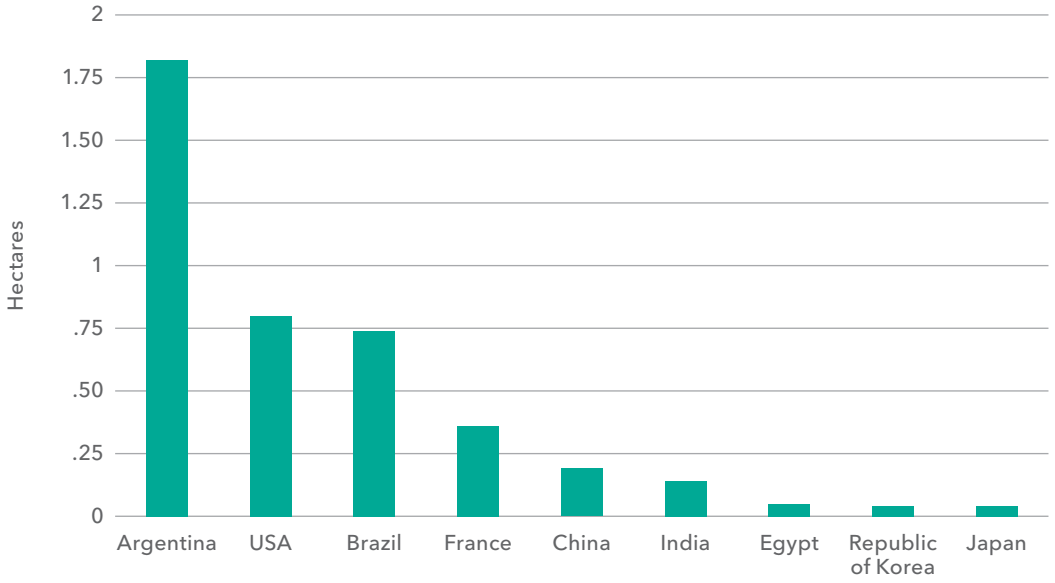
without trade in food is not just vulnerable in the short term. It also faces the Malthusian trap of population growth outpacing food growth in the longer term. If living conditions are initially favorable, the population grows geometrically, but agricultural output grows more slowly, hampered by the need for land.

A few years after Thomas Malthus posed the problem of population and food supplies at the end of the 18th century, David Ricardo introduced the key rationale for free trade in food products when he formulated the notion of comparative advantage, which explains why countries with relatively more efficient agriculture sectors should export food products in return for other goods. Interregional trade in the United States offers a good example: in a context of minimal trade barriers in the 20th century, regions with greater agricultural potential, such as the Midwest, replaced less suited regions, such as New England, in the production of field crops. Given enormous differences in productivity between regions, the gains from increased trade in agricultural products within the United States are estimated to have been similar in magnitude to the enormous gains in productivity recorded over that period.[5]

Modern economic development offers a way out of the Malthusian demographic trap, with most regions experiencing falls in the death rate, followed by declining birthrates and ultimately a transition to stable or declining populations.[6] But because this transition is long and complex, and countries vary enormously in their size and share of potential agricultural land, they have ended up with very different ratios of agricultural land per person (Figure 1). A group of super-land-abundant countries, such as Argentina, have about 2 hectares (ha) or more of agricultural land per person. Other important agricultural exporters, such as the United States and Brazil, have close to 1 ha per person. Countries like China, France, and India are intermediate cases. At the other extreme, countries such as Egypt, Japan, and the Republic of Korea have only about 0.04 ha per person.

Given the vast differences in land endowments, only international trade or massively greater productivity in the land-scarce countries would allow food demand in those countries to be met at reasonable cost. Of these two alternatives, international trade is the easier to implement in the short run, and the only one directly in the hands of policy makers. Agricultural productivity growth is

FIGURE 1 Agricultural land per person, selected countries, 2009



Source: Based on E. Fukase and W. Martin, "Who Will Feed China in the 21st Century? Income Growth and Food Demand and Supply in China," *Journal of Agricultural Economics* 67, no. 1 (2016): 3–23.

Note: Agricultural land is defined as arable land plus one-third of permanent pasture.

enormously important in the development process because it allows countries—whether land-abundant or land-scarce—to raise farm incomes and potentially to lower food prices, both of which can contribute to lowering poverty. Trade in inputs and commodities and in ideas can promote this improvement and contribute to technological progress by facilitating the international diffusion of technology and creating incentives for innovation.[7]

Since the 19th century, many countries have been able to take advantage of opportunities for international food trade because of lower transport costs, reductions in conflict, and the establishment of a workable institutional framework for international trade.[8] Two major episodes of global trade liberalization have supported population growth *and* economic development. The first occurred during the 19th century, when the European population doubled, benefiting from food imports from emerging countries of the time (Australia, Russia, and the United States) in the context of a safer international order and improved communication and transportation technologies. The second occurred more recently: since 1970, Asia has managed to combine a doubling of population with increases in quantity and quality of per capita food consumption, thanks to higher agricultural productivity at home and better integration with global markets and, in recent years, expansion of livestock-feed exports, especially from South America. Even countries with a conservative attitude toward agricultural trade—such as Japan—rely heavily on imports of nonsensitive agricultural products such as maize and soybeans.

The World Trade Organization (WTO) included agriculture in its Uruguay Round negotiations (1986–1994), which achieved some liberalization of agricultural trade and provided a framework for further reform (for more on international trade governance, see Chapter 8).[9] The Uruguay Round also included rules on standards that reduced the risk of covert protectionism. Regional reforms such as the establishment of the European Union (EU) and NAFTA liberalized agricultural trade within these blocs. Perhaps partly in response to these reforms, agricultural trade liberalization became much more controversial in the 2000s, with the G33 coalition in the WTO resisting further reform of agricultural trade in developing countries, and the food sovereignty movement questioning the role of agricultural trade both within and between countries.[10]

BENEFITS OF OPENING TO TRADE

Opening to trade has important implications for incomes, food consumption, nutritional outcomes, and resource use. By encouraging production in areas with a comparative advantage in agriculture, trade raises countries' incomes and provides access to better prices on world markets. Widespread opening to trade, of the type observed since trade costs began to fall sharply in the 19th century, has lowered the average cost of food worldwide. In contrast, limiting trade—given the huge differences in land and resource endowments—would have resulted in extremely high prices in land-scarce countries, depressed food prices in land-abundant countries, and lower real incomes in both.[11] This unbalanced pattern would have been good for neither group—with Argentine tables groaning under the weight of even more beef and Japanese farmers struggling to produce enough food on the country's scarce land.

Beyond improving food availability and access, international trade can improve nutrition by allowing better access to a diversified food basket. Relying on locally produced food greatly limits dietary choices. For those living in temperate climates, it restricts options in winter months and rules out products that require a more tropical climate. Trade allows year-round consumption of many healthy products, such as fruits and vegetables, and gives access to nontraditional food items that have improved nutrition—for example, allowing East Asian countries to rapidly integrate more milk into their diets; consumers in developed and emerging economies to adopt olive oil, a healthy source of unsaturated fat; and markets to expand for lesser-known nutritious crops such as quinoa.[12]

Similarly, international trade provides consumers with various sourcing options for any given product. Economic development has been accompanied by an increase in the variety of food imports and sources of food imports (Table 1). In 15 years, Ghana moved from importing 310 food products from world markets to 491, each product being sourced now from 7.1 countries on average compared to 3.0 in the past. China, which was already importing many products in the late 1990s, increased the diversity of its suppliers by 50 percent on average (from 9.4 to 14.5) to meet the expectations of consumers with growing purchasing power. The preference for diversity is well illustrated by advanced economies. Australia and

TABLE 1 Diversity of internationally traded food products

Country	Average number of food products		Average number of origin countries by product	
	1998–2000	2011–2013	1998–2000	2011–2013
Afghanistan	97	397	1.5	3.7
Argentina	514	429	5.3	4.8
Australia	548	546	10.4	15.7
Brazil	540	502	6.4	7.4
China	575	558	9.4	14.5
Ghana	310	491	3.0	7.1
Guatemala	491	495	3.9	4.7
Malawi	221	359	1.7	2.2
Mali	250	309	3.0	3.7
Paraguay	379	369	3.0	3.7
United States	601	585	20.9	24.9
Uzbekistan	230	299	2.5	3.2

Source: L. Deason and D. Laborde, "Trade and Nutritional Contents," unpublished, International Food Policy Research Institute, 2012.

Note: Food products are defined here as HS6 products (the Harmonized System 6-digits), the international classification for trade in goods.

the United States—major net agricultural exporters—import nearly all varieties of food products and from a rising number of countries. The growing number of exporters is an important feature of the ongoing globalization trend that, even for countries already largely open, continues to deliver gains in terms of food diversity, development of more efficient value chains for transferring and transforming agricultural products, and the emergence of new suppliers, including from developing countries.

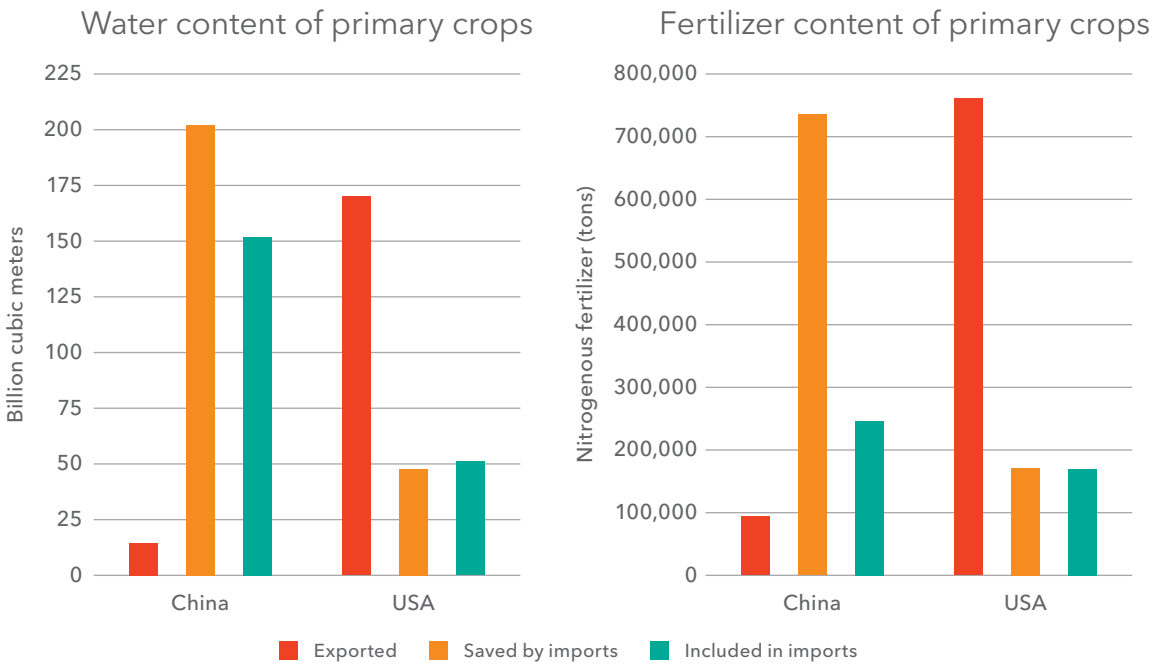
Trade can also contribute to the sustainability of food systems and reduce both the risk of overexploitation of natural resources and negative environmental impacts linked to production, known as externalities. For example, by reducing the need to rely on domestic supply, trade in agricultural products can reduce local water and fertilizer use in countries where these inputs are relatively scarce. Analysis of the main crops of the world's two largest exporters, the United States and China, shows the magnitude of these impacts (Figure 2). While the United States is a net exporter of "virtual" water—the water used to produce agricultural goods that is embedded in the traded products—and "virtual" fertilizers, China, whose domestic resources are already strained, saves substantial resources through imports, partly because its partners use technology that is less fertilizer- and water-intensive than China would have to use to replace these imports.

CHALLENGES OF OPENING TO TRADE

Trade has driven great improvements in food security and nutrition, but real risks are associated with trade opening, including increases in inequality and negative impacts on health and the environment. Acknowledging and identifying problematic aspects of the globalized food system can lead to effective policy solutions that protect the benefits of trade.

REDISTRIBUTION, POVERTY, AND INEQUALITY. Trade improves food access and availability, allowing consumers in importing countries access to more food at lower prices and raising incomes for producers in exporting countries. However, free trade has redistributive implications that may affect food security. In exporting countries, the higher product prices resulting from international trade opportunities push local prices up, hurting local consumers. Indeed, even "success stories," where increased exports raise smallholder incomes, can be offset by the adverse economic and nutrition outcomes for consumers. This is the story of quinoa—as Andean exports of the grain exploded and many poor producers enjoyed rising incomes, traditional poor consumers faced reduced access to a nutritious staple food.[13] To tackle inequalities related to trade and protect people from adjustment costs, tax and revenue transfer programs (including social safety

FIGURE 2 Water and fertilizer content embedded in international trade



Source: D. Laborde, "International Trade and Natural Resources: A Sustainable Path toward Global Food Security," presentation at the US-China Oilseeds and Grains Annual Forum, Beijing, June 17, 2017.

Note: Water content includes all water used in the production and processing of primary crops.

nets) are better options than restricting trade. Provision of public goods (such as education and agricultural research and development) can also play a role both in increasing national incomes and improving the distribution of income and opportunities.

ENERGY USE AND EMISSIONS. Bringing food from farther afield clearly involves transport costs. Both producers and traders factor in these costs and only transfer goods from one region to another if doing so lowers costs or improves product quality. However, there are externalities—unaccounted for costs, including greenhouse gas emissions—associated with production and transport of food. Such externalities should be dealt with "symmetrically." For example, if energy use is a problem, it should be discouraged equally in transportation, in production, and in consumption. This approach recognizes that free trade is not the problem, but rather distortive policies, such as tax rebates on fossil fuel use in the agriculture sector, that can alter incentives and lead to overuse of fossil energy are the problem. Limiting these distortionary policies—including subsidies and tariffs—is a cornerstone of the modern global trading system managed by the WTO.

ENVIRONMENTAL DEGRADATION. Agricultural trade is also frequently criticized for contributing to biodiversity loss and driving land use change that affects both biodiversity and greenhouse gas emissions.[14] The risk to endangered species from agricultural production—whether linked to trade or to domestic consumption—is a real and pressing problem. Investigation of this issue must consider not just the specific links between trade and species loss, but also the potential land use gains from trade: trade allows for sourcing products more efficiently, reducing the total demand for land in agriculture by encouraging production in the most efficient areas. However, by expanding markets, trade can influence the extent and pace of adverse environmental impacts.

Two well-studied examples illustrate the problem of biodiversity externalities. The slaughter of 30 million bison in the United States in the 1870s was driven by tanning innovations in Europe and a consequent booming demand for hide exports.[15] With no conservation policy in place in the United States, foreign demand clearly contributed to the near-extinction of this iconic animal. However, suppressing international trade in hides would only have

retarded the slaughter very slightly, as American tanners were rapidly learning the new techniques. Even a ban on hide exports would merely have resulted in exports of leather and other products, with the slaughter continuing in the absence of conservation policy. Only public and private conservation efforts,rather than trade restrictions, ultimately ensured the survival of the bison.[16]

Over a century later, a debate has arisen about a similar problem driven by the EU's demand for vegetable oil to feed its biodiesel policies. These policies have increased demand for palm oil and led to expansion of palm plantations in some parts of Southeast Asia, where land and environmental governance are weak. The resulting deforestation and peatland degradation has led to loss of biodiversity, including iconic species like the orangutan, and to massive greenhouse gas emissions.[17] Even if the EU biofuel policies are not the main driver of the palm plantation expansion, policy debates have been fierce since the EU policy has aggravated the environmental damage. In addressing such issues, it is more important to address the root cause—weak land and biodiversity governance in Southeast Asia—rather than restrict trade.

UNHEALTHY DIETS. Health impacts present a similar policy challenge. Human nutrition is complex, and people often make choices that are not in their long-term interests. New, tasty, energy-dense, or ultraprocessed foods, often heavily promoted, attract many consumers. The adverse health outcomes, such as obesity and diabetes, only become apparent with time. If the new food is foreign, a frequent response is to call for a ban on imports of the good, such as Fiji's ban on imports of high-fat mutton "flaps."[18]

Identifying the source of the nutritional problem is critical to selecting the right response. Such analysis has been done for related issues, including the health burden of some agricultural products, notably tobacco.[19] Import bans may not significantly reduce consumption, even if the problematic commodity was originally introduced through international trade, because domestic substitutes emerge. If domestic substitutes become available at a similar cost, restricting trade will not solve the health or nutritional problem. By encouraging domestic production, trade restrictions may also create a powerful domestic lobby opposed to efforts to reduce consumption.

In complex situations like these, the "assignment principle" states that we should target each goal with the policy that most directly affects it.[20] For example, to cut sugar consumption to reduce obesity-related diseases such as type-2 diabetes, we should focus on policies that directly address sugar consumption. If the problem is that consumers lack information about the effects of the good, then provision of information is likely the best policy. And if the good has addictive properties that make it difficult for people to give up, even when informed of its attributes? Perhaps consider taxes that will reduce the risk of people becoming addicted. We know that policies that raise the price of sugar—either consumption taxes or import duties—will reduce consumption. The assignment principle favors the tax rather than an import duty, because it affects consumption alone, without creating collateral damage by stimulating domestic production.

UNDERSTANDING TRADE RESTRICTIONS

Trade barriers create economic losses by encouraging costly production of goods that could be purchased on world markets for less and discouraging efficient production of goods that could be sold at a profit on world markets. A tax on imports, which stimulates production of import-competing goods, functions as an equivalent tax on exports, reducing exports in line with imports—it does not create the trade surplus frequently anticipated by proponents of protection.[21] If trade policies are to be used to raise revenue, a strong argument exists for using relatively low and uniform rates of tariff protection. Trade regimes using high rates of protection, or variable rates of protection across commodities or across time, create much higher costs than low and uniform rates—a 10 percent tariff is 100 times as costly, in terms of welfare, as a 1 percent tariff. So why do countries restrict agricultural trade?

Several arguments for high levels of protection, or taxation, of agriculture have been offered, including the terms-of-trade argument; the infant industry argument; the income redistribution argument; and a number of arguments for "active" protection rates that change over time, usually to stabilize domestic prices. Political economy explanations of trade restrictions look at the role of organizational and political factors.

TERMS OF TRADE. Larger countries may be able to improve the price of imports relative to exports—their terms of trade—by lowering the prices of their imports or raising the prices of exports. However, these gains come at the expense of their trading partners, who will pay more or earn less; it will generally be possible to make both these countries and their trading partners better off by lowering these barriers. This builds an argument for trade negotiations to lower barriers, rather than for use of trade barriers, since retaliation and noncooperative outcomes lead to lose-lose situations, both at the multilateral and bilateral level and for both import and export restrictions.[22]

INFANT INDUSTRIES. Surprisingly, the infant industry argument is sometimes used to justify protection for agricultural products. Proponents argue that inferior technology prevents developing countries from competing against established producers in developed countries, and that protection is needed to foster the growth of new industries. Protection is provided through export taxes on raw products. This is the flip side of the argument made in developed countries that they cannot compete because of low wages in developing countries. The problem with both of these arguments is the failure to recognize that they are two sides of the same coin. Developed countries have higher wages because their productivity—in a range of sectors—is higher than in developing countries. Developing countries hold a comparative advantage—and will be successful exporters—in those sectors where their productivity is higher relative to other potential export sectors (the theory of comparative advantage, outlined above). Infant industry protection for agricultural processing activities does not create an incentive to increase productivity, but rather enables low-productivity firms to stay in business.[23] This protection also frequently hurts poor agricultural producers such as cotton growers, who receive lower prices for their products.

REDISTRIBUTION. Another common argument for protection is that it can redistribute income. In rich countries, which tend to import labor-intensive goods, using trade protection to raise the price of these goods may raise wages relative to the returns to capital. Protectionist policies have occasionally been justified in this way.[24] In developing countries, however, imports tend to be capital intensive and protection against imports will tend to raise the returns to capital relative to labor, meaning that incomes will fall, with implications for food and nutrition security.

VOLATILITY. Active or variable trade policies in agriculture are sometimes implemented to reduce domestic impacts of world price volatility. Yet developing country markets can be destabilized by domestic shocks, such as drought, and suffer high domestic price volatility even when international markets are calm.[25] Global food markets have lower volatility in the long run than most country markets because the impact of supply and demand shocks is spread across multiple markets. In addition, trade connects the two hemispheres, which have different planting and harvesting periods, further reducing global volatility. Policy interventions through variable tariffs and export restrictions are attractive to individual countries, but increase volatility in world market prices by reducing export supplies and increasing import demand when world prices rise. Once this is considered, we see these tools are not effective in reducing the volatility of domestic prices or in sheltering the poor from the impacts of higher prices.[26] Moreover, poorly calculated policy interventions in many low-income countries increase domestic price volatility. For example, use of export bans to ensure availability of food during the 2015–2016 El Niño event in southern Africa resulted in price volatility, as the supply outlook changed after the bans went into effect.

POLITICAL ECONOMY. The most widely accepted explanation for the high levels of intervention seen in many agricultural markets is related to the redistribution argument. Some sectors are able to organize at relatively low cost and to exert strong pressure on governments for interventions that raise the prices of their outputs and/or lower the cost of their inputs.[27] This explains the tendency for agricultural production to be taxed in poor countries and subsidized in rich countries.[28] In poor countries, farmers are numerous and widely dispersed, while urban consumers care deeply about the price of food and are few enough to be readily organized. As incomes grow, the number of farmers declines sharply, and urban consumers become both more numerous and less concerned

about the price of food. The result is low (or negative) protection for agriculture in poor countries and high protection in rich countries. This political economy model explains the current high levels of farm support in the United States, the EU, and Japan.[29] It also helps explain the rise of agricultural protectionism in the late 19th century. For instance, the German "iron and rye" tariff of 1879 was Chancellor Otto von Bismarck's response to political pressure from Prussian Junkers hurt by falling transportation costs and the resulting decline in European grain prices.[30]

ENSURING SUSTAINABLE TRADE LIBERALIZATION

As shown, the merits of trade for strengthening food and nutrition security are clear. Self-sufficiency is costly and likely to put food security at risk. But this is not a call for *laissez-faire*. Market and policy imperfections can be alleviated by appropriate interventions, and movement toward free trade needs to be backed by active policies and strong institutions to guarantee cooperative behavior and coordination. International trade can be an important catalyst: it can support and accelerate economic growth, diffusion of agricultural production technology, and reallocation in food consumption and production patterns. But opening to trade has both benefits and costs, and generates winners and losers. In the presence of incomplete markets (for example, no pricing for carbon or biodiversity), poor resource governance, and externalities, it can be tempting to limit trade, switching off the catalyst instead of addressing the root causes of economic, health, or environmental problems. When considering policy in this situation, the assignment principle suggests that policies should be targeted at production when that is the source of the problem (for example, biodiversity loss or emissions) or at consumption (overnutrition or poor access to food) when that is the root of the problem. Important recommendations include:

ADDRESS INEQUALITY AND VOLATILITY WITH SAFETY NETS. Investing in human capital and social safety nets is an important way to tackle the impacts of shocks, whether from trade reform or other events. With improvements in biometric identification, it has become much easier to target safety nets to beneficiaries with particular nutritional needs, such as low-income mothers of young children. Smart policy solutions will protect the population (consumers and producers) through direct support, rather than exporting problems to their neighbors.

ADDRESS ENVIRONMENTAL IMPACTS WITH RESOURCE MANAGEMENT POLICIES. When looking at environmental issues, policies targeting trade rather than production, such as log export bans, are frequently ineffective in dealing with the market failures that lead to environmental damage.[31] Likewise, dealing with biodiversity problems requires an approach that mainstreams good management of resources and maintenance of diversity into production.[32]

ADDRESS OVERNUTRITION WITH EDUCATION. To tackle the nutrition challenges that arise with rapid income increases and growing consumption, and our human preference for rich, high-calorie foods, governments should focus on providing information and consumer education. Banning or limiting trade is likely to promote smuggling and other illegal or unmonitored activities leading to worse outcomes, such as higher prices and violation of sanitary and phytosanitary norms, creating serious health risks for national food systems on both the consumer and producer sides.

Today, the world is facing global challenges, including climate change and a growing population, that cannot be solved uniquely with local solutions, but will need strong global institutions and governance based on cooperation. These institutions must ensure that international trade continues to contribute to the peaceful redistribution of wealth and resources among nations, fostering development, and playing a key role in achieving food security.

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