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Lost in translation

The fractured conversation about trade and food security

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Background paper

Lost in translation: the fractured conversation about trade and food security

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Executive summary

There is heated debate among policy-makers and civil society about the impact of trade and trade policies on food security. This paper speculates on the reasons for such fractured and antagonistic discussion in the hope that a better understanding of these reasons may lead to more convergent views as to which policies and approaches are appropriate. The paper argues that part of the disagreement emerges from: (i) the different meanings attached to trade (Section 2); (ii) the multidimensional nature of food and nutrition security, and the large numbers of potential indicators for both concepts (Section 3); and (iii) the variety of channels that may link food and nutrition security to trade issues (Section 4).

All three aspects complicate empirical assessment of the interactions between trade and food and nutrition security, as discussed in Section 5. In addition, empirical assessments also have to contend with the different impacts that a single trade policy may have, depending on the contextual and structural characteristics of the national economy, and the global economy in which it is immersed, and on the other elements of the policy package of which the trade policy is part.

However, the comprehensive empirical studies reviewed in this paper clearly show more cases of positive than negative food security outcomes emerging from trade liberalization events. In most countries, trade has also helped food security by stabilizing domestic consumption versus more erratic domestic production (while self-sufficiency tends to lead to more instability in domestic prices and availability). In addition, the greater availability through imports appears to have complemented rather than displaced local production.

Section 5 also reviews other potential channels through which trade may affect food security, such as changes in land tenure, concentration in product and input markets, gender impacts, and consumption of junk food. Empirical evidence suggests that any potential negative effects on these dimensions have most likely been related to factors other than trade expansion per se, such as precarious land tenancy for the poor and vulnerable; inappropriate competition policies of governments (which sometimes create or reinforce monopolies and reduce competition in general); legal, administrative or social discrimination against woman; and the lack of an integrated approach to malnutrition (allowing the expansion of food that is high in sugars, salt and unhealthy fats). These issues must be addressed directly; protectionism and self-sufficiency will not solve them and may aggravate them.

Section 6 discusses other methodological and value issues that may lead to disagreement, such as policy objectives and their measurement; the evaluation of impacts and outcomes; and the existence of established beliefs about how the world and national economies operate.

The paper concludes with some reflections on what can reasonably be said about the potential impacts of trade on food security. Considering the variety of potential effects from a single trade policy, depending on the context, the best advice to policy-makers, rather than “it depends”, should be “know your country and its circumstances”. It is also necessary to recognize that there are differences in values and ideological lenses. If some people continue to oppose trade simply as a proxy for the expansion of an economic system that they dislike, the policy differences will never be bridged.

1. Introduction

The links between trade and food security have received particular attention in public debates, stirring strong views that cover a range of opinions, from those who argue that trade causes hunger (Madeley, 2000) to those who believe that complete liberalization of world agricultural trade is the best possible approach for food security (e.g. Griswold 1999).

Comprehensive reviews of case studies have analysed the issues involved (FAO, 2003; Thomas, 2006; OECD, 2013; Brooks and Matthews, 2013; McCorriston *et al.,* 2013). However, this systematic review of evidence does not seem to have abated the controversy, as demonstrated by discussions of the "right to food" (e.g. the debate between De Schutter, 2011 and Lamy, 2011), "food sovereignty" (e.g. the 2014 special issue of *The Journal of Peasant Studies*, with an introduction by Edelman *et al.,* 2014) and other similar concepts.

The disagreements about trade and food security are related to similar controversies about trade and poverty (e.g. Winters, McCulloch and McKay, 2004; Winters and Martuscelli, 2014) and about globalization, poverty and food security (Díaz-Bonilla, 2002; Díaz-Bonilla and Robinson, 2001).

This paper does not aim to settle the controversies, but – reflecting the apt title of Kanbur 2001 – it focuses on trying to understand "the nature of the disagreements", in the hope that such understanding may lead to more fruitful policy dialogue. Kanbur 2001 argues that discussions of poverty and globalization between opposing groups, which he called the "Finance Ministry (FM) type" and the "Civil Society (CS) type", are based on differences in: (i) aggregation, with FM types thinking in terms of incidence of poverty (percentage of poor people over total population)and using national averages, while CS types look mostly at absolute numbers, usually at more disaggregated levels; (ii) time horizons, with the FM group thinking in the medium term, while the CS group usually looks at the short run (poverty now) or the long run (the sustainability of policies over the coming 50 to 100 years); and (iii) market power, with FM types tending to see policies playing out in a more competitive economy, while CS types consider that markets are non-competitive and dominated by powerful agents that can also influence governments (Kanbur, 2001).

Building on Kanbur's analysis, Díaz-Bonilla 2002 explored additional sources of disagreement, arguing that discrepancies occur at four main levels: (i) trends in poverty and income distribution; (ii) the meaning of globalization; (iii) links among the outcomes identified in level (i) and the process of globalization as defined in level (ii); and (iv) more structural disagreements related to the definition of welfare objectives and the role of poverty in the world economy (see also Díaz-Bonilla and Robinson, 2001). Similar disagreements appear in the debate on trade and food security, as argued in this paper.

The paper is structured in seven parts. This introduction is followed by a brief discussion of the different meanings of "trade" (Section 2) and "food security" (Section 3) that have been used in this debate. The paper then discusses different conceptual frameworks for identifying the main linkages and conditioning factors related to trade and food security (Section 4) under their various definitions. Using a specific conceptual framework (from Díaz-Bonilla *et al.,* 2000), the paper then analyses the different channels through which trade may have impacts on food security, arguing that such variety of channels and meanings of trade and food security all significantly contribute to the widely differing views on how trade affects food security. Section 5 reviews empirical studies on trade and food security in general and in relation to the different channels identified in Section 4. Section 6 speculates on why disagreements may persist even after considering the empirical evidence. The final section draws conclusions.

2. What is the meaning of "trade" in "trade and food security"?[1]

2.1. Trade, trade policies and WTO trade-related policies

It is useful to distinguish among "trade" as the physical and economic exchange of goods and services, "trade policies" as the interventions of governments when these economic and physical flows cross national boundaries, and "WTO trade-related policies" as a larger set of policies.

Some debates seem to focus on how the expansion of trade in the first sense affects food security. For instance, De Schutter (2011: 1) argues that the debate on trade and food security "must acknowledge the dangers for poor countries in relying excessively on trade", and that "these countries are caught in a vicious cycle. The more they are told to rely on trade, the less they invest in domestic agriculture. And the less they support their own farmers, the more they have to rely on trade". On the other hand, most economists consider that trade is simply the connection between supply and demand through which human beings exercise their freedom to exchange goods and services, leading presumably to greater efficiency, and more variety and stability in consumption, with stability resulting from the balancing role of trade, which allows people to smooth consumption in the face of shocks to domestic production (e.g. OECD, 2013; Abbott, 2010).

The previous notion of trade considers events that may occur because of impersonal forces of technology, demography and the like, with or without government intervention. The notion of trade policies obviously refers to an activity of governments. In economic terms, these policies usually denote government measures at the border, applied when goods and services cross a country's frontier on their way to or from the rest of the world. These policies include import taxes and quotas, export subsidies or taxes, import or export bans, the operation of State trading enterprises, and other non-tariff measures (such as health and safety procedures) with some equivalence to tariffs and trade restrictions. In this context, "trade liberalization" is considered to be the reduction or elimination of barriers to trade that are directed at the agriculture and food sectors of the economy and that result from the use of government instruments at the national frontier or border, with impacts on imports or exports, such as the measures mentioned earlier in this paragraph (McCorriston *et al.,* 2013).

These two different definitions may lead to dissimilar prescriptions about what the government can or should do. For instance, if trade is presumed to cause hunger and is expanding because of government policies, the government can stop promoting trade expansion by using protectionist measures, which is the preferred option of many who distrust the expansion of trade. On the other hand, if trade expansion simply reflects the supply and demand developments that occur because of changes in incomes, endowments, technologies or preferences, policies that interfere in these processes to reduce trade could conceivably generate negative consequences, not only for growth and efficiency but also for poverty alleviation and food security.

In addition to border measures, the notion of "trade policies" has been expanded in world trade agreements to include a series of *domestic* measures that operate within national borders. This expanded interpretation results from negotiations under first the General Agreement on Tariffs and Trade (GATT) and then the World Trade Organization (WTO). Because countries exchanged concessions[2]

[1] This section is based on Díaz-Bonilla, 2015b: Chapter 11.

[2] It has been widely noted that the diplomatic/legal view of trade negotiations is usually from the perspective of producers; thus, for example, reducing a tariff is a concession (a cost) for the country, which has to be

(such as reduction of tariffs for some products) during the different rounds of trade negotiations, it is assumed that there is a balance of rights and obligations among countries agreeing to the full package negotiated, and that these rights and obligations arereflected in reciprocal market access opportunities. Based on this assumption, not only border measures but also domestic policies may affect the balances of rights and obligations and of reciprocal market access opportunities that have been negotiated. Since its beginning, GATT has therefore included regulations related to domestic measures (such as subsidies to production) that could affect market access opportunities. This broader legal interpretation of trade policies, which was more limited in the 1948 GATT, has been greatly expanded since the WTO was created in 1995 as part of the conclusion of the Uruguay Round of trade negotiations.

For instance, the WTO Agreement on Agriculture (AoA) considers three pillars of the negotiations: (i) market access – mainly, but not exclusively, border measures related to imports; (ii) export competition – also mainly border measures related to exports, but also including credits, international food aid and the operation of State enterprises; and (iii) domestic support – a series of domestic government programmes operating within the country's borders. Only the first two pillars include obvious border measures.

The Uruguay Round also led to agreements on other legal texts, such as those on intellectual property rights, which many observers and developing countries have argued are not really related to trade.[3] However, the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) and the Agreement on Trade-Related Investment Measures, for example, are now part of the legal framework to which WTO members are committed. The Uruguay Round also expanded the legal WTO coverage of goods to include services, with the approval of the General Agreement on Trade in Services (GATS).

Therefore, the term "trade policies" may be given two separate meanings: one is narrower, focusing on border measures, while the other reflects the more expansive view embedded in WTO legal texts.

At a minimum, the discussion of trade and food security must incorporate the usual economic perspective on border measures, but it also refers to topics related to agriculture and food security that are part of the broader WTO definition. As noted, this is the case of the three pillars embedded in the AoA. The discussion of government policies may also be expanded to other trade-related measures with implications for agriculture, such as sanitary and phytosanitary measures and other technical regulations, intellectual property rights, and the treatment of State trading enterprises.

Given the variety of issues and policies, it is important to clarify the notion of trade being used in debates about the links between trade and food security: does "trade" refer to the expansion of trade alone; to policies and changes in policies, such as trade liberalization; or to implementation of the WTO legal framework (and what part)?

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compensated by a concession from the trade partner in terms of access to its domestic market. In many cases this is also the view held by civil society organizations following trade negotiations and, of course, by the associations representing producers. On the other hand, the economic view focuses mainly on consumers and sees tariff reductions as a tax cut for consumers, which – along with any other measure that improves consumption opportunities through trade – represents a benefit for the country. The differences in these two visions continue to complicate the diplomatic, legal and economic debates around trade negotiations.

[3] Many low-income developing countries argue that because of their limited resources, they were unable to analyse some of these obligations in full and felt that their only option was to accept what was presented or be excluded from the overall agreement.

2.2. Quantification of trade measures

Whatever concept of trade is used has to be quantified to enable serious analysis of the potential links between trade and food security. For instance, controversies about the virtues or defects of closed/protected economies versus open/liberalized ones are complicated by the question of how to measure these concepts, which are usually not binary categories but may include a range of policies with different levels of implementation. Even the oft-quoted study of Sachs and Warner 1995 classifies countries as either "open" or "closed" on the basis of five variables: the level of average tariffs; the coverage of non-tariff barriers; being or not being a socialist economy; having or not having a State monopoly on major exports; and the level of the black market premium for the exchange rate. Only three of these variables refer to trade issues in any of the meanings discussed so far.

Other studies have looked at "openness" based on variables such as trade as a percentage of gross domestic product (GDP)[4] or changes in this ratio,[5] but these indicators reflect outcomes of multiple factors, only some of which may be trade policies. This weakness was noted by Rodriguez and Rodrik 1999 and Rodrik 2001, who present criticisms of the different empirical measures utilized as proxies for openness and trade liberalization in many multi-country econometric studies.

2.3. Non-agricultural trade and non-trade policies

Empirical studies show that the final impacts of trade measures on agriculture and food production and consumption depend on whether they apply to only agricultural and food products (or even just a subset of these) or also affect non-agricultural and non-food products. The overall impact of the trade policies considered also depends on whether the trade policy change occurs in just one country, which may be opening or closing its economy unilaterally, or simultaneously in multiple countries, as happens with the implementation of regional, plurilateral or multilateral trade agreements.

Furthermore, in empirical analyses and case studies, trade liberalization is usually mixed with other policy changes, which are variously defined as "privatization," "structural adjustment" and so on (Thomas, 2006; Díaz-Bonilla, 2013; McCorriston *et al.,* 2013).

Table 1 shows the variety of possible interpretations of the terms used to discuss trade issues.

Table 1: Trade policies – meanings and levels of application

Sectors	Trade	Trade policies	WTO trade policies	Other (non-trade) policies

[4] Some authors have cited the high values for the trade/GDP ratio in sub-Saharan Africa as evidence that excessive trade leads to poor economic performance (Mazur, 2000). However, East Asian countries that have higher levels of openness than sub-Saharan Africa have done much better.

[5] For instance, Dollar and Kraay 2001 compare changes in openness rather than absolute levels and conclude that countries that increased their integration in global trade ("globalizers") did better than those that did not increase integration. However, looking at levels instead of changes in levels, of either trade/GDP ratios or import tariffs, countries labelled "non-globalizers" by Dollar and Kraay have larger ratios of trade to GDP and lower tariffs than countries labelled "globalizers". In addition, Birdsall and Hamoudi 2002 show that the positive correlation found by Dollar and Kraay 2001 between growth and increases in the trade/GDP ratio is related to the commodity dependence of the poorer-performing countries; thus, the collapse in prices reduced both growth and the value of the variable interpreted as a proxy for openness, creating a misleading correlation.

Agriculture and food	Expansion or decline: national, regional, global	1. National level: free trade, intermediate, or protectionism 2. Regional and global levels: free trade, intermediate, or protectionism	1. AoA 2. Agricultural aspects of SPS, TBT, TRIPS, others	Macroeconomic policies, privatization, liberalization of domestic market, others, as they directly affect agricultural and food issues
Non-agricultural and non-food	Expansion or decline: national, regional, global	1. National level: free trade, intermediate, or protectionism 2. Regional and global levels: free trade, intermediate, or protectionism	Non-agricultural aspects of TRIPS, TBT, GATS, others	Macroeconomic policies, privatization, liberalization of domestic market, others, as they directly affect non-agricultural and non-food issues

Source: author.
Notes: SPS = Agreement on the Application of Sanitary and Phytosanitary Measures; TBT = Agreement on Technical Barriers to Trade.

In summary, the first point to be emphasized is the need to define clearly the notion of trade being used in the debate. The second issue is that in causal analyses, it is necessary to use quantitative measures that are clearly related to the notion being used. In this regard, it is also important to distinguish indicators of outcomes (such as trade as percentage of GDP) from indicators of policies and, within the latter, trade policies from non-trade-related policies. Third, to understand the systemic, economy-wide implications of the policies being analysed, it is important to determine whether the trade policy changes focus only on agricultural and food products (or a subset of these) or apply to all products, and what concurrent non-trade policies are being implemented. At least part of the disagreement over the links between trade and food security is related to imprecise conceptualization of these three issues.

3. What is the meaning of "food security"?

3.1. Definitions

To understand how trade is linked to and has impacts on food security, it is necessary to agree on the meaning of food security and on how food security should be measured.

Food security has been analysed at the global, national, regional, household and individual levels. The United Nations Conference on Food and Agriculture, which was held at Hot Springs, Virginia, in the United States of America in May and June 1943 and which led to the creation of FAO in 1945, clearly focused on the individual as a consumer of food. The final declaration stated "its belief that the goal of freedom from want of food, suitable and adequate for the health and strength of all peoples can be achieved" (quoted in Shaw, 2007: 3). It also defined poverty as the main obstacle to attaining the goal of freedom from want of food (see the references in Shaw, 2007). The declaration outlined an ambitious global economic and social programme that included, and went beyond, trade issues.

Several factors led to the gradual narrowing of this broad view of trade security and policies over time (Díaz-Bonilla, 2015a). Basically, the reconstruction of Europe and Japan after the Second World War led to concerns about production issues in the 1950s and 1960s, while the price shocks of the early 1970s also generated fears about the scarcity of production. In fact, the World Food Conference held in Rome in 1974 defined food security from the supply side, as "availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices" (CFS, 2012: 4).

However, the collapse of commodity prices during the second half of the 1980s suggested that production did not seem to be the main limitation to achieving food security. The focus therefore moved away from global and national perspectives on availability, towards food access and utilization at the household and individual levels, where problems with food security are more concrete (Maxwell, 1996). The point made by the 1943 United Nations conference regarding poverty and lack of income opportunities, rather than food supply, as the main obstacle to access to food was reasserted in the 1980s (Sen, 1981). The issue of variability in the trends of both food supply and access, and their sustainability over time, were also increasingly highlighted (Maxwell, 1990). Another basic point made clearly in 1943 and presented again much later as a refinement to the definition of food security was that food intakes must exceed the needs for simple survival in order to support an active and healthy life.

The 1996 World Food Summit pulled together most of those different components when it asserted that "food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 1996: paragraph 1). (See FAO, 2003: chapter 2 for a history of the successive definitions of food and nutrition security.) However, physical availability and economic access are only preconditions for the adequate utilization of food; food availability and access do not determine unequivocally the more substantive issue of malnutrition or nutrition insecurity at the individual level when measured by anthropometric indicators (Smith, 1998; Smith and Haddad, 2000).

Smith (1998) noted that the indicator of undernutrition utilized by FAO[6] – a measure of availability of calories at the national level, doubly corrected by the gender and age structure of the population and by the consumption or income distribution profile of the country – although obviously showing quite a close correlation with measurements of national food availability, was more weakly correlated with measurements of malnutrition based on anthropometric indicators. For instance, Smith and Haddad (2000) analysed nutrition insecurity at the individual level (using child malnutrition as the indicator) and found that although national food availability plays a role, there are other important determinants, such as the health environment, women's education levels, and women's relative status in the society.

These findings implied a need to distinguish undernourishment, linked to calorie intake, from malnutrition, which is a physiological condition related to food intake but also affected by other determinants. More recent definitions clearly differentiate food security and nutrition security; for example, a recent report from FAO, the International Fund for Agricultural Development (IFAD) and the World Food Programme (WFP) uses the following definitions (FAO, IFAD and WFP, 2013: 50):

> Food insecurity. A situation that exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life. It may be caused by the unavailability of food, insufficient purchasing power, inappropriate distribution or inadequate use of food at the household level.
>
> Nutrition security. A situation that exists when secure access to an appropriately nutritious diet is coupled with a sanitary environment, adequate health services and care, in order to ensure a healthy and active life for all household members. Nutrition security differs from food security in that it also considers the aspects of adequate caring practices, health and hygiene in addition to dietary adequacy.

The latter definition needs also to consider the "triple burden" of malnutrition that now affects households and individuals throughout the world (Pinstrup-Andersen, 2007): undernutrition, the traditional focus of food insecurity, caused by insufficiencies in calories and proteins; overnutrition, leading to problems with obesity, diabetes and cardiovascular functioning; and deficiencies in micronutrients, with various negative health outcomes. In developing countries, the coexistence of under- and overnutrition even within a single family has been documented (Garrett and Ruel, 2003; IFPRI, 2014).

While the double burden of undernutrition and micronutrient deficiencies fits within the notion of "nutrition security", which is envisaged as being on a somewhat linear spectrum from insecure to secure, problems related to overnutrition may require a more precise characterization of what "healthy and active life" means. This requirement suggests a rather non-linear relation between consumption and nutrition status, with overconsumption also being part of "malnutrition", although it would seem awkward to apply the term "nutrition insecurity" to a situation in which there is an excess of consumption, and perhaps a better term needs to be coined for this condition.

[6] The traditional indicator for hunger and food insecurity is the "prevalence of undernourishment", which is calculated by FAO and was adopted as the official Millennium Development Goal indicator for Goal 1, Target 1.9. Prevalence of undernourishment expresses the probability that a randomly selected individual from a country consumes an amount of calories (the habitual daily "dietary energy consumption") that is insufficient to cover his/her energy requirement for an active and healthy life – the "minimum dietary energy requirement".

3.2. Measurement

As in the case of trade, the different definitions of food and nutrition security make it crucial that these concepts are measured appropriately: it would be impossible to evaluate the links between trade and food and nutrition security without appropriate indicators to capture these concepts, which are basically multidimensional. This subsection starts by commenting on what can be called "primary indicators", to distinguish them from aggregate indicators, which are combinations of mostly primary ones and include the Global Hunger Index (GHI) (IFPRI, Concern Worldwide and Welthungerhilfe, 2013) and the Global Food Security Index (GFSI) published by the Economist Intelligence Unit.[7]

Another point to be noticed, which was briefly mentioned in the discussion of trade, is that some indicators and indices signal policy interventions; others show the direct results of these interventions; still others reflect outcomes and impacts that result from a variety of factors, not only government interventions; and another group are indicators of structural conditions, which may be influenced by government interventions only in the long run, if at all. Although each of these types of indicator has implications for food and nutrition security, there is a difference between indicators that focus on policy levers that can be utilized by governments (actionable indicators) and those that describe the different types of more or less structural conditions in different countries, which may not necessarily point to clear government interventions (Díaz-Bonilla, Orden and Kwieciński, 2014).

In addition, definitions of food and nutrition security are usually considered to encompass four main components: availability, which is usually represented by indicators of domestic supply and trade of food; access, for which a series of indicators has been suggested linked to income, employment, income distribution, poverty, food inflation and market power; utilization, which has been represented by direct indicators of nutrition status but also more indirect indicators of the nutritious quality of food, and has also included such factors as health services, water and sanitation infrastructure, education, empowerment of women, and good governance; and stability, which is represented by different indicators of variability in availability, access and quality of food and health services.

Because food and nutrition security is a multidimensional concept, the main issue is how to organize and present the large array of potential indicators, such as those documented in the Food Insecurity and Vulnerability Information and Mapping Systems.[8]

Pangaribowo, Gerber and Torero (2013) review potential indicators in detail, classifying them into three major categories:[9] (i) indicators that measure food and nutrition security *status/outcomes*; (ii) indicators that measure *drivers, determinants and risks* related to food and nutrition security; and (iii) indicators that measure *policy interventions and processes* related to food and nutrition security. The authors

[7] The International Food Policy Research Institute (IFPRI), Concern Worldwide and Welthungerhilfe developed the GHI, which attempts to reflect the multidimensional nature of hunger by combining three equally weighted indicators into one index: (i) the proportion of undernourished people as a percentage of the population (which is FAO's indicator, as previously mentioned); (ii) the proportion of children under five years of age who have low weight for their age; and (iii) the mortality rate of children under five (IFPRI, Concern Worldwide and Welthungerhilfe, 2013). The GFSI aggregates 28 variables into a single indicator. It also reports on seven "background variables".

[8] http://www.nfpcsp.org/agridrupal/sites/default/files/Lao_FIVIMS_Training_Guide_for_FIVIMS_Data_Analysis_and_Mapping.pdf

[9] Matthews (2013) also divides indicators into three groups: initial conditions, policies and strategies, and outcomes.

combine these three levels with: (i) the four dimensions of availability, accessibility, utilization, and stability (or vulnerability); (ii) the time scale of these indicators (whether they refer to short-term/transitory aspects or long-term/persistent ones); and (iii) the level, from macro (world, regional, national) to micro (household, individual). The authors include this classification in Annex 1 of their paper, which presents a long list of potential indicators. They present a reduced set of indicators as a possible minimum to be considered when discussing outcomes (Table 2).

Table 2: Potential indicators for food and nutrition security

Availability	Accessibility	Utilization	Stability
Per capita total amount of net calories available in a given country (FAO/national) (taking into account the level of imports and exports in terms of calories)	Average share of food expenditures in total households expenditures (FAO, national household surveys, or computed from LSMS expenditure module/national and household)	Prevalence rate of stunting among children under 5 years (WHO, UNICEF/national)	Per capita food variability (FAO/national)
Net share of energy supply (calories) derived from cereals, roots and tubers (FAO/national)	Prevalence rate of undernourished people (FAO/national)	Prevalence rate of underweight among children under 5 years (WHO, UNICEF/national)	Domestic food price volatility (FAO/national)
Average supply of protein derived from animal sources (FAO/national)	Depth of food deficit (FAO/national)	Dietary diversity score (national household surveys, or computed from LSMS expenditure module/household)	
		Prevalence of overweight and obese adults (based on body mass index measures in demographic and health surveys – women only/national)	
		Prevalence rate of anaemia among women of reproductive age and children under 5 years (WHO, UNICEF/national, Feed the Future/national)	

Source: Pangaribowo, Gerber and Torero, 2013: 35, Table 3.
LSMS = living standards measurement study; UNICEF = United Nations Children's Fund; WHO = World Health Organization.

Another simplified version of the potential larger array of indicators is in FAO, IFAD and WFP (2013), which includes not only outcomes but also drivers and policy levers (Table 3).

Table 3: Potential indicators for food and nutrition security

The suite of food security indicators		
FOOD SECURITY INDICATORS	**DIMENSION**	
Average dietary energy supply adequacy Average value of food production Share of dietary energy supply derived from cereals, roots and tubers Average protein supply Average supply of protein of animal origin	AVAILABILITY	STATIC and DYNAMIC DETERMINANTS
Percentage of paved roads over total roads Road density Rail lines density	PHYSICAL ACCESS	
Domestic food price index	ECONOMIC ACCESS	
Access to improved water sources Access to improved sanitation facilities	UTILIZATION	
Cereal import dependency ratio Percentage of arable land equipped for irrigation Value of food imports over total merchandise exports	VULNERABILITY	
Political stability and absence of violence/terrorism Domestic food price volatility Per capita food production variability Per capita food supply variability	SHOCKS	
Prevalence of undernourishment Share of food expenditure of the poor Depth of the food deficit Prevalence of food inadequacy	ACCESS	OUTCOMES
Percentage of children under 5 years of age affected by wasting Percentage of children under 5 years of age who are stunted Percentage of children under 5 years of age who are underweight Percentage of adults who are underweight Prevalence of anaemia among pregnant women Prevalence of anaemia among children under 5 years of age Prevalence of vitamin A deficiency (forthcoming) Prevalence of iodine deficiency (forthcoming)	UTILIZATION	

Source: FAO, IFAD and WFP, 2013.

It should be noted that Tables 2 and 3 include some indicators of dietary diversity, which seems relevant considering that lack of dietary diversity is correlated with child stunting/wasting and underweight mothers (Arimond and Ruel, 2006). The issue of dietary diversity also has implications for trade negotiations to the extent that it challenges the reductionist view of there being only a limited number of "food security crops", usually major cereals (such as wheat, rice and maize). Another aspect to be mentioned is that Table 2 (but not Table 3) includes a measure of overnutrition.

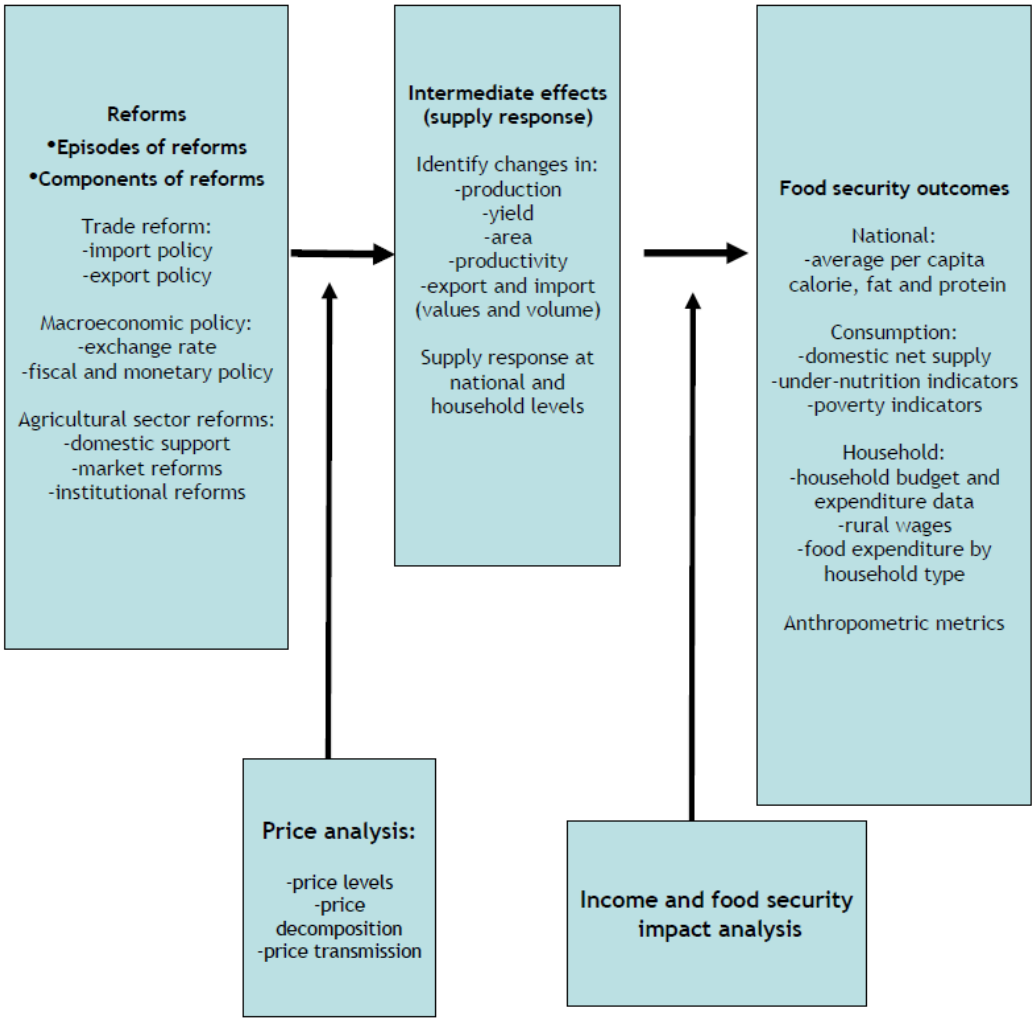
A related issue is that when food and nutrition security is defined by a variety of indicators, there may be complementarities among the indicators (such as improving water and sanitation, and expanding rural health care services), but there can also be trade-offs: for instance, policies that increase the price of food may lead to more availability but may also reduce access for poor consumers. This is a basic dilemma in food policy, which governments have tried to solve with a variety of interventions that have not always been beneficial in terms of poverty alleviation, food security, economic efficiency or macroeconomic stability (e.g. Timmer, Falcon and Pearson, 1983; Díaz-Bonilla, 2015b).

In summary, this brief review of the variety of definitions and potential indicators, even in the simplified formats shown in Tables 2 and 3, immediately indicates the difficulties in unequivocally linking the multidimensional concept of trade with the even more multidimensional notions of food and nutrition security. Some of the possible links are discussed in the next section.

4. What are the links between trade and food and nutrition security?

A well-known framework for analysing the linkages between trade and food security is the one utilized in the comprehensive studies conducted by FAO (FAO, 2003; Thomas, 2006). The basic structure, presented in a simplified format in McCorriston *et al.,* 2013, is shown in Figure 1.

Figure 1: An economic framework for analysing the links between trade and food security



Sources: McCorriston *et al.,* 2013: 16, Figure 3; based on FAO, 2003; and Thomas, 2006.

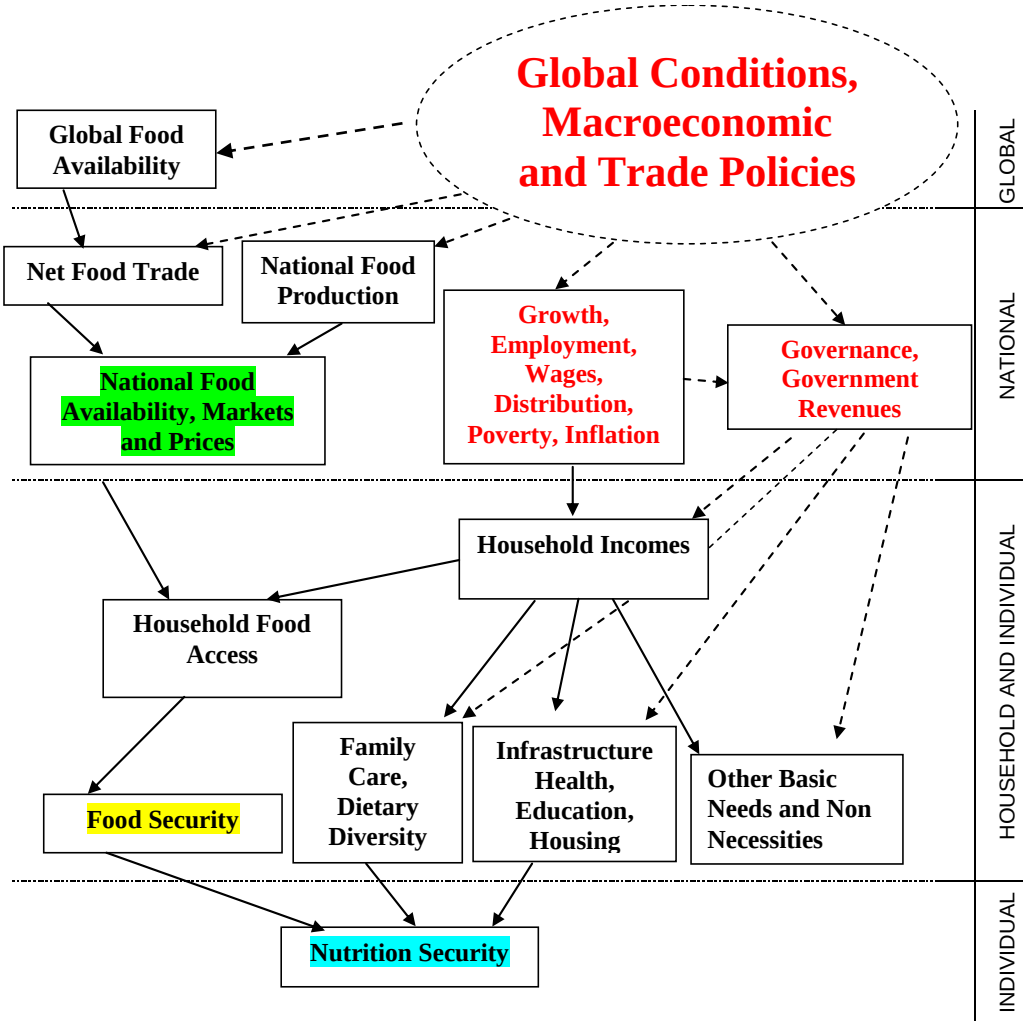
Several points should be mentioned. First, the policies considered include more than trade aspects. As the title of the first block in Figure 1 indicates, the cases analysed are episodes of policy reform in general, suggesting the difficulties in assigning impacts and outcomes to trade alone when trade reforms are part of a broader policy package. A second point is the emphasis on price analysis as a key factor in the transmission from policies to final outcomes. The question is whether there are other potential channels – in addition to prices – that may also need to be highlighted. Third, the immediate intervening factor before moving to direct food security outcomes is income. Thomas (2006) appropriately notes

that the analysis should include not only changes in prices but also effects on production, wages and employment, and on public and private transfers (from public safety nets to remittances).

While the framework in Figure 1 focuses on economic aspects and emphasizes the definition of food security, the nutrition community follows mainly the widely used UNICEF framework for nutrition analysis. This framework differentiates three levels of the determinants of undernutrition – basic, underlying, and immediate causes – each with different possible indicators (e.g. Black *et al.,* 2008). The focus is therefore mostly on nutrition issues and their consequences.

Other frameworks have focused on economic links to poverty outcomes, emphasizing the functioning of markets but also government operations, as in McCulloch, Winters and Cirera (2001). Another possible representation is shown in Figure 2, based on Díaz-Bonilla *et al.,* 2000, which in turn is based in part on Smith (1998), which separates the concepts of food security and nutrition security (as in Black *et al.*, 2008) but also expands the channels for considering other economic and poverty aspects, in line with both Figure 1 and McCulloch, Winters and Cirera (2001). This representation highlights the presence of several policies and factors, not only trade issues, while suggesting other potential channels beyond price transmission mechanisms that may affect food and nutrition security.

Figure 2: A conceptual framework for analysing the economic links to food and nutrition security



Source: author, modified from Díaz-Bonilla *et al.,* 2000: 33, Figure 1.

In Section 4.1, Figure 2 is used as the basis for discussing some of the main channels linking trade to food and nutrition security that have been highlighted in academic and political debates. Section 4.1 seeks only to describe the potential links and the debates. Section 5 focuses briefly on some conceptual and empirical issues related to the operation of these links.

4.1. Channels linked to stable food availability and related issues

Trade and trade policies, along with other macroeconomic policies and events, influence world food availability as well as production and food net trade (including exports, imports and food aid) at the national level. These policies – particularly if interpreted to include not only border measures but also the domestic support measures considered in the AoA of the WTO – have effects on the operation of factor, input and product markets and respective prices and wages. Through their impact on agricultural and food production, they determine national food availability, the first component in the definition of

food security. They can also determine how food supplies are distributed at the subnational level, across domestic regions, between urban and rural markets, and at different points in time, affecting availability geographically and temporally. In addition, these policies may have impacts on the stability of availability (the fourth component of the notion of food and nutrition security).

Some of the debates at this level are briefly outlined in this section, focusing mainly on stable availability. Issues related to income generation, access and related topics are discussed in the following sections.

4.1.1. Displacement of, or complementarities with, domestic production

The issue is whether trade is displacing domestic food production, or food imports are complementing national availability. If trade is displacing domestic production one for one – presumably because of lower prices – and such production is based on small producers, or its displacement generates negative employment effects among rural workers, there may be a decline in income opportunities among the rural poor, which would also hurt their access to food. In this line of argument, there would not be more availability (there is a one-for-one displacement), but the price of food would be lower. In that case, consumers may benefit, particularly poorer consumers for whom food is a large percentage of their expenditures, but rural producers and rural workers would suffer. Overall poverty and food insecurity may then increase as a whole if the aggregate benefits for poor and food-insecure consumers (many of whom may live and work in rural areas) are lower than the aggregate losses for rural producers and workers. However, overall poverty and food insecurity may decrease if the benefits to the former are larger than the costs to the latter.

On the other hand, the increased food imports may simply expand and supplement the availability of food without displacing domestic production, offering consumers additional supply that is not available domestically (or that would be available only at higher costs for the economy and increased prices for consumers, negatively affecting access).

Discussion of these effects may focus on trade expansion alone, trade policy (as in trade liberalization) or WTO trade policies. In the last case, and considering only the AoA, part of the debate centres on whether the WTO framework allows developed countries to subsidize production and exports in ways that displace agricultural and food production in developing countries, while restricting the policy space for these countries to support and expand their own agriculture.

4.1.2. Changes in the structure of production: cash versus food products

Another disputed link is between trade and trade policies and production diversification. A long-standing debate concerns whether expansion of trade, international as well as domestic, may be shifting production patterns at the local level in ways that privilege cash/export/non-food products, which would then displace food production for family consumption, with negative impacts on food and nutrition security.

An alternative view is that expanded trade enables the expansion of production, which may become more diversified without a decline in traditional food crops, eventually enabling the production of new foods. This situation would be beneficial in terms of nutrition security, given the link between positive anthropometric nutrition indicators and dietary diversification, as mentioned in Section 3.

4.1.3. Changes in the agrarian structure

Even if there are no displacements of domestic food production by imports and no changes in domestic production away from food crops, other debates have focused on what may happen at the level of the productive structure supporting domestic production. An issue that has received particular attention is the potential impact of trade and trade policies on the balance among large commercial farms, family and small farms, and landless farmers and workers within the agrarian structure of developing countries. Some criticisms of trade relate to potentially negative impacts on this agrarian structure, such as the expansion of "industrial agriculture" (a term used with a negative connotation) at the expense of smallholder farmers. It has also been argued that many smallholders producing food are women, and therefore trade that displaces domestic production would also have negative gender effects (IANWGE, 2011).

A negative scenario would highlight the difficulties arising from lack of access to land, technology and other resources for small and poor producers – particularly women – which prevent these producers from participating profitably in the enlarged domestic or international markets generated by trade expansion. Depending on the evolution of wages and employment on labour markets, these limitations on participation in the opportunities offered by trade may lead to worsening income distribution, but not necessarily to increases in absolute poverty.

In a more worrying scenario, the poor would become worse off absolutely, not only in relative terms. Most of the authors who argue that this undesirable outcome is likely to believe that the expansion of market opportunities may shift relative prices against the poor, reduce productive and income-generating opportunities for them, increase the competitive advantage of large firms, or reinforce the power of already dominant actors (such as large landowners and big commercial enterprises), allowing them to extract additional incomes from the poor or to expropriate the poor's assets, such as land or access to water, through different methods.

These are not new arguments and have emerged before in the context of developments such as the green revolution, the increase in commercialization, and now the expansion of international trade and – more generally – the process of globalization (Díaz-Bonilla, Thomas and Robinson, 2003 discuss some of the issues involved). There are also gender aspects of these arguments, which are expanded on in Section 4.3.3. The controversy also includes the perennial debate about the competitive advantages of large versus small farms (e.g. Deininger and Byerlee, 2011), and a renewed attention to land tenure issues, as manifested in concerns about "land grabbing".

These are empirical issues that need to be considered, starting with the recognition that agrarian structures are far more complex than the dichotomy of industrial agriculture versus smallholders: they include a variety of commercial and family farmers, and landless workers and vulnerable rural groups whose fate also has to be taken into account.

4.1.4. Changes in global and national market structures for products and inputs

This discussion takes place at several levels of market structures. At the more general level, it has been argued that global production has become more concentrated. This concentration may increase the vulnerability of world consumers regarding food availability if the supply in some producing regions is compromised. On the other hand, a well-known argument is that trade expansion would smooth availability and prices in volatile domestic markets, helping consumers (Abbott, 2010; OECD, 2013).

A different issue is the degree of competitiveness (or contestability) of product and input markets. Even if production is not as concentrated globally as some analyses argue, commercialization and processing channels may be falling into the hands of fewer and larger agents. However, the main questions in the context of the issues discussed here are: (i) what the welfare consequences would be for producers and consumers if markets were becoming more concentrated; and (ii) what the influence of trade or trade policies would be in this process. These questions can be asked at the levels of global, national and local markets.

In general, the usual view of economists is that expanded trade tends to reduce the market power of dominant actors, which would lead to a larger supply and lower prices. On the other hand, critics tend to paint a picture in which the dominant position of key market players along the value chain would be reinforced by trade expansion and specific trade policies, which – these critics argue – would have negative impacts on food availability and prices.

4.1.5. Volatility in availability and prices

The stability of production and prices for food consumption relates to the fourth component of food and nutrition security. The debate in this regard is whether international or domestic markets are more volatile in terms of production and prices, and therefore whether reliance on trade increases or decreases volatility in domestic availability and prices.

4.2. Channels affecting stable access to food, and related issues

Stable access can be analysed at the country/national level and the household/individual level. At the national level, access to food depends on variables such as domestic income or GDP, trade, external financing (including remittances) and foreign reserves. At the household level, access depends on the relationship between household income (broadly defined) and the cost of the minimum household food requirements (MHFR). In assessing economic access to food, all sources of income and food costs must be considered (Sinha, Lipton and Yaqub, 2002). Therefore, for households, the analysis of access, while involving a comparison of food prices with wages, must also consider all income sources – incomes from production (prices and quantities), wages and employment, and other incomes (including from public safety nets) – and all other costs, as well as food prices.[10]

Availability influences MHFR, but is only one aspect of food and nutrition security; access is affected by incomes, poverty and income distribution.[11] An implication is that a policy measure that increases the cost of MHFR while other factors remain constant would increase both the poverty head count and the number of food-insecure households among those that are net food buyers. However, other factors may not be constant, and the general impacts of trade and trade policies on production, employment, wages

[10] At the individual level, within households, there may be a problem of access if food is divided unequally among household members (perhaps to the disadvantage of girls and women in the family).

[11] In this regard it should be noted that besides the obvious link between poverty and food insecurity, noted at the 1943 United Nations Conference and revived by Sen 1981, there is also a definitional link: the general poverty line is usually the cost of MHFR, with an additional mark-up for other expenditures (and the line for indigence is usually only the cost of MHFR with minimal or no additional expenditures). Therefore, measurements of poverty and food insecurity based on consumption of calories should move closely together by statistical construction. However, differences in the sources of data and methodologies used for the poverty and food insecurity indicators weaken the empirically observed links between these two measurements.

and the other components of incomes and costs, in both the short and the medium to long terms, must also be factored in.

4.2.1. Growth, employment, wages, poverty and income distribution

Trade policies, along with other macroeconomic policies and events, may affect the rate and variability of overall growth, and its "quality" (the employment, income distribution and poverty effects of growth). The literature on this feature is large and reflects a variety of perspectives on the relationship among different trade policies, growth, income distribution and poverty, some of which are mentioned later in this section.

Besides growth in general, it may be important to consider the sectoral composition of growth. Growth in agricultural and food production generates broad employment and income opportunities that are crucial for food access (the second component of food security). To the extent that poverty is the main cause of food insecurity, agricultural growth, which seems to have particularly positive effects on poverty alleviation, contributes to reducing food insecurity through increased access.[12] With its multiplier effects in the rest of the economy, agricultural growth also helps overall growth.

Broad employment and income opportunities, along with adequate food prices and low inflation, define economic access (the second component of food security). Therefore, much depends on the level, inclusiveness and stability of the growth generated by the expanded trade and new trade policies. While poverty in the developing world declines rapidly with growth that is at least neutral in terms of income distribution,[13] episodes of growth that are accompanied by strongly worsened income distribution may reduce or wipe out the income gains for vulnerable groups (Lipton and Ravallion, 1995), affecting their food and nutrition security.

The issue is whether better results in terms of growth, poverty reduction and income distribution are achieved through more trade and trade openness, or through less.

4.2.2. Growth volatility and crises

Stability regarding food *availability* was discussed in Section 4.1; this section focuses on stability of *access*, which is related to potential volatility in overall incomes and employment, particularly for poor and vulnerable people. Even with reasonably high rates of growth that is neutral in terms of distribution,

[12] Several studies show that not only is agricultural growth pro-poor in reducing poverty or increasing the income growth of the lower quintiles of income distribution, but it also seems to have larger effects on poverty reduction than growth in other sectors (e.g. Lipton and Ravallion, 1995; Eastwood and Lipton, 2000; Christiaensen, Demery and Kuhl, 2010). Exceptions to these results appear in developing countries with large inequalities in landholdings, where agricultural growth appears uncorrelated with poverty reduction (Eastwood and Lipton, 2000). The correlation also weakens with increases in a country's income (in richer countries, agricultural growth does not have stronger effects on poverty reduction than growth in other sectors).

[13] The meaning of "neutral" has also been debated. Some studies consider neutrality in terms of rates of change: if the incomes of the poor and food-insecure and of the non-poor and food-secure grow at the same rate (say 10 percent), these analyses call the growth "neutral". The ratios of high to low quintiles or deciles do not change if all are growing at the same rate. However, if inequality is considered in terms of the gap in absolute terms, the difference across groups is permanently increasing. For instance, if the poor have an income of 2 units of currency and the non-poor 8 units, the absolute difference is 6 units and the ratio is 4. If the income of both groups grows by 10 percent per year, at the end of the year, the poor would have 2.2 units and the non-poor 8.8 units, making an absolute difference of 6.6, even though the income ratio is still 4.

if income variability also increases – increasing the likelihood of crises – the poor may face significant additional downside risks.[14] Higher unemployment, and its persistence over time because of economic crises, may compromise the limited productive and human capital of the poor if, for instance, assets such as livestock must be sold to help small-scale farmers face economic shocks, and if children are taken out of school to help support the family (Lipton and Ravallion, 1995). Improvements in health, nutrition and education indicators are usually slowed or reversed by a crisis, with negative medium- and long-term impacts on the human capital of the poor, which contribute to the persistence of poverty (Dercon and Hoddinott, 2005).

Some of these crises have involved episodes of hyperinflation or very high inflation, which have been accompanied by large increases in poverty and food insecurity (Díaz-Bonilla, 2008a; 2015b). These episodes are related to more general macroeconomic policies rather than trade policies per se (although there are links, as discussed in Díaz-Bonilla, 2015b).

Crises can also worsen income distribution, making it more difficult for growth recovery to reduce poverty (Lustig, 2000). Declines in the human capital of the poor also affect the performance of the economy, and this effect provides an economic justification for the provision of publicly funded safety nets (Lustig, 2000).

Again the debate is about whether overall economic stability and the steadiness of incomes and employment are helped by more trade and trade openness, or less.

4.2.3. Trade and the food import bill

Some analysts have expressed concerns about the increasing food import bill of developing countries, particularly poorer and more vulnerable ones (a problem of access at the country level). These concerns are often based on measurement of food import bills expressed in absolute nominal terms. However, the issue is to determine whether the food import bill is becoming more or less affordable relative to the evolution of other nominal variables such as national incomes or total exports, as discussed in Section 5.

4.3. Channels affecting food utilization and related issues

Figure 2 emphasizes the importance of the impact of policies at the individual level (labelled “Nutrition security” in Figure 2). Availability and access at all times are only preconditions for adequate utilization of food. They do not determine unequivocally malnutrition (or nutrition insecurity) at the individual level (Smith, 1998; Smith and Haddad, 2000). Analysing food and nutrition insecurity at the individual level seems to require the consideration of other factors, as shown in Figure 2. Some of these channels are mentioned in the following sections.

[14] For example, for the poor and food-insecure it would be better to grow for five years at 4 percent (implying a GDP increase of about 22 percent) than – in the same five-year period – to grow for three years at 8 percent and then suffer growth declines in the other two years, amounting to the same overall GDP increase over the period. This asymmetry for the poor and vulnerable is related to their scarce assets and resources for weathering a downturn without compromising their future, as discussed in the main text.

4.3.1. Trade and health

Regarding trade and health, the main issues discussed so far have related to: (i) the impact of intellectual property rights, as codified in the WTO's TRIPS; (ii) the impact of import taxes and trade restrictions on the availability and affordability of drugs and medical equipment and inputs; and (iii) the potential impact of GATS on governments' ability to operate public health systems and health insurance programmes. This list shows that the links between trade (in its different connotations) and health issues involve a large set of issues, most of which are beyond the scope of this paper and will not be pursued further here (for more detailed discussion, see Díaz-Bonilla *et al.,* 2002; 2003).

4.3.2. Trade and diversification in production and diets

Another link is between trade and trade policies, and production diversification and dietary change. The debate on cash/export crops versus food crops has already been mentioned. A second issue is related to whether expanded trade could accelerate a major shift in the structure of diets, resulting in a growing epidemic of the "diseases of affluence". Following this line of thought, some authors would argue that traditional low-cost diets, which are rich in fibre and grains, may be replaced by high-cost diets that include more sugars, oils and animal fats, giving rise to increasing rates of overweight, obesity and associated chronic diseases among both children and adults (Hawkes, 2008).

4.3.3. Trade and gender issues

Another issue is the effect of trade and trade policies on women. Women play a crucial role in agricultural production and food security (World Bank, FAO and IFAD, 2009; FAO, 2011; Quisumbing *et al.,* 2014). They are important producers of food (thus contributing to availability, the first component of food security), even though the claim that they produce 60–80 percent of global food seems to be incorrect (Doss, 2014). Women make up more than 40 percent of the global labour force in agriculture – although regional figures range from a low of about 20 percent in Latin America and the Caribbean to 50 percent in sub-Saharan Africa (Quisumbing *et al.,* 2014; FAO, 2011) – and they have been shown to be as productive farmers as men are, when they have access to similar levels of productive resources (Quisumbing *et al.,* 2014; FAO, 2011).

Women also contribute to household incomes (and therefore to food access, the second component of food security) through a variety of economic activities, on- and off-farm and in rural and urban settings. However, women's potential contributions to production, employment and incomes are limited by the constraints and discrimination they suffer in access to land, inputs, credit, labour opportunities with just pay, education and other factors (Quisumbing *et al.,* 2014; FAO, 2011).[15]

In addition, women make crucial contributions to food utilization (the third component of food security) through the variety of activities they perform within households, including nursing babies, preparing food and providing health and nutrition care at home. Gender issues are therefore at the core of health and nutrition conditions, particularly among the poor. The good health of women is key to the health status of families, as women are generally the main providers of care for children and the elderly. Health

[15] It has been argued that not only have women's weaker property rights in land and other resources, along with the rigid gender division of labour, limited the gains that women may obtain from expanded trading opportunities, but they may also be a reason for Africa's feeble agricultural supply response to export opportunities (Fontana, 2009).

problems may occur at different stages of the life cycle of individuals, but many begin at the mother–child level and then persist throughout life. The status and empowerment of women has been found to be an important determinant of the anthropometric measurements of nutrition in household members, particularly children (Smith and Haddad, 2000). The level of women's incomes is also important, as women tend to have spending patterns that are more in line with the needs of children and vulnerable people in the household, although there may be a trade-off between income-generating activities and the time that women have to dedicate to the care of children and others. Some authors have debated the impacts of commercialization and trade expansion on women's ownership of land and productive resources and on their potential for changing the mix of cash and food crops that they grow. Overall, the debate is over whether trade increases women's capacities and autonomy, or affects them negatively.

4.4. Channels involving government operations

Another important channel of influence for trade policies is through the operations of governments, and the quality and efficacy of governance. Government policies, expenditures, taxes, regulations and other interventions influence all four components of food security. The question is whether trade, in its various definitions, affects the operations of governments in ways that help or hinder food security. Díaz-Bonilla (2008b) differentiates two dimensions of governance that may be affected by international economic integration in general, and trade and trade policies in particular: (i) government's responsiveness to the needs of the country's people in terms of institutional issues such as the advance of democracy, transparency and the rule of law; and (ii) government's effectiveness in designing and implementing policies and programmes, particularly those in support of rural and agricultural development and food and nutrition security, and its overall ability to respond to the needs of its citizens in a more internationally open economy.

The effectiveness of governance also has two aspects that may be affected by trade as defined in some of the meanings discussed in Section 2. One aspect is whether legal and institutional constraints related to international trade agreements and frameworks (such as that of the WTO) limit the range of possible policies to be implemented (the "policy space"), thereby also limiting countries' ability to respond to economic crises resulting from increased trade integration. In this scenario, global trade integration would generally constrain the capability of governments to address the issues that their electorates demand, limiting governments' responsiveness to the needs of citizens, and even weakening democracy itself.

The other aspect of effectiveness is the availability of resources: whether trade and trade policies may have an impact on government revenues, directly through the operation of the tax system, or indirectly through the impact of the rate and quality of growth on general tax collection.

Obviously, a government's policy space, operational capabilities and level of revenues all have important implications for all the components of food and nutrition security. The provision of public goods and investments that enable food and agricultural production, combined with appropriate trade policies, helps ensure food availability and prices, which influence the first and fourth components of food and nutrition security. Governments can and should also implement and manage safety nets for the poor and vulnerable, such as food subsidies or other poverty-oriented programmes, which influence access and stability, the second and fourth components of food and nutrition security. General expenditures and investments in basic health services, water and sanitation systems, education, housing and related areas facilitate the proper utilization of food (the third component of food security).

In conclusion, some authors argue that the rising importance of international trade and finance, combined with increasing supranational accords, rules and regulations, may reduce the economic and political autonomy and effectiveness of national governments. Section 5 discusses some empirical analyses of alternative views on these issues.

4.5. Other channels

Some authors argue that the expansion of trade may increase emissions of greenhouse gases, which contribute to climate change. This increase may in turn aggravate the short-term occurrence of extreme weather events (with their impacts on the stability aspect of food security) and generate medium- to long-term overall conditions that affect production (with its impact on availability). These topics exceed the scope of this paper and are not discussed here.

5. Brief review of evidence regarding some of the channels discussed

There is need for properly analysed empirical evidence to evaluate the issues raised in Section 4, from the claims that trade and trade liberalization help food and nutrition security to the assertions of critics that trade "causes hunger", displaces domestic production, hurts small-scale farmers and women and has other negative effects. This section comments on evidence related to the various hypotheses presented in Section 4 without claiming that all the empirical studies on each issue are mentioned. Before discussing some of the available empirical evidence, the section emphasizes the need to consider relevant contextual and structural issues, both when designing and implementing specific policies and when interpreting particular developments and outcomes. Section 5.1 comments briefly on different methodological issues that arise in the design and evaluation of policies.

The rest of Section 5 looks at empirical evidence, first focusing on direct analyses of trade policies and trade reform in relation to food security, without considering the specific channels, then discussing some of the main channels presented in Section 4.

5.1. Contextual and structural issues in the analysis of trade and trade policies and food and nutrition security[16]

As is the case of any government intervention, the impacts and outcomes of trade policies depend on a series of contextual variables.

First, it is necessary to consider *prevailing domestic conditions* in the country being analysed. For instance, the impact of a policy when the domestic economy is close to full employment will be different from its impact in conditions of considerable underutilization of human, capital and natural resources. Second, it is important to consider the *structural aspects* of the domestic economy, both in general and in the agriculture sector. Some of these aspects are relatively fixed, at least within a certain period (say five to ten years). For instance, how important is the agriculture sector for domestic GDP, employment and international trade? What is the country's demographic profile?

Structural aspects such as land distribution (and, in the short to medium term, rural infrastructure) may also be crucial in determining the effects of a policy: reducing (or increasing) agricultural tariffs in a country with relatively equal land distribution and good infrastructure is likely to have very different outcomes from those of doing so in a country with unequal landholdings and bad infrastructure.

Over longer periods, however, many structural factors may change as a result of policy adjustments, endogenous developments or exogenous events. Development is a process of structural transformation in the composition of both employment and production. The demographic profile in terms of age structure and rural/urban composition also changes over time, as does the structure of land tenure. Another aspect to consider is therefore the phase of agricultural development of the country (Timmer, 1988; Dorward *et al.,* 2004).

In general, when policy-makers and analysts in developing countries have to assess the impact of specific trade policies, they can avoid many faulty conclusions by being aware of the structural conditions in their countries.

[16] This section is based on Díaz-Bonilla, 2015b.

Third, individual trade policies (or any other policy) must be considered within the *country's whole economic programme,* as noted in Section 2. Their impacts cannot be analysed individually without making clear reference to the entire economic programme (explicit or implicit) of which they are a component. For instance, as mentioned previously, a reduction of agricultural tariffs will have different impacts on a country depending on – among other factors – whether it is carried out unilaterally by the country or is the result of a multilateral exercise, and whether it affects only the targeted agricultural products or also includes other non-agricultural products and services. Agricultural liberalization will also have very different impacts depending on whether the exchange rate has been allowed to appreciate (become less competitive) or is more depreciated/competitive.

Fourth, any policy with economy-wide impacts (such as trade policies and, basically, all macroeconomic policies) will have *differentiated impacts on households and firms* because of the diversity of these economic agents. Such heterogeneity needs to be considered in general but also specifically for food security and poverty alleviation, which take concrete form at the household and individual levels. A general policy operating at the economy-wide level may therefore be too blunt an instrument for addressing food security and poverty problems at the individual level, and more differentiated policy approaches may be needed.

Fifth, the *evolution of the global economy,* considering both trends and cycles, affects a country's performance in general and that of its agriculture sector in particular. Domestic trade policies may have different effects depending on prevailing international economic conditions. These conditions include indicators of the global business cycle, such as whether the global economy is growing; whether world interest rates and world agricultural prices are high or low; the evolution of the exchange rates of major global currencies; and the level, composition and direction of international capital flows. Other factors refer to more sustained trends, such as the increasing integration of the world economy through the expansion of trade, finance, labour and information flows.

In summary, to analyse the impacts of specific trade policies on the economy in general and on agriculture and food security in particular, it is important to consider: (i) current domestic conditions; (ii) the overall economic programme; (iii) structural aspects of the domestic economy and society; (iv) the heterogeneity of economic agents; and (v) the global economic environment. Many analytical mistakes result from analysing isolated trade and macroeconomic policies without considering these five aspects (Díaz-Bonilla, 2015b).

5.2. Methodological approaches

Even if everybody agrees on the meaning of food and nutrition security and on how it should be measured, the meaning of trade and how to measure trade, and the main links between the two concepts, there is still the issue of assessing empirically the impacts and outcomes of trade for food and nutrition security. In this regard, another source of discrepancies is the nature of the techniques used to analyse economic and social processes. In empirical analysis of specific policies it is necessary to use adequate methodologies that seek to isolate the impact of the policy being evaluated from other factors that may influence the observable outcomes.

There are different approaches, some more adequate than others: (i) unstructured anecdotes, almost amounting to simple assertions about something that happened or did not happen; (ii) structured case studies, usually considering before/after but not with/without the policy changes or events considered;

(iii) a variety of single- and multiple-equation econometric analyses; (iv) partial equilibrium models; (v) multimarket models; and (vi) general equilibrium, economy-wide and macroeconomic models.

Statistical and econometric approaches to comprehensive data sets try to control for exogenous factors and to identify clearly the impacts of the policies or events of interest. Some of these approaches (such as case studies and econometric analyses) are based on historical data, seeking to understand what has happened (*ex-post* analysis). Another approach uses simulation models that can be utilized both for counterfactual analysis of historical events (*ex-post* analysis) and to try to simulate future changes (*ex-ante* analysis).

On the other hand, the use of case studies and individual stories to present arguments, which tend to be before-and-after stories, can make it difficult to attribute causality. In between these two extremes are different types of structured case studies, with predefined methodologies that aim to identify channels of influence and determine causality. While econometric and simulation approaches may miss the historical, political and institutional context, case studies, especially those that are similar to unstructured anecdotes, may suffer from selection bias and would therefore not be representative and may fail to provide an adequate view of the general trends and potential counterfactuals.

Discrepancies between the results and interpretations from quantitative analysis and those from unstructured case studies or anecdotes are not surprising. However, even within the quantitative tradition and methodologically careful case studies there may be differences in results and policy prescriptions because it is difficult to isolate specific policies from the variety of contextual and structural factors mentioned in Section 5.1. In this regard, a general recommendation for policy-makers and analysts involved in designing, implementing and evaluating policies is "know the country and its circumstances".

5.3. Reviews of trade and food security

In 2002, FAO conducted a thorough review of case studies from 15 countries[17] to analyse trade-related reforms and food security (Thomas, 2006). The study noted that trade-specific policies were usually immersed in policy reforms that included other macroeconomic aspects (such as exchange rate, fiscal and monetary policies) and microeconomic and institutional issues (including privatization or reform of public-sector enterprises related to the agriculture sector). In addition, the reforms occurred at different times, their paces were dissimilar and they included reversals of policies. It was therefore not always easy to make a clean attribution of results to the trade policies considered (see Sections 5.1 and 5.2).

Nevertheless, the review presented several relevant results. First, it decomposed price changes, finding that exchange rates, in combination with world prices, seemed to be key determinants of final domestic prices. In other words, macroeconomic issues rather than trade policies per se seemed to influence the results. Second, although food imports increased in nominal terms, the impact on the ratio of food imports to total exports minus debt service[18] was more varied, decreasing or staying the same in seven

[17] China and India in Asia; Chile, Guatemala, Guyana and Peru in Latin America and the Caribbean; Morocco in North Africa and the Near East; and Cameroon, Ghana, Kenya, Malawi, Nigeria, Senegal, Uganda and the United Republic of Tanzania in sub-Saharan Africa.

[18] This ratio includes the payment of debt servicing, which although important in financial terms does not allow the isolation of pure trade effects: the ratio may change not only because of changes in food imports or total exports, which would be trade effects, but also because of changes in debt levels and interest rates, which would reflect influences other than trade.

countries and increasing in eight (Thomas, 2006: Table 18). A related result, common in many studies with a similar focus, was that agricultural exports became more diversified after trade liberalization, which reduced some of the risks for the country's export revenues. Third, comparing the average production of calories per capita in the period 1999–2001 ("post reforms") with that of the two previous periods, 1980–1982 and 1990–1992, the indicator increased in eight countries and declined in four against both periods, with three countries showing mixed results depending on the period of comparison (but two of these three countries showed increases in 1999–2001 compared with 1990–1992, showing that they were recovering in the last period). For proteins, eight countries had increases in the last period compared with the previous two, three countries had declines against both pre-reform periods, and four had declines against one period and increases against the other (with three countries showing increases in the last period) (Thomas, 2006: Table 16).

Fourth – the main point of this discussion – the results were also varied regarding indicators of undernourishment (using the FAO measure) and poverty, but with a predominance of positive outcomes, as shown in Table 4. The percentage of undernourished people declined in 11 countries and increased in four, while the incidence of poverty declined in nine and increased in three (three countries lacked data for one period, while in Senegal there were no data for either period).

Table 4: Indicators of food security (percentages)

Country	Undernourished		Change	Rural poverty		Change
	1990 –92	2000–02		Early 90s	End of 90s	
Africa						
Cameroon	33	25	-8	59.6	49.9	-9.7
Ghana	35	13	-22	63	49	-14
Kenya	44	33	-11	46.3	59.6	13.3
Malawi	49	33	-16	-	66.5	na
Nigeria	13	9	-4	48	76	28
Senegal	23	24	1	-	-	na
Uganda	23	19	-4	59.4	39.0	-20.4
United Republic of Tanzania	35	44	9	41	39	-2
Morocco	6	7	1	18	27	9
Asia						
China	17	11	-6	32.9	3.2	-29.7
India	25	21	-4	30.1	21.0	-9.1
Latin America						
Chile	8	4	-4	39.5	23.8	-15.7
Guatemala	16	24	8	-	-	na
Guyana	21	9	-12	45	40	-5
Peru	40	13	-27	70.8	64.8	-6

Source: Author, based on data from Thomas, 2006: 58, Table 17
na = not available.

More recently, McCorriston *et al.,* 2013 undertook a comprehensive review of different studies of trade liberalization and food security. They first reviewed 1 176 articles that potentially focused on the link between trade liberalization and food security, but after further selection only 34 studies fitted the

criteria established for consideration.[19] The studies used both *ex-ante* simulations and *ex-post* econometric analyses. Some of the reviewed studies covered individual countries; others undertook a global analysis of a variety of developing countries.

The authors conclude that of the 34 studies, 13 reported improvements in the food security indicators utilized, 10 showed declines, and the other 11 had mixed results, "with food security metrics varying across segments of the population, regions and time or with alternative food security metrics indicating different outcomes for specific countries" (McCorriston *et al.,* 2013: 2). The authors speculate on the reasons for the mixed results: (i) trade liberalization involved a variety of policies, and the studies analysed different trade policies (from reduction of import tariffs alone, to export measures, domestic support and other measures); (ii) trade liberalization (in its various definitions) was usually part of a broader policy programme of reforms; (iii) a variety of metrics were used to define food security outcomes; and (iv) the initial conditions of the countries' economies were very different.

Taking these caveats into account, it seems useful to look more closely at the type of food security indicators and the specific instruments considered in the studies covered by McCorriston *et al.,* 2013. For instance, for food security, some studies utilized only food self-sufficiency indicators, while others focused on indicators related to food consumption and malnutrition, which are more appropriate for assessing the impact on households and individuals.[20] Regarding trade liberalization, some studies referred to exchange rate policies (which affect trade but are not trade policies), some referred to measures related to export subsidies (which are not usually considered under the term "trade liberalization"), and some did not define the trade policies under consideration. Therefore, a relevant question is what the outcomes would be if the studies reviewed were limited to those satisfying two criteria: (i) using indicators of food security linked to malnutrition, consumption and availability; and (ii) focusing on trade policies that reduce taxes and controls on imports, which fall under the more common notion of trade liberalization. This second criterion would exclude studies that considered non-trade policies that did not explain which trade policies were considered, or that focused only on export subsidies and the like. When these two adjustments are made, a somewhat clearer picture emerges.

Two of the studies with mixed results would now show positive results on the food security indicators of interest,[21] while four of the studies with negative results did not apply trade liberalization policies in the sense defined in the previous paragraph. Therefore, the breakdown would now be 15 studies with positive results (the original 13 plus the two newly reclassified), six with negative results (because four were excluded from the original negative ten studies), and nine with mixed/inconclusive results (the original 11 minus the two that moved to positive results).

[19] The criteria included a first cut based on issues such as whether the research referred to at least one developing country, focused on trade liberalization, included an outcome measure of food security, and was written in English; a second cut sought to ensure that evidence relevant for the systematic review question was captured in the studies selected, and points were awarded depending on "whether the aims were clear, whether the methodology was clear/appropriate, whether an appropriate food security metric was isolated, whether the authors comment on potential mechanisms, whether controls were used or counterfactuals analysed, whether the findings were clear, and whether the paper contributed to the synthesis" (McCorriston *et al.,* 2013: 22).

[20] If self-sufficiency is achieved through protection, the domestic price increases, leading to more production but less consumption. When consumption is decreasing, achieving self-sufficiency is inadequate for food security.

[21] One study was considered as having mixed results because there were declines in self-sufficiency although food consumption (which is what should count for nutrition) rose at the same time. The other was considered mixed because production of the main staple (maize) declined but supply of food nutrients in general increased. Both studies are considered as having positive results for the indicators of interest.

Other studies – such as those by OECD (2013), which summarizes extensive work done at the Organisation for Economic Co-operation and Development (OECD) by Jonathan Brooks and colleagues, and Gillson and Fouad (2015), which was based mostly on Work Bank work – take a generally positive view of what trade liberalization can do for food security, using a variety of indicators.

5.4. Are food imports displacing or complementing domestic production?

As noted previously, according to some narratives, rising food imports are displacing domestic production in many developing countries, and farmers, discouraged by these food imports, are producing less, leading to a vicious cycle of more imports. An alternative view would argue that overall, trade is complementing rather than displacing domestic production: increases in incomes and population in developing countries are fuelling food demand, and imports help to expand domestic availability (the first component of food security).

What do the data suggest? In general it is a fact that developing countries as a whole, and also in specific categories such as least developed countries (LDCs), net food-importing developing countries (NFIDCs) and low-income food-deficit developing countries (LIFDCs),[22] have moved from being net food exporters (using the FAOSTAT definition of food) in the 1960s and 1970s to becoming net food importers, and increasingly so, since the 1980s and 1990s. Of course, there is some heterogeneity among developing regions (for instance, Latin America and the Caribbean has maintained a consistent net food surplus) and among countries, as shown in Table 5 (from Valdés and Foster, 2012, who utilized a more restrictive definition of food than FAOSTAT but the same definition of agricultural products).

Table 5: Net trade in developing countries

Type of trade	1995–1999	2005–2009
	% developing countries	
Net food-importing	81.2	81.6
Net food-exporting	18.8	18.4
Net agricultural importing	56.9	68.6
Net agricultural exporting	43.1	31.4

Source: author's calculations, based on Valdés and Foster, 2012: 7, Table 1.
The sample includes 136–138 countries.

It is clear that a large and somewhat increasing percentage of developing countries fall into the category of net food importers, and a smaller but increasing number are net agricultural importers.

Different, and probably more adequate, indicators of the impact of trade are the ratio of food imports to total agricultural production (which, following Díaz-Bonilla and Reca, 2000, can be called the "import

[22] The LDC category was defined by the United Nations Assembly. The NFIDC category defined during the Uruguay Round of negotiations was incorporated into the current legal system of the WTO. Both have some legal implications for economic aid and trade negotiations. LIFDC is a statistical category that FAO uses to present some data.

penetration ratio") and a similar ratio of food exports to total agricultural production (the "export orientation ratio"). In Table 6, the indicators have been calculated for LDCs, NFIDCs and LIFDCs.

Table 6: Import and export ratios to total production

Category		1980–1989	1990–1999	2000–2009	2010–2013
Export orientation ratio					
LDCs	Agriculture	0.131	0.103	0.083	0.090
	Food	0.082	0.095	0.050	0.045
LIFDCs	Agriculture	0.109	0.109	0.132	0.147
	Food	0.063	0.066	0.085	0.094
NFIDCs	Agriculture	0.220	0.174	0.152	0.162
	Food	0.144	0.130	0.106	0.113
Import penetration ratio					
LDCs	Agriculture	0.146	0.154	0.192	0.204
	Food	0.128	0.132	0.163	0.171
LIFDCs	Agriculture	0.105	0.102	0.136	0.154
	Food	0.092	0.087	0.115	0.130
NFIDCs	Agriculture	0.236	0.234	0.257	0.272
	Food	0.213	0.204	0.218	0.228

Source: author's calculations from FAOSTAT, 2015.

Several points should be noted in regard to Table 6. First, agricultural integration in world markets (at least as measured by adding these simple trade ratios) has increased on the whole since the 1980s. Second, the levels and trends of import and export ratios differ somewhat among these groups of countries. Import penetration ratios have been increasing in all three groups, but export orientation ratios have been declining in LDCs and NFIDCs (indicating that these countries are keeping more production for domestic consumption), while LIFDCs have somewhat increased their export ratios.[23] The third point is that despite increases in international agricultural and food trade, domestic production for domestic utilization is the dominant characteristic of the agriculture sector of developing countries as a whole.[24] For instance, only 5–16 percent of total production is exported (based on export orientation

[23] Among developing regions (Díaz-Bonilla and Robinson, 2010; Díaz-Bonilla, 2015b), which are not shown in Table 5.3, sub-Saharan Africa had the largest export/production percentage during the 1960s (28.5 percent), but has declined since then, standing at less than half the initial value (13.2 percent) in 2000–2009. On the other hand, sub-Saharan Africa's import/production percentage climbed from 8 percent at the beginning of the period to almost 14 percent during 2000–2009. Asia has the lowest agricultural export and import ratios, although both have been trending upwards slowly. Based on the indicators mentioned here, Latin America and the Caribbean has become the developing region that is most integrated into world agricultural markets, surpassing sub-Saharan Africa on both export and import ratios. Obviously, these import and export ratios differ by product: crops and by-products tend to have larger trade ratios than livestock and dairy products (Díaz-Bonilla, 2015b).

[24] There are exceptions, including city states, small island countries with large tourism inflows, oil-producing countries with very limited land, and countries affected by war and civil strife.

ratios). The percentages of domestic production in total agricultural and food consumption is presented in Table 7. These percentages range from about 66–72 percent in NFIDCs to 74–82 percent in the other two groups.

Table 7: Domestic production as percentage of total consumption, 2010–2013

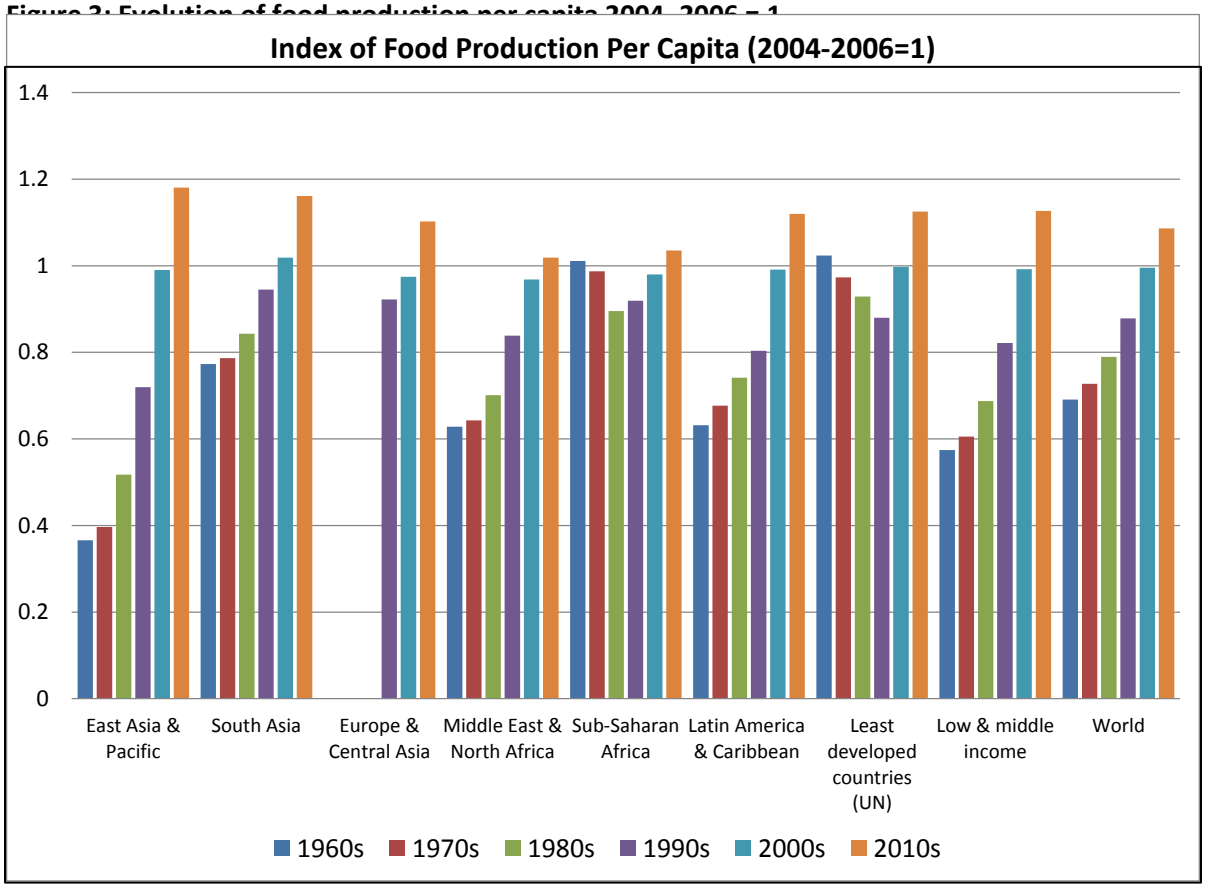
Country category	Product category	% of consumption
LDCs	Agriculture	75.6
	Food	81.6
LIFDCs	Agriculture	73.9
	Food	80.2
NFIDCs	Agriculture	65.9
	Food	72.2

Source: author's calculations from FAOSTAT, 2015.
The calculation is (1 - export orientation ratio) divided by (1 + import penetration ratio).

At the same time as agricultural and food trade in general have increased, production per capita in basically all developing regions has also increased. Figure 3 shows the index of food production per capita. The aggregate of all developing countries ("low- and middle-income countries" in the definition of the World Bank) and all regions shown (which include only developing countries) had levels of production per capita in 2010–2013 that were above the production levels of the previous periods. Some regions and groups, such as sub-Saharan Africa and the LDCs,[25] have recovered from the lows of the 1980s and 1990s. The other regions and groups show continuous growth in per capita terms.

[25] The LDCs include a large percentage of sub-Saharan African countries.

Figure 3: Evolution of food production per capita 2004–2006 = 1



Source: author's calculations from FAOSTAT, 2015.

The height of the bars cannot be compared across regions; the only meaningful comparison is across decades within the same region. There are no data for Europe and Central Asia in the 1960s and 1970s.

Therefore, as a whole, in developing countries there is more food production (total and per capita) and more trade than in the past. This fact is generally more compatible with the hypothesis that increases in income and population are leading to both more food production and more trade, rather than the notion that there is more trade because domestic production is being displaced.

A way of assessing causality is to apply a Granger test using change in production and change in trade. This method tests whether a change in imports in the past (say in years t - 1, t - 2, and so on) is associated with changes in current production in year t, or whether the reverse causality is true (that is, changes in past production are associated with changes in current imports). Table 8 shows the results of the test. The notes explain the variables, which incorporate agriculture versus food, production versus imports, and the group of countries that is considered.

Table 8: Causality between production and imports of agricultural and food products in LDCs, LIFDCs, and NFIDCs

Null hypothesis	Observations	F-statistic	Probability of rejection	
AGPRLDC does not Granger-cause AGRIMLDC	49	6.80789	0.0122	*
AGRIMLDC does not Granger-cause AGPRLDC		2.96663	0.0917	
FOODPRLDC does not Granger-cause FOODIMLDC	49	11.0226	0.0018	*
FOODIMLDC does not Granger-cause FOODPRLDC		3.40112	0.0716	
AGPRLIFDC does not Granger-cause AGIMLIFDC	49	4.44061	0.0406	*
AGIMLIFDC does not Granger-cause AGPRLIFDC		0.39071	0.535	
FOODPRLIFDC does not Granger-cause FOODIMLIFDC	49	4.18421	0.0465	*
FOODIMLIFDC does not Granger-cause FOODPRLIFDC		0.40710	0.5266	
AGPRNFIDC does not Granger-cause AGIMNFIDC	49	0.08624	0.7703	
AGIMNFIDC does not Granger-cause AGPRNFIDC		0.71425	0.4024	
FOODPRNFIDC does not Granger-cause FOODIMNFIDC	49	0.89128	0.3501	
FOODIMNFIDC does not Granger-cause FOODPRNFIDC		0.41782	0.5212	

Test: Pairwise Granger causality. Sample: 1960–2015. Lags: 1.

Source: author's calculations from FAOSTAT, 2015.

Notes: The variables measure the changes in production and in imports as the differences in natural logarithms between year *t* and *t* - 1. The null hypothesis is that neither variable at time *t* - 1 affects changes in the other variable at time *t*. If the null hypothesis is rejected, then the variable at time *t* - 1 is affecting the other variable at time *t*. The values of production and imports are the aggregates for agriculture on the one hand, and for food (FAO definition) on the other, corresponding to each category of countries: LDCs, LIFDCs and NFIDCs. The results reported are for the effect at one-year lag (the impact from *t* - 1 to *t*), but further lags (*t* - 2 and so on) show similar results. The symbol"*" indicates cases where the rejection of the hypothesis of no causality occurs at least at a significance of 5 percent, based on the F-statistic.

Symbols: AG = agricultural products; FOOD = food products; PR = production; IM = imports. Therefore, AGPRLDC = agricultural production in LDCs; FOODIMLIFDC = food imports by LIFDCs, and so on.

The tests indicate that the causality runs from changes in production to changes in trade, for both agricultural and food products in LDCs and LIFDCs, while the reverse causality, from imports to production, is not supported by the data. This is compatible with the view that trade has a stabilizing effect in LDCs and LIFDCs: if production declines because of exogenous shocks such as droughts or other natural disasters, countries utilize more imports to stabilize domestic consumption, while if production increases because of very good weather or some other non-trade cause, imports decline.[26] In the case of NFIDCs, the tests cannot reject the null hypothesis of no causality in either direction: production is not affecting imports as in the other two cases, nor are imports displacing production, as claimed by the critics of expanded trade.

[26] The full equation on which the test is based (not shown here) clearly shows that changes in production are negatively correlated with changes in imports, while the reverse is not true.

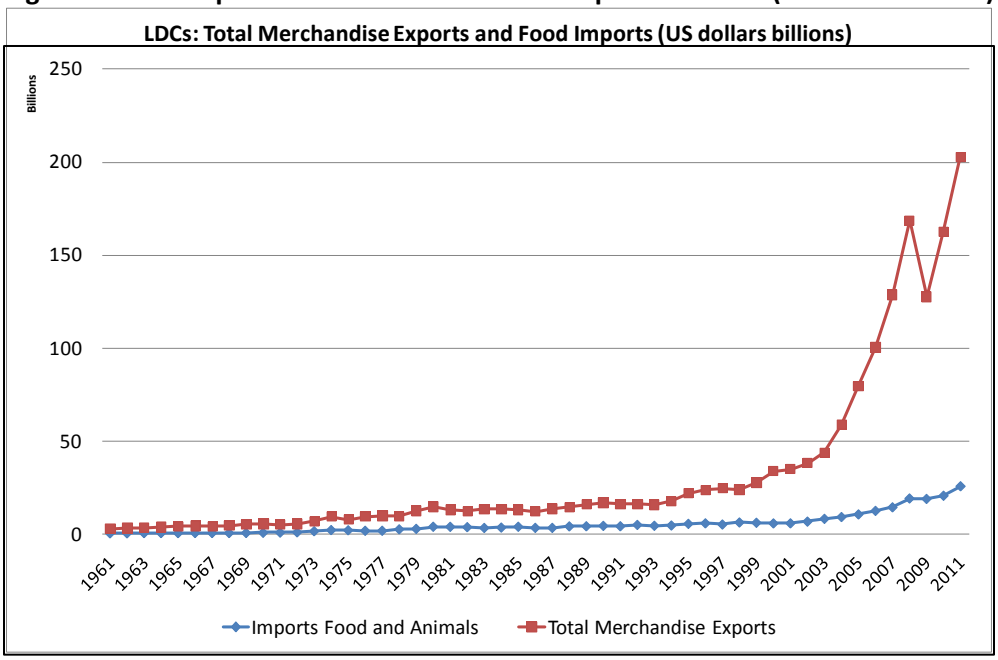
5.5. Are food imports becoming an excessive economic burden in developing countries?

The fact that more developing countries are becoming net importers of food and agricultural products has led to concerns about the economic sustainability of this trend. For instance, according to FAO data, food imports from LDCs between 1992 and 2011 increased about fivefold (and somewhat less than fourfold until 2008). However, some authors have argued that being a net food importer is not a good indicator of food access at the country level (Díaz-Bonilla *et al.,* 2000).[27] The main question is how big the nominal food import bill is compared with total exports, overall income, GDP or some other metric that indicates affordability – that is, the economic potential to buy the increased food imports. For instance, some developing countries, such as Belize, Burundi, Cameroon, Ethiopia, Guatemala, Guinea-Bissau, Guyana, Kenya, Nicaragua, Sri Lanka, Uganda and are all net food exporters but still have high food import bills of at least 15 percent of exports (average 2010–2012), a value above the average of about 10 percent for comparable countries in the same period. On the other hand, countries such as Angola, Azerbaijan, Chad, China, the Congo, Equatorial Guinea, Gabon, Kazakhstan, Malaysia, Nigeria, and Turkmenistan are all net food importers, but the value of food imports is less than 5 percent of total exports for the period.

Figure 4 shows that while the food import bill has increased in LDCs, total exports from these countries have risen much more. So the countries' ability to pay for imports has also increased in the aggregate because of the overall expansion of trade. The same can be shown of NFIDCs and LIFDCs, where the ratio of imports to exports in value terms has been declining significantly.

[27] In any case, analysts concerned about the net trade position should also scale the net trade value by other variables, such as (again) total exports or GDP, to get an adequate sense of the burden. However, when the net trade value is scaled, the use of net food trade would show smaller burdens in absolute values than the use of total imports, which would still give a better sense of the economic implications of the food import bill (as argued by Díaz-Bonilla *et al.,* 2000). For instance, assuming that a country's total exports are 100 units in value, with 80 units that are non-food exports and 20 that are food exports, and that food imports are 30 units, the ratio of imports to total exports is 0.3 (or 30 percent) and the net food trade value is -10 (20 - 30). Calculating the net food trade ratio in absolute value, this would be 10/80 = 0.125 (or 12.5 percent), which gives a more benign view of the cost of buying food in terms of the country's exports (12.5 percent against 30 percent for the total food import ratio).

Figure 4: Food imports and total merchandise exports for LDCs (billion US dollars)



Source: author's calculations from FAOSTAT, 2015.

Table 9 shows the declining ratio for most of the developing regions covered (with the exception of Southeast Asia and Oceania).

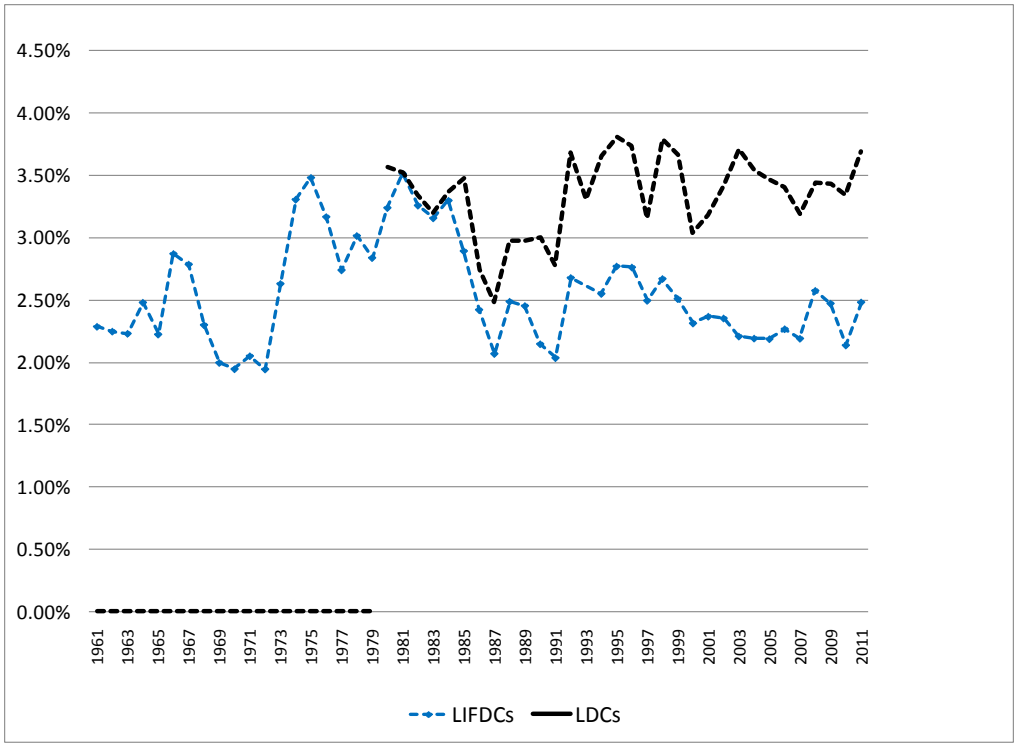
Table 9: Value of food imports over total merchandise exports

Region	1990s	2000–2007	2008–2010
World	6.2	5.0	5.0
Developing regions	6.9	4.7	5.0
Africa	14.1	10.4	10.0
North Africa	21.2	12.3	13.0
Sub-Saharan Africa	10.9	9.5	9.0
Asia	5.2	3.7	4.0
Caucasus and Central Asia	19.4	6.7	7.0
East Asia	3.7	2.6	3.0
East Asia (excluding China)	4.3	3.1	3.0
South Asia	11.1	7.6	7.0
South Asia (excluding India)	15.8	10.5	11.0
Southeast Asia	4.4	4.1	5.0
West Asia	9.2	5.5	6.0
Latin America and the Caribbean	9.8	6.9	6.0
Caribbean	23.6	22.1	21.0
Latin America	8.8	6.6	6.0
Oceania	17.1	17.8	19.0

Source: Díaz-Bonilla, 2015b, based on FAOSTAT, 2015.

Figure 5 shows the food import bill as a percentage of GDP for LDCs and LIFDCs. With some oscillations, the bill has stayed relatively flat as a percentage of total GDP.

Figure 5: Food imports as a percentage of GDP in LIFDCs and LDCs



Source: author's calculations from FAOSTAT, 2015, and World Bank, 2015.

Overall, and contrary to arguments regarding the unsustainability of increases in imports, aggregate data for many developing country regions and categories show declines, or at least stability, in the relative burden of the food import bill compared with merchandise trade or GDP, even during the two recent price shocks. However, the burden of food imports is still high for some countries, which need particular consideration.[28]

5.6. Is trade leading to more volatility in availability?

Table 10 shows that except for butter, and marginally for beef, production at the global level is more volatile than consumption for the whole period, suggesting that trade (and stocks) helps stabilize consumption. If the calculation is disaggregated by period, volatility in production and consumption declined from the period 1970–1994 to the more recent 1995–2010. In particular, volatility of consumption was smaller during the latter period, in which trade increased.

[28] Of about 200 countries and territories included in the FAOSTAT database, about 38 percent have a food import bill exceeding 20 percent of total exports. More than half of these countries and regions are in special situations, including small island countries where revenues from tourism (not included in the ratio) finance the food bill, countries where international receipts from services are not counted in merchandise trade, and countries affected by war and domestic conflict. However, even discounting these cases, there are still countries with food import bills of more than 20 percent of total merchandise exports.

Table 10: Average variability for production and consumption (percentages)

Period	Production	Consumption	Production	Consumption	Production	Consumption
	Wheat		Rice		Maize	
1970–2010	5.19	3.48	3.93	3.42	7.28	5.02
1970–1994	5.71	4.42	4.42	4.18	8.14	5.32
1995–2010	4.37	2.03	3.16	2.24	5.95	4.54
	Soybeans		Sugar		Beef	
1970–2010	10.11	8.30	4.84	3.83	3.12	3.15
1970–1994	10.97	9.01	4.70	4.29	3.72	3.61
1995–2010	8.77	7.20	5.07	3.10	2.19	2.44
	Whole milk powder		Butter		Soybean oil	
1970–2010	6.63	6.45	6.06	6.15	9.26	8.64
1970–1994	7.91	7.37	4.12	4.22	10.06	9.05
1995–2010	5.04	5.76	9.09	9.16	8.00	7.99

Source: author, based on Liapis, 2012: 15, Table 1.

5.7. Is trade shifting the composition of production away from food crops towards cash crops in ways that affect food security?

Many studies have analysed whether the expansion of trade may be shifting production patterns at the local level in a way that privileges cash/export/non-food products, which would then be displacing food production for family consumption, with negative impacts on food and nutrition security (see von Braun and Kennedy, 1994 for a discussion of trends in the 1980s and early 1990s; Achterbosch, van Berkum and Meijerink, 2014 provide a recent review of different studies).

A first point to be noticed is that some cash crops are also food crops and may be also exported (Achterbosch, van Berkum and Meijerink, 2014). A second point is that small-scale farmers tend to operate with a mix of products (including small animals and larger livestock on a small scale) rather than specializing in a single crop.

In general, studies of the interaction between cash and food crops tend to paint a more positive picture of the processes involved, usually showing improvements for the poor and food-insecure resulting from production and employment effects.

The comprehensive study by von Braun and Kennedy (1994) on the impact of expansion of cash cropping on nutrition in several developing countries[29]– although not all the countries included international trade – showed that in general, staple food production per capita was maintained or increased even though cash crops expanded. Overall household incomes also increased, resulting in more food purchased at the household level. At the same time, the uniform attainment of benign outcomes was by no means guaranteed, with some case studies providing counterexamples to the positive impacts of commercialization (von Braun and Kennedy, 1994; IFAD, 2001).

Other studies of several countries in Africa have shown that poverty fell more among export crop producers than among staple producers (Christiaensen, Demery and Kuhl, 2010; Kherallah *et al.,* 2002).

[29] Guatemala, Kenya, Malawi, Papua New Guinea, Rwanda, the Philippines, The Gambia and Zambia were also considered, but in less detail.

The recent review by Achterbosch, van Berkum and Meijerink (2014) summarizes a variety of studies by noting that "cash crop production enables farmers and farm workers to increase their living standards, thus contributing to food security. Moreover, and perhaps of greater importance, the production of cash crops offers farmers opportunities for investment and improving management of their farms, stimulating agricultural innovation and increasing yields" (Achterbosch, van Berkum and Meijerink, 2014: 7). Therefore, more income from cash crops and better technologies may also lead to more production of food by farmers. The authors recognize that, as in all agricultural production, different types of risk need to be managed. Government policies must therefore play a role in supporting the risk coping strategies of small-scale farmers. However, if trade expansion leads to higher incomes and more diversification, it would facilitate both risk management and nutrition.

Minten, Randrianarison and Swinnen (2009) present two cases in which this positive result took place. One was in exports of fruits and vegetables to Europe from Madagascar under contract farming with high standards of production. The participants increased from 100 farmers in 1990 to about 10 000 small-scale farmers in 2005. Productivity of rice (the staple crop not included in the value chain) increased by 70 percent because of technology spillovers; the length of the lean period for food availability was reduced by 2.5 months for contract farmers compared with farmers without contracts (1.7 versus 4.3 months). In fact, contract farmers interviewed about why they wanted to enter into contracts mentioned as main reasons the stable income during the year, access to inputs on credit, learning of new technologies, and access to a source of income during the lean period (Minten, Randrianarison and Swinnen, 2009).

Another example is the expansion of biofuels based on castor oil in Ethiopia, where Negash and Swinnen (2012) found a significant adoption rate within a few years of promotion, with penetration of the castor crop into inaccessible and remote areas, diversification of crops, and fertilizer use up by 70 percent, helping with both castor and food crop productivity. All of these developments led to higher household income and significant improvement in food security as measured by the "food gap", which was reduced from 47 to 30 days (Negash and Swinnen, 2012).

Overall, empirical analyses do not support the argument that, as a general rule, trade is changing the composition of production away from food crops in ways that affect food security; rather, empirical studies show more positive effects linking trade, export crops and food security, albeit with exceptions.

5.8. Is trade leading to more concentration in production in world markets?

Some analysts have expressed concern about whether expanded trade has led to the concentration of production in just a few countries, perhaps reflecting static comparative advantages or specific policies in support of agriculture. Table 11 presents an indicator of concentration, the Herfindahl-Hirschman (HH) index, for a variety of products over several decades. A lower number on the HH index indicates less concentration.

Table 11 shows that the concentration of production in world markets for most commodities has been in general *declining,* considering both exporters and importers, particularly when the period 2000–2009 is compared with the 1970s and 1980s.

Table 11: Concentration in production

Herfindahl-Hirschman Index								
Product	Average 1970-1979		Average 1980-1989		Average 1990-1999		Average 2000-2009	
	Exporters	Importers	Exporters	Importers	Exporters	Importers	Exporters	Importers
Wheat	0.27	0.05	0.22	0.06	0.17	0.05	0.11	0.04
Maize	0.44	0.08	0.45	0.08	0.38	0.07	0.28	0.05
Rice	0.19	0.04	0.18	0.03	0.14	0.03	0.14	0.02
Raw sugar	0.2	0.23	0.13	0.15	0.13	0.11	0.2	0.08
Refined sugar	0.18	0.05	0.17	0.05	0.12	0.04	0.09	0.02
Meat (bovine)	0.1	0.13	0.08	0.09	0.09	0.08	0.08	0.06
Butter	0.14	0.19	0.13	0.09	0.1	0.08	0.09	0.05
Milk	0.11	0.05	0.13	0.06	0.1	0.05	0.09	0.03
Soybeans	0.77	0.11	0.64	0.09	0.47	0.09	0.34	0.16
Soybean oil	0.25	0.06	0.16	0.05	0.16	0.05	0.21	0.06

Source: author, based on Liapis, 2012: 30, Table 5.

5.9. Are land tenure structures showing more concentration?

Another concern is whether trade expansion and trade liberalization are leading to more concentration of land structures. The competitive pressures of a more open economy may require concentration of land in larger farms to take advantage of economies of scale. There is also the question of whether opening trade would lead to instances of "land grabbing", displacing smaller-scale farmers. On the other hand, import protection, which is basically a transfer of income per unit of product from consumers to producers, would benefit larger farmers more than smaller ones (given that the larger ones produce more), and this unequal distribution of incomes may give larger producers the resources to buy out and displace smaller ones.

The evolution of the agrarian structure is related to the comparative advantages and disadvantages of commercial/large versus family/small farms, which derive from a variety of factors, including many that may be unrelated to trade and trade policies per se. Commercial/large farms may have advantages of scale, such as in the case of some plantation crops, or benefit from better access to credit and markets, sometimes because of government policies. However, in general, worldwide agricultural production still shows a significant presence of family and small farms. Because of the use of family labour, these farms appear to have better incentives for adjusting to local variations in the quality of natural resources, climate and marketing conditions. Reduction of poverty is also associated more with the strengthening of family farms than larger ones (Deininger and Byerlee, 2011).

However, recent developments may have affected the comparative advantages of smaller farms. Deininger and Byerlee characterize these new factors as: "(i) new technology that makes it easier to standardize and/or monitor farm operations; (ii) increased consumer demand for social and environmental standards and certification even for traditional low value commodities; and (iii) a desire to expand cultivation into previously uncultivated areas where, in the absence of immigration, labo[u]r is scarce" (Deininger and Byerlee, 2011: 3). These developments may increase the advantages of large farms and of vertical integration in the value chain. The presence of large farm operators in Latin America and sub-Saharan Africa is rekindling the debate about the comparative advantages of different types of farm.

Some of the trends, however, do not have to bias the agrarian structure in favour of large farms. For instance, different technological innovations, such as information technology, are not necessarily scale-biased and can be utilized by small-scale farmers to coordinate their efforts in stronger cooperatives or other organizations for collective action (e.g. Chong, Galdo and Torero, 2009). In some cases, the comparative advantage of large farms may come from policy biases that favour these farms, rather than from any inherent economic advantages over small and family farms: for instance, large farms may benefit from access to finance and public goods, including agricultural research and development (R&D) and infrastructure, which small and family producers may lack.

Deficient governance of land markets – leading to situations in which the rights and land titles of small-scale farmers and native communities are not registered and protected, and State land is not clearly demarcated and allocated – also appear to be more relevant issues than trade policies when considering the development of equitable agrarian structures.

Improving land rights and governance, and eliminating policy biases in favour of large farms, are therefore essential to maintaining a level playing field for small and family farms, under any trade policy. Future scenarios will depend not only on the inherent competitive advantages of family/small farms based on family labour and local knowledge, but also – and crucially – on public policy that monitors the concentration of land and protects from "land grabbing" while defining and implementing adequate public programmes in support of small-scale farmers and family farms (Deininger and Byerlee, 2011).

These critical issues must be addressed, irrespective of the stance of trade policies.

5.10. Issues related to the operation of international and domestic markets affecting food systems

Even if international production has become less concentrated, as shown in Sections 5.8 and 5.9, there is still the issue of whether the international and domestic markets for the commercialization and processing of products are becoming less competitive. In addition, the level of competition in markets for inputs, such as seeds, fertilizers and machinery, also matters for agricultural and food production.

Echoing the early work of Servan-Schreiber (1968) and Vernon (1971), some observers have argued that opening the economy increases the power of multinational corporations to the detriment of the welfare of citizens and democratic governance. On the other hand, other empirical observations indicate that greater economic openness increases the level of competition, reducing the market power of concentrated firms (Hallward-Driemeier, 2001).

Several concerns have been voiced regarding what has been perceived as an increasing concentration in many agricultural and food production markets (Murphy, 2008; Morrison and Murphy, 2009), and the implications that these developments may have for food security and the poor.

These are relevant empirical issues that encompass several components. The first issue is the level of analysis (global, national or local markets) and the focus (primary products, processed products, inputs, consumer retail goods, and so on). The second question is factual and regards whether or not markets are indeed becoming more concentrated. However, the third and core question refers to the consequences of such concentration in welfare terms, for producers, consumers, workers and other stakeholders, and in particular for food security. Markets may still be "contestable" even though

quantitative measures of concentration increase, and this fact limits the potential for firms to abuse their apparently dominant positions. While changes in concentration are easier to measure, the welfare consequences of these changes are more difficult to determine and cannot be inferred by simply pointing to concentration measures. In the context of this paper, the main issue is the role of trade and trade policies in developments related to these three questions.

Answering these questions is particularly difficult in the new global context of complex value chains and networks of suppliers, the consolidation of firms in many industries, the advance of supermarkets, and the use of private standards.

The current global agrifood system is large and complex: more than 450 million farmers worldwide (of whom about 85 percent operate on 2 hectares or less) buy inputs, equipment and machinery from a variety of industrial firms and then supply their products to an intricate network of processors, traders and retailers, which in turn face a market of about 7 billion potential consumers worldwide (although more than 1 in 10 of these potential consumers lack purchasing power and suffer from undernutrition) (von Braun and Díaz-Bonilla, 2008). Transactions and trade occur across all the components of these value chains, which have become more integrated at the global level, with big players in each of their segments. Foreign direct investment in agriculture, processing and retail (supermarkets) has increased the level of global integration of agrifood markets. Some of the players in these segments include important State trading enterprises and large private firms that operate, both domestically and internationally, under market structures with different degrees of imperfect competition. Supermarkets are rapidly expanding into developing countries, changing the operation of food value chains (Reardon and Timmer, 2012), including through the rapid increase in private standards and food safety and quality requirements, which may make other public policy frameworks (such as WTO's SPS) less relevant.

The discussion about concentration, welfare effects and the role that trade may play therefore needs to identify clearly the level (global, national, local) and focus (type of good or service) of analysis. A traditional preoccupation has been the role of big multinational corporations in *global markets of primary products*. Some studies (e.g. Murphy, Burch and Clapp, 2012) have pointed out the dominant presence of the four big commodity traders Archer Daniels Midland (ADM), Bunge, Cargill and Louis Dreyfus. At the same time, these authors consider that "while the four major, and long-serving, trading companies still maintain a dominant position in the world trade in grains, oilseeds, sugar, and other commodities, it is arguable that now, for the first time, they are facing a degree of competition from a number of new trading companies, most of which have only recently been established" (Murphy, Burch and Clapp, 2012: 39). The authors go on to list some of these new companies. In addition, as argued previously, the crucial issue of characterizing market behaviour must go beyond a simple numerical determination of concentration.

On the *input side*, Fuglie *et al.,* 2011 use the HH index and four-firm and eight-firm concentration ratios to show that concentration in *global markets* increased in several important industries (crop seeds and biotechnology, crop protection chemicals, farm machinery, animal breeding and genetics, and animal health) from 1994 to 2009. These authors also found that, at least in the United States of America, the prices of agricultural inputs have been increasing with respect to the prices of farm products, although the authors note that this trend is not corrected for quality of goods and services supplied and the implications of improvements for productivity.

The global agrifood system is also experiencing changes in R&D and intellectual property rights in ways that may affect farmers in developing countries and the ability to conduct agricultural research in these countries, although opinions are divided (e.g. Pardey and Wright 2001).

There are a variety of circumstances on the *processing side* at the *national level*. For instance, the United Nations Development Programme (UNDP, 2012) calculates the market shares of the top five agroprocessing companies in selected African countries, which range from 39 percent in South Africa to 11 percent in Egypt, with other countries in between (for instance, Kenya with 31 percent, Nigeria with 23 percent, Cameroon with 19 percent and Algeria with 13 percent). There are also differences among countries in Africa in the participation of different international and domestic firms in the market for agrifood products: for instance Egypt has four foreign firms in the top five, while Algeria has only one; the other countries generally have three foreign and two domestic firms.

Overall, levels of concentration vary but do not seem to approach the levels considered conducive to exercising monopoly power (greater than 45–50 percent). On the other hand, UNDP (2012) refers to agrifood products in general, while some firms may have dominant positions in specific products. However, there is still the possibility of substitution in consumption among goods, which reduces monopoly power for the producers of individual goods.

The impact of concentration also has to be compared with a counterfactual: the situation that poor households would be in without the presence of the dominant firm. For instance, Maertens, Colen and Swinnen (2011) analyse *production for export* (of cherry tomatoes) in Senegal. This would seem a clear-cut case of trade expansion affecting food security: Senegal is a poor country, producing a cash crop to very high standards, through a monopoly that does not contract outside farmers (small or large) but produces directly on its own land. Nevertheless, the authors report that in the area of production, almost 40 percent of households (about 3 000 workers) are employed by the firm, and these households have total incomes (of which somewhat more than 50 percent come from wages) that are more than double those of households in the area that are not employed in this value chain.

At the *local level,* market power conditions may differ even further depending on a variety of factors, which may be unrelated to trade. For example, many authors have identified the crucial role in staple markets in many sub-Saharan African countries of “market queens”, powerful women who are the heads of trade associations that set prices and market conditions and manage disputes (Awo, 2012; UNDP, 2012; KIT and IIRR, 2008).

Regarding *consumer goods* at the *national level*, Reardon and Timmer (2008; 2012) analyse changes in food markets, focusing on what they call the “supermarket revolution”. They note that these changes are driven by multiple factors (not only trade), such as urbanization, increases in incomes, changes in lifestyles and women’s participation in the labour force, liberalization of foreign direct investments in developing countries, high competition in industrialized countries, increasing use of refrigerators and other domestic appliances in developing countries, and changes in information technology that allow better organization of supply chains. The changes in domestic markets documented by these authors are transforming trade patterns, particularly if much of the food trade takes place within large multinational organizations.

Reardon and Timmer found that consumers across the globe (in both developed and developing countries) have benefited, in terms of lower costs and a larger variety of products,[30] from the highly competitive supermarket supply chain (the authors found that markets have been very competitive, or at least contestable, because of the need to increase market share to achieve the requisite economies of scale). However, this increase in competition has increased the pressure on farm producers to supply higher-quality goods at lower prices. The changes in the retail sector may therefore have mixed or negative effects on farmers: the investments and organizational adjustments needed to meet volume, cost, quality and consistency standards may be challenging for many farmers and processing firms, particularly small ones. However, Reardon and Timmer (2008; 2012) cite studies showing that under certain circumstances, small-scale farmers are included in the procurement systems of large-scale agroprocessors and supermarket chains, particularly for fresh food items such as fruits and vegetables. However, those included tend to be the upper tier of the general category of small-scale producers in terms of physical, human and organizational capital.

Swinnen 2015 reviews case studies in different countries and geographical settings where an increasing number of small and poor farmers are included in supply chains, playing crucial roles in technology transfer and productivity growth, with implications for positive direct and indirect effects on food security. This situation is contrary to the view that quality standards and the strategies of dominant companies in value chains have led to the marginalization of small and poor farmers, with negative effects on welfare and poverty. Even in cases where small-scale farmers are not directly included, Swinnen found that there can be improvements in poverty reduction and food security through other channels (such as employment).

In other cases, the *public sector* plays a larger role in processing and commercialization. For instance, McCorriston 2015 notes the large role of State-owned enterprises in the operation of sugar mills in Bangladesh, Kenya, and Viet Nam, where these enterprises hold dominant market positions. An example of public-sector involvement in consumer goods is India's Targeted Public Distribution System (TPDS), the largest food system of its type in the world, having reached 600 million people considered food vulnerable or undernourished. India's National Food Security Act of 2011, expanded and revised in 2013, will increase this coverage to about 800 million people. In their analysis of rice distribution in several Asian countries, Reardon *et al.,* 2012 note that fair-price shops in India's TPDS handle about 15 percent of the rice consumed in New Delhi, while the incipiently expanding supermarkets are already reaching 7 percent (although the customers of the two types of retail outlet may differ). However, surveys conducted in New Delhi found that about two-thirds of fair-price shops were closed during business hours, and showed that public food distribution systems face challenges associated with waste and losses because of inadequate storage, handling and transportation; leakages of funds and products; and diversion of food from the poorest members of society.

In summary, global agrifood value chains are very complex; when discussing market power and concentration it is therefore important to define the level of analysis and the focus. Even though it appears that there are more quantitative measures of concentration at a properly defined level and with adequate focus on the good or service considered, there are still questions regarding the impacts of developments on the welfare of consumers, producers and workers, and the role of trade and trade policies in this process. For instance, it is important to determine whether concentration has led to more economies of scale and specialization, reducing costs for all, or whether it has generated abuse of market power by international or domestic companies, leading to increased margins to the detriment of

[30] The impact on nutrition is discussed in Section 5.14.

final consumers, primary producers and workers. In addition, concentration and vertical integration may be the only way in which a value chain can become competitive and able to offer production and employment opportunities in a country or region.

At the same time, monopolies may exist because of a public policy that directly or indirectly grants monopoly powers (such as discretionary import licences or domestic trade licences and restrictions). In these cases, the appropriate approach would be to eliminate the policy-induced monopoly/monopsony. On the other hand, if the monopoly (or monopsony) power originates in market imperfections, the proper approach is to establish adequate anticompetitive regimes and regulatory approaches to eliminate abuses.

In any case, the presence of large players in different segments of value chains highlights the need to pay attention to the relative market power of different actors, in both product and input markets (e.g. the discussion of imperfect competition in the global fertilizer industry in Hernandez and Torero (2011); Reardon and Timmer (2008) also highlight the need to pay attention to the relative power in price formation between supermarkets and processors, and to explore price formation in oligopsonistic or oligopolistic settings).

Developing countries will therefore have to strengthen domestic policy and legislation (such as antitrust laws) to govern monopolistic structures. There is also a parallel international challenge if horizontal and vertical integration of the national agrifood system makes the global system less competitive. At minimum it would be useful to improve information about competition issues related to the international agrifood system. Efficient functioning of the global agrifood system may need an internationally agreed framework for competition policies in the future (for different views on these issues, see von Braun and Díaz-Bonilla, 2008).

5.11. How does trade affect growth, poverty and income distribution?

The link between trade policies and economic performance in developing countries has been a hotly debated topic in development literature for a long time (for early reviews, see Kravis, 1970 and the rejoinder from Crafts, 1973).[31] Several studies during the 1970s and early 1980s pointed out the limitations of a development strategy based on inward orientation and closed trade regimes, with its tendency to generate macroeconomic imbalances and recurrent balance-of-payment crises and to foster low-employment and capital-intensive growth patterns, with negative impacts on poverty (Little, Scitovsky and Scott, 1970; Balassa, 1971).

During the 1990s, with increasing availability of cross-country data sets, a variety of empirical studies applied regression analysis to measure the impacts of trade on income growth, poverty and distribution. These studies generated a far-ranging debate about their results, methods and interpretation. Although it has been difficult to establish a clearly attributable link between trade liberalization and income growth, many authors agree that foreign trade has played an important role within the overall policy package in nearly all countries where high income growth has been sustained over time (a point that even critics of the growth-regression approach acknowledge; see Rodriguez and Rodrik, 1999). In this vein, Sala-i-Martin (2002) summarizes some of the early results, noting that although there is no simple determinant of growth, economies that are open tend to grow faster. The Commission on Growth and Development (2008; 2010), also known as the Spence Commission organized by the Word Bank, which

[31] A review of the links among trade, growth and poverty can be found in McCulloch, Winters and Cirera, 2001.

has been the latest large-scale effort to analyse development experiences, has also argued that countries with successful growth stories have been those that, among other factors, have fully exploited the trade and financial opportunities offered by the world economy.

Regarding trade and poverty (and the impact of poverty on food insecurity), Winters, McCulloch and McKay (2004) and Winters and Martuscelli (2014) reached the conclusion that trade liberalization generally increases incomes and leads to reductions in poverty, although they note studies that raise questions regarding the general application of this conclusion to very poor countries. These authors also note that most studies suggest that trade liberalization has very heterogeneous effects on poor households, depending on the type of policies being changed; different complementary conditions, such as the ease with which factors of production can move between activities; and where the poor work, with those working in export industries generally benefiting while those working in import-competing sectors that were protected before the trade liberalization episode are hurt. These reviews also suggest that women may gain relatively more from trade liberalization (based mostly on industrial studies).

However, empirical studies still appear to leave many open questions regarding the links among openness, growth, poverty and inequality, and results vary with either equation specification or choice of openness indicators. As discussed before, this indetermination may be the result of the diversity in country experiences and the multiple dimensions of trade policies and open/closed regimes. The way in which changes in trade policies interact with the country's initial situation and concurrent changes in domestic policies is at least as important (as discussed previously). It is this interaction that may produce divergences in country experiences, even when fairly uniform trade policies are adopted. Even those authors who strongly support and encourage openness policies acknowledge that there is no "magic bullet" for growth and poverty alleviation, and that trade policy is only one of many determinants of growth.

All in all, while there are grounds for being sceptical about claims that trade liberalization always induces strongly pro-poor growth, it seems even more dubious that retreating into isolation from global markets will help the poor in developing countries.

5.12. Is trade leading to more volatility in growth and incomes?

Section 4.1 discussed whether trade makes food *availability* more or less volatile. This subsection examines the impact of trade on volatility of growth, incomes and employment, which affects stable *access* to food. As argued previously, even if trade accelerates growth, the poor may suffer if this growth becomes more volatile and crises become more likely, with negative impacts on the poor's incomes, employment and livelihood strategies.

The debate over whether open or closed economies are more vulnerable and volatile also has a long tradition in development circles. After experiencing the volatility and breakdown of world markets during the two world wars and the great depression of the 1930s, many developing countries turned to inward-oriented policies in the hope of reducing external vulnerability. In the 1970s and 1980s, studies that looked at the performance of the closed economies of several developing countries concluded, paradoxically, that countries following inward-oriented policies appeared more prone to macroeconomic instability and more vulnerable to external shocks and balance-of-payment crises, while those following outward-oriented policies showed better results in terms of not only efficiency but also flexibility and adaptability to external events (Balassa, 1984; 1986).

An important reason for economic instability was that the inward-oriented strategy created a stop/go dynamic in economic activity: the acceleration of the economy usually led to fewer exports (because a larger percentage of goods was consumed internally as a result of growing incomes) and more imported inputs and capital goods (demanded by the expanding industry), generating balance-of-payment crises when official external reserves reached very low levels. In addition, compressing imports through import substitution meant that exports also declined. The result was that these economies ended up with very little diversification on the export side (that is, the country ended up selling a small range of goods). In addition, because industrialization for import substitution was never able to replace some of the most crucial and difficult-to-produce goods, countries ended up being very dependent on the import side, buying a narrow group of non-substitutable imports that were crucial for the operation of the economy. Rather than achieving the desired reduction in vulnerability to any external shock on the export, import or financial side, all of these events appear to have increased external vulnerabilities (Balassa, 1986).

As well as external vulnerability, protectionism for import substitution appears to have increased inflationary pressures at the internal macroeconomic level (Krueger, 1980; 1984) and fostered unsustainable fiscal deficits associated with State interventions, which led to recurrent macroeconomic crises.

This debate took place in the context of inward-oriented industrialization. The question is whether a policy of isolating the agriculture sector from world markets may have similar destabilizing systemic effects on the sector and, eventually, on the whole economy, as happened when the industrial sectors were isolated. One line of thinking considers international agricultural markets unreliable and suggests that domestic food production should be expanded to some level of self-sufficiency so that countries can depend less on external sources.

However, this approach must consider the far greater volatility in the domestic production of individual countries than in global and regional aggregates. As shown in Table 7, most of the food consumed in developing countries is produced domestically, making food trade a component that can provide the margin of supply necessary to stabilize food prices and quantities. Thus, using international trade to supplement domestic production should stabilize domestic food availability. Although some developing countries have successfully managed external volatility, there are likely to be more examples of efforts to shield domestic markets from global volatility that have instead led to increased internal volatility. For instance, Minot (2011; 2012) shows that: (i) food price volatility in several sub-Saharan African countries seems higher in domestic markets than in international markets; (ii) such domestic food price volatility has not changed much with the increases in international price volatility that occurred in the late 2000s; (iii) commodities in which there is more international trade have lower volatility than those that are traded less; and (iv) volatility is higher in countries and for commodities where governments intervene actively in markets through State-owned enterprises (see also Chapoto and Jayne, 2009, who show the destabilizing results of government interventions aimed at stabilizing maize prices in several sub-Saharan African countries). All of these findings would suggest that self-sufficiency as insurance against food insecurity may increase, rather than decrease, vulnerability to external and internal fluctuations.

There are also economy-wide effects when governments try to compensate consumers through food subsidies for the costs of higher prices resulting from protection, and these transfers become a heavy budgetary burden (Díaz-Bonilla, 2015b). Morocco during the second half of the 1990s provides an example: the country was spending about 1.7–2.4 percent of its GDP on food subsidies (IMF, 2001), partly in an attempt to compensate for the higher prices generated by trade protection. At the same time, simulations of alternative uses of water in Morocco showed that the protection of certain crops

was shifting the use of water, a scarce resource, towards these crops, even though the value of agricultural production measured at world prices would increase if protection were reduced and water were reallocated to other crops (Diao, Roe and Doukkali, 2002). In addition, the concentration of production in some protected crops seems to have increased the vulnerability of Morocco's agriculture to droughts, in turn making the whole economy more volatile (World Bank, 2001).

5.13. Trade and gender

Section 4.3.3 highlighted the importance of women for all aspects of food and nutrition security. As noted, there are differing views about the impact of trade and trade policies on women's well-being. One narrative argues that women are the main producers of food at the global level, and that trade liberalization is hurting women and endangering food security by affecting domestic food production. Even if trade expansion leads to additional production opportunities for women in what are considered to be "women's crops", women may not be able to take advantage of these opportunities because they lack access to land and productive resources. When women do participate in the expanded production and employment opportunities, it may be at the expense of their time for caring for children and other household members, endangering nutrition; alternatively, the additional work burden may fall on younger women and girls, affecting their schooling.

A different narrative argues that expanding trade generates additional income and employment opportunities for women; that expansion of cash crops does not usually displace food production, but rather provides resources for expanding it (as discussed in Section 5.7); and that women, empowered with additional incomes, are able to improve the nutrition status and other human development indicators of their households, as they tend to have more family-oriented expenditure patterns than men. In addition, improvement in women's demonstrated income-earning capability would strengthen the incentive for investing in the human capital of girls, with all the wider benefits that the education of girls brings.

The reality is obviously more complex and shows a variety of outcomes. Analysing the relatively limited empirical studies on these topics requires the consideration of several points. A first problem is the general lack of gender-disaggregated data (Quisumbing *et al.,* 2014). Analysis based on whether the household head is a man or a woman obscures the fact that a man household head may have a woman partner (whose presence is not taken into account), while there are diverse situations in women-headed households (a household with an absent man who sends remittances is different from a household headed by a widow). In addition, although there are some gender patterns of cropping, the distinction between "men's" and "women's" crops, given the complex patterns of collaboration within families, is not sufficiently clear to provide a basis for mapping what the different incomes of men and women would be (Doss, 2014). This complexity has implications for the factual validity of narratives based on the assumption that men produce cash crops for export and women produce food for domestic consumption.

A second problem is that "women" and "men" are not uniform categories. Women differ among themselves depending on their wealth, status, education, skills and age. The power of market queens in the commercialization of many food crops in sub-Saharan Africa has already been mentioned (Awo, 2012; UNDP, 2012; KIT and IIRR, 2008). There are also different prevailing social norms regarding women's roles and obligations in households, with mothers of infants less likely than women with older children or single women to be able to respond to new opportunities (Fontana, 2009).

Third, most of the analyses of the impact of trade on women have focused on manufacturing, while there are fewer studies on agriculture, and even fewer on services. However, the importance of these three sectors for women's employment globally is in the inverse order: according to IANWGE (2011), based on 2008 data from the International Labour Organization (ILO), there were 3 billion people employed worldwide, including 1.2 billion (about 40 percent) women, of whom about 16 percent were employed in industry, 37 percent in agriculture, and 47 percent in services (compared with about 27, 33 and 40 percent, respectively, for men).

The comprehensive study of commercialization (including domestic expansion of trade) and nutrition by von Braun and Kennedy (1994) showed increases in incomes, in general, for both men and women in several countries. However, women did not play a significant role in management decisions and had less direct control over incomes from the new crops than men. Women's incomes increased, and this increase had a positive impact on food intake at the household level, but this study was conducted some time ago.

Paolisso *et al.,* 2001 looked at the time that rural Nepalese women had to care for other household members when production and exports of fruits and vegetables increased, and found that there may be trade-offs between income-generating activities and the time allocated to child care, with the number and ages of children in the family affecting how women take advantage of production and employment opportunities. Another potential trade-off – which the Paolisso *et al.* study does not analyse and about which little is known in general (Fontana, 2009) – is whether there may also be redistributive impacts of time among women of different ages within the household: for example, when some of the older women go out to work, younger women in the household may have to carry an additional burden of domestic chores, potentially affecting their schooling time. Edmonds and Pavcnik (2002) analysed export liberalization of rice in Viet Nam and found it to be associated with declines in child labour and increases in school attendance, particularly for girls of high school age.

Fontana (2009) surveyed a variety of studies on trade liberalization and women in industry, agriculture and services. The empirical evidence indicated that trade and trade policies (particularly trade liberalization) have different effects on women and men and across different groups of women, depending on several factors and preconditions. These factors include gendered patterns of rights over resources, the labour force participation rates of women and girls, education levels and gaps by gender, patterns of labour market discrimination and segregation, and the general socio-cultural environment (Fontana, 2009).

Fontana's results for agriculture are mixed. In sub-Saharan Africa, women do not often benefit directly from increased export production of traditional crops because their property rights to land are limited and smallholder export production is based on unpaid family labour. On the other hand, the situation may be more favourable to women in non-traditional agricultural exports (such as fruits, vegetables and floriculture), with women in some countries appearing to participate as both workers and small-scale producers. Reinforcing this finding, Maertens and Swinnen (2012) argue that women benefit more and more directly from employment in large-scale estate production and agro-industrial processing than from smallholder contract farming. These authors conclude that using the indicator of "participation of small-scale farmers" can generate misleading findings on the welfare and poverty effects on women.

In this vein, Fontana (2009) notes that women, who in many countries have more clearly established rights over their own labour than over land and other resources, would benefit more from increases in labour-intensive production than from increases in production based on the use of land and natural

resources, where their rights may be weak. Fontana also notes the differences in women's property rights to land between Africa and Asia, with the former region showing weaker protection.

As already noted, the gender effects of trade in manufacturing are better documented than those in the agriculture and informal sectors, where many women work. This gap emphasizes the need for greater efforts to collect gender-disaggregated data on household labour, earnings and expenditures (see also Quisumbing *et al.,* 2014).

In general, it seems that much depends on the interaction between external factors and country conditions. In this respect, it is crucial to ensure that all discrimination against women in property rights, family law, employment opportunities, access to education and health services, political participation, and general social status are eliminated. These, rather than trade, seem to be the defining factors for women's well-being.

5.14. Trade and dietary diversity

Dietary diversity has been associated with better nutrition outcomes as assessed by anthropometric measurements (such as indicators of stunting, wasting and similar phenomena) (Arimond and Ruel, 2006; Remans *et al.,* 2014).

Empirical studies have shown that trade has contributed to more availability and, of greater importance, to more diversity in the average supply of food available for consumption. For instance, Remans *et al.,* 2014, using different measures of diversity,[32] show that food production in many developing regions is less diversified than food availability (which also includes imports). Table 12 shows that in most regions production is less diversified than total availability for consumption, particularly using the modified functional attribute diversity indicator, a measure of nutritional diversity (in both indicators, a higher number indicates more dietary variety).

Table 12: Food production and supply diversity

	Shannon entropy diversity metric		Modified functional attribute diversity indicator	
	Production	**Total availability**	**Production**	**Total availability**
South Asia	0.71	0.85	0.13	0.71
East Asia and the Pacific	0.76	0.88	0.12	0.71
Sub-Saharan Africa	0.80	0.83	0.05	0.71
Middle East and North Africa	0.92	0.86	0.08	0.82
Europe and Central Asia	0.82	0.88	0.08	0.80
Latin America and the Caribbean	0.78	0.92	0.08	0.80

Source: author, based on data from Remans *et al.,* 2014: 4, Table 1

It could therefore be argued that trade leads, on average, to a potentially better quality of diet through greater diversity.

[32] The Shannon entropy diversity metric reflects how many different types of food *items* there are in a certain country; and the modified functional attribute diversity indicator reflects the diversity in *nutrients* provided by the different food items, based on their nutritional composition.

However, researchers have also noticed a bifurcation of consumption habits in developing countries: poor-quality diets predominate among low-income groups (based on mass consumption of low-quality vegetable oils, fats and sweeteners), while, in parallel, a comparatively smaller market for "healthy" food products exists (Hawkes, 2008). This "nutrition transition" in developing countries is leading to low-quality diets associated with rising rates of obesity and diet-related chronic diseases, such as heart disease, diabetes and some cancers. Low-quality diets are also associated with undernutrition in the form of micronutrient deficiency, which in turn lowers immunity to infectious diseases.

Some authors argue that trade and trade liberalization have played a role in the transition by reducing prices and increasing availability of a variety of unhealthy foods (such as those that are rich in calories, poor in nutrients and high in saturated fats and salt) compared with more healthy foods (Hawkes, 2008; Kearney, 2010). However, these effects may be the result of autonomous demand shifts (linked to urbanization and higher incomes) or to the advertisement and cost/benefit calculations of processors, which in turn affect trade, rather than the other way around.

These developments point to the need to consider that trade and trade policies may have different outcomes for people at risk of undernutrition relative to those at risk of overnutrition, for urban compared with rural populations, and for the poor relative to the rich (Hawkes, 2008). In particular, Hawkes highlights the risk that poor consumers may be more susceptible to adopting unhealthy diets than wealthier consumers, who have access to more resources and information. Hawkes looked at the important increase in production and consumption of vegetable oils and the changes linked to market liberalization in three countries: Brazil, China and India. She concludes that the policy changes have had the effect of integrating these countries into the global soybean oil market and, in doing so, have facilitated the increase of soybean oil consumption worldwide, not only as cooking oil but also in processed foods through hydrogenation, a process that increases the risk of coronary heart disease by creating trans fats. She notes that, contrary to these trends, and taking advantage of the income bifurcation in consumption patterns already noted, companies have been trying to target higher-income consumers with products that are lower in trans fats.

At minimum, these developments require stronger consumer-oriented policy responses (such as education, and nutrition labelling). In general, tackling these nutrition problems will require a broad cross-sectoral response, including taxes, regulations and a variety of policy instruments, most of which are unrelated to trade policies.

5.15. Trade and government operations

As noted in Section 4.4, Díaz-Bonilla (2008b) identified three aspects of governance that may be affected by trade (or globalization in general): the government's responsiveness to the needs of the inhabitants of a country; the availability of public resources; and the policy space (the latter two aspects influence governments' effectiveness). These three aspects are briefly discussed in this section.

5.15.1. Responsiveness

As noted previously, some authors argue that trade and trade liberalization undermine democracy, and thereby the possibility that governments will respond to the needs of the people. Others have argued that closed countries – where the State holds substantial power over the fate of firms – fortunes and people tend to be captured by elite groups and vested interests, undermining political institutions and

the rule of law, and leading to corruption and waste of resources (Krueger, 1974; Bhagwati, 1982; Hirschman, 1982). In this context, international legal frameworks may lead to greater transparency and stability in domestic legal frameworks, protecting citizens from inefficient, inequitable and unstable changes in regulations by governments that are captured by sectoral interests.

In line with Lipset (1960) and others who have argued that economic development is associated with the expansion of democracy, it has also been argued that free trade leads to greater growth and productivity, which expands the middle class and, with it, the demand for greater political rights, democracy and good governance.

The broader debate on whether trade (and more generally globalization) is contributing – through accelerated growth – to the creation of a middle class that eventually demands political rights, helping to strengthen democracy, or is instead generating stagnation and worsening income distribution, to the detriment of stable democratic institutions, is complicated by the inconclusive evidence on the links between globalization, growth, volatility, poverty and income distribution, which depends on the indicators used to proxy trade expansion (and globalization in general), the variables of interest, the periods considered, and several other factors (Díaz-Bonilla, 2002; 2008b).

Studies have therefore skipped the intermediate variables (growth, volatility and income distribution) and tried to analyse the globalization–democracy link directly, usually finding a positive link between trade and trade openness and democracy, but with caveats about the lack of this positive link, or even its reversal, in the case of commodity exporters[33] (Hamilton, 2002; Li and Reuveny, 2003; López-Córdova and Meissner, 2005; Rigobon and Rodrik, 2004; Giavazzi and Tabellini, 2005; Eichengreen and Leblang, 2006; and a more detailed discussion in Díaz-Bonilla, 2008b).

5.15.2. Resources

Some analysts have argued that trade and trade policies (along with other aspects of international economic integration) may also affect government revenues negatively, both directly in the operation of the tax system (for example, if tax competition at the global level reduces the sources of revenues and import tariffs are reduced) and indirectly through the influence of the rate and variability of growth on general tax collection. In this view, expanded trade makes countries more vulnerable to international factors and amplifies external competition, increasing the need for government resources to help affected populations, while governments are losing resources because of trade liberalization (with the reduction of tariffs) and are forced to cut welfare expenditures to reduce costs and maintain a competitive economy.

Regarding the impact of trade liberalization on revenues, the empirical evidence does not suggest an erosion of governments' revenues in developing countries (Díaz-Bonilla, 2015b): although receipts from trade taxes as a percentage of GDP have declined in many of these countries since the 1990s, the declines have been more than compensated for by expansion in other taxes, particularly value-added tax (VAT), which has reinforced the revenue raising capacity in many developing countries. While only a small number of developed countries and practically no developing countries were using VAT in the 1960s, by the beginning of this century all developed countries and nearly 100 developing countries

[33] Countries with concentrated natural resources (minerals, oil), particularly when these resources are in the hands of the State, seem to be correlated with low quality of governance and high levels of social strife (Collier and Hoeffer, 1998).

were doing so (Ebrill *et al.,* 2001). Even in sub-Saharan Africa, the region where trade taxes contribute most to fiscal accounts, these taxes remained stable at about 5 percent from the 1990s into the first decade of this century, but showed a decline compared with the 1980s (Keen and Mansour, 2009). Nevertheless, comparing 2000–2009 with the 1980s, total taxes as a percentage of GDP increased by several percentage points in sub-Saharan African countries. Trends are similar in other developing countries, where tax revenues have been relatively stable or slightly increasing (supported by the expansion of VAT) even though trade taxes have been declining (Díaz-Bonilla and Robinson, 2010).

5.15.3. Policy space

Even if public revenues have not declined (and therefore governments have the budgetary means to implement policies), the other criticism mentioned previously is that international agreements limit the policy space in which governments can operate without running into legal challenges from these agreements.

The issue of policy space in agriculture is usually related to the WTO's AoA. Data show that different developing countries (mostly in the middle- and upper-middle-income categories) have been increasing support for their agriculture sectors, taking advantage of the significant policy space available under the AoA.

Indicators of support for agriculture, such as the nominal rate of assistance (NRA) (calculated by a World Bank project), the producer support estimate (PSE) (computed by OECD) and the categories of domestic support that must be reported to the WTO as defined in the AoA, all show increases (Díaz-Bonilla, 2014; 2015b).[34] In particular, domestic support as measured by the WTO has also increased for several important developing countries, as calculated by Orden, Blandford and Josling (2011). These authors show that for the period 1995–2008/2009, the developing countries they considered (Brazil, China, India and the Philippines) increased their domestic agricultural support; India in particular moved from a level of domestic support of about 6 percent of the total value of agricultural production in the 1990s to more than 18 percent in 2008/2009 (or more than 11 percent if the domestic food aid programme and related public stockholding are not counted). China moved from 6.5 to 9.6 percent in the same period. On the other hand, domestic support in Brazil and the Philippines stayed relatively flat at somewhat less than 6 and 4 percent of the value of agricultural production, respectively. Domestic support in these developing countries as a percentage of agricultural production still remains clearly below the levels seen in developed countries.

Therefore, in legal terms, developing countries do not seem particularly constrained in the implementation of a range of possible investment and financial policies in support of agriculture. However, most industrial countries are not particularly constrained either, and – unlike many

[34] PSEs and NRAs are economic measures of support to agricultural producers. Both the NRA and the PSE include support through trade measures (which usually imply a transfer from consumers to producers), plus different measures of support that imply fiscal expenditures (in that they represent transfers from taxpayers to producers). A third indicator of domestic support for agriculture is defined in the AoA but is significantly different from the other two. Increases (decreases) in the values of these indicators in a country broadly signify expanded (reduced) support to agricultural producers. For calculation of the NRA see Anderson and Nelgen (2013) and the database at http://econ.worldbank.org/external/default/main?pagePK=64214825&piPK=64214943&theSitePK=469382&contentMDK=21960058. Comparisons of PSE and different WTO measures of domestic support can be found in Effland, 2011; see also Brink, 2009.

developing nations – they have the financial, human and institutional resources to implement highly distorting policies.

Although a better fiscal position in developing countries seems to have led to increases in public expenditures in and for agriculture (Díaz-Bonilla, 2015b), the main question is not about general policy space but whether the composition of these expenditures is adequate for the goals pursued. Although there seem to have been some improvements in the balance of public goods (which increase overall productivity) versus private goods (which are transfers to some individuals), there is still plenty of room to improve the allocation of fiscal resources to public expenditures that have the best payoffs for agricultural productivity, poverty reduction, food security and environmental sustainability. These investments are usually oriented towards agricultural R&D, rural infrastructure and health and education (Mogues *et al.,* 2012). Other expenditures, such as subsidies for fertilizers, water and credit, may still play a role, depending on the level of the country's development, either by helping to start up some activities in the short term or by contributing to the correction of market failures. However, the validity of the assumptions on which those programmes are based needs to be assessed periodically: these expenditures use fiscal resources that may have a better alternative use for growth and equity in agriculture and for the whole economy.

More generally, these programmes have economy-wide effects, whether they are funded within the budget through mechanisms that create second-round effects (such as inflationary money financing deficits, or increased indebtedness) or are financed off-budget by shifting the implicit costs from general taxpayers to specific economic agents. In addition, subsidies may be unequally distributed, benefiting the well-off more than family and small farms and the poor and vulnerable.

On the other hand, public expenditures and investments that focus on important development outcomes – poverty reduction, social equity, environmental sustainability, enhanced land and water property rights for rural communities, and the proper operation of labour, credit, input and output markets – have important beneficial impacts on both the agriculture sector and the general economy, and should receive particular attention (Mogues *et al.,* 2012).

In summary, while some of the potential interventions of governments for improving food and nutrition security may be influenced by trade and trade policies, others are not related to trade. In addition, for most of the public interventions that can really help with food and nutrition security,[35] governments seem to retain a large margin of policy autonomy, and many developing countries have been increasing the availability of resources that can be dedicated to the policies and investments needed.

[35] These interventions may include, among others,: (i(1) ensuring adequate productive services and infrastructure for small-scale farmers (including women) so that they can take advantage of productive opportunities; (ii(2) monitoring and curbing episodes of the displacement of small-scale farmers from their access to land and water, while trying to secure land and water rights to for rural workers, landless producers, and other poor and vulnerable rural populations willing to work the land; (iii(3) ensuring thea proper operation of labour markets, with adequate wages and working conditions; (iv(4) ensuring thea proper operation of financial markets; (v(5) safeguarding competition within along the whole value chain, monitoring dominant actors and the possible presence of monopolies/oligopolies or monopsonies/oligopsonies; (vi(6) implementing several nutrition programmes, starting with multidimensional interventions related to for children, pregnant women, and other vulnerable groups; (vii(7) making sure that legislation, regulations, or and other practices do not hamper women's status and their access to land and other productive assets, and but rather, that they provide for equal opportunities related to employment, and wages, and access to education; and (viii(8) implementing campaigns of consumer education, product labelling, and so on, to ensure dietary awareness.

6. Other methodological and value issues related to the analysis of trade and food and nutrition security

In addition to the data and methodological problems, contextual and structural divergences, complex linkages and policy combinations, and varied empirical evidence discussed in Sections 2–5, there may be even deeper differences in how groups with opposing views on trade and food and nutrition security judge and interpret the conditions and issues involved. There are three crucial topics in this regard: (i) policy objectives and their measurement; (ii) how to evaluate impacts and outcomes; and (iii) the existence of prior views on the operation of the world and national economies.

Regarding the first two topics, economic analysis tends to focus on efficiency and welfare, usually measuring welfare as an equivalent variation[36] in consumption or a similar indicator, as well as by other variables such as production, employment, wages and trade balances. Non-economic policy-makers and civil society may add other policy objectives, such as health, environment, participation, gender equality and human dignity.

The definition of policy objectives or desirable outcomes more generally is a matter of the ideological values that influence judgements about whether trade is or is not helping to reduce food and nutrition insecurity. Policy analysis and communication efforts must also consider the debates about these more general values and the discrepancies that may arise from the existence of different value frameworks.

Religious traditions and ethical approaches emphasize the importance of considering the needs of the poorest of the poor. For instance, Swaminathan (2008) referred to some of Gandhi's simple ground rules for helping the poor, particularly *antyodaya,* which Swaminathan translates as "start with the poorest of the poor", and *sarvodaya,* interpreted as "a high social synergy society – a society in which there are no winners and losers") (Swaminathan, 2008: 94). Other religions also make explicit reference to favouring the poor and vulnerable. For instance, in the Christian tradition, the Gospels set the standard for moral behaviour as giving food to the hungry, water to the thirsty, clothes to the naked, and so on. In economic terms, Rawls's "maximin" principle of justice accords with the prescription of trying to improve the situation of the worst-off people first (Rawls, 1971).

Besides the question about whether all participants in the debate are focusing on the same values (which would help to frame the issues/problems to be addressed and to define more clearly the policy objectives to be pursued), there is the issue of measuring and evaluating impacts and outcomes of the policy change (the second topic mentioned at the beginning of this section).

For many critics of trade (and globalization in general), merely presenting the story of someone poor being made worse off by the policy change being analysed is enough to rest their case against the policy. On the other hand, economic analysis tends to consider average and total increases in welfare as adequate indicators of good outcomes. The Pareto optimality principle (that reforms leave no one worse off than before while at least one person is better off) is accepted by economists as a guide for welfare decisions in general, but – unlike approaches that prioritize those who are worse off – it is not restricted to the poor. In addition, the cross-compensations that a larger overall welfare level may allow to ensure that no one is made worse off are not necessarily implemented in practice.

[36] The equivalent variation is the difference in economic value between the consumption basket with the policy change and the consumption basket without the policy change, with both baskets valued at the prices prevailing before the policy change.

A general Pareto criterion of the type utilized by economists would not be considered favourably under the principles discussed previously because an increase in general welfare that leaves the poor no better off than they were before would not be deemed just, and – of course – it would be unacceptable if some poor people were affected negatively.

Even for Pareto-optimal policy reforms, optimality is likely to be achieved only in the medium term when all transitional adjustments have played out, while in the immediate aftermath of policy changes, the more realistic scenario is one in which there are winners as well as losers. For example, import-substituting sectors and industries that were previously enjoying the benefits of protection would lose, while consumers who can now buy cheaper imported goods gain. In cases where the previously protected sector is an unskilled labour-intensive sector, poverty may increase in the short term (even though protection in this sector may have been hurting the poor in other sectors). Of course, over time, labourers in the contracting sector can seek and find employment in expanding sectors. However, this kind of adjustment is not always easy for the poor, especially if some kind of retraining or geographic relocation is required (Díaz-Bonilla, 2015a; Fernandez de Cordoba *et al.,* 2006).

So there are discrepancies in how to evaluate impacts/effects, from requiring that not a single poor or food-insecure person be made worse off, to other criteria, including those that focus on an overall reduction of the number of poor or food-insecure people even when there is some "churning" (when more people become food-secure while a smaller number may be dropping into food insecurity).[37]

Beyond the methodological and value issues, there may be deeper differences based on specific views about how the world works and should work (the third of the topics introduced at the beginning of this section). As noted in Díaz-Bonilla (1982), critics of trade (and globalization in general) tend to consider participation in the international economy as the root of all problems, and seem to perceive the world as being controlled by corrupt governments and greedy corporations. In this view, the world economic system basically entails a long chain of exploitation that starts from the very poor and benefits the very rich – an interpretation linked to Marx's "law of increasing misery" of the proletariat as counterpart to the "law of increasing concentration" (leading to exploitation across classes), and to the historical experience of domination under colonial rule (resulting in exploitation across countries). In this view, poverty and food insecurity are necessary outcomes of the operation of the global economic system. The expansion of trade would therefore be a proxy for the expansion of the current economic and political system that critics consider deeply flawed. The policy implications would be to cut off, or sharply limit, links with the rest of the world while undertaking a wholesale restructuring of economic and social relations within the country.

Alternative visions consider poverty and food insecurity as unnecessary components for operation of the world economy; in these views, poverty and food insecurity can be eliminated, improving the functioning of the current global economic system. For instance, some analysts would argue that the increasing gap between the rich and the poor is related in good measure (at least in present times, leaving aside the debate over the possible importance of colonial transfers in the past) to endogenous technological change in more advanced countries, linked to higher human capital and a better

[37] Obviously, this churning would violate the Pareto optimum.

institutional framework for entrepreneurship.[38] In an endogenous growth scenario, poverty in developing countries may be indifferent to the world economic system, rather than necessary for its operation: considering the enormous imbalance in wealth, the poor do not seem to have an economic base that can sustain the transfers to the rich that would be necessary for the operation of the world economy in line with the first view. While this reality opens the possibility of further marginalization of the poor, it also allows humanitarian reasons to be invoked to address poverty problems.

In addition to the compelling humanitarian reasons (which should suffice), the case in favour of eliminating poverty and hunger is further strengthened if hunger and poverty are dysfunctional to the world system, as a third view would contend. In this perspective, poverty and hunger in developing countries continues to generate a sequence of health, environmental, military and humanitarian crises, which end up affecting rich countries through multiple channels, with potentially critical implications for the economic and physical security of developed nations and regions. Alleviating poverty and hunger would therefore at least eliminate the negative feedback effects on more advanced countries. In more positive terms, helping poor developing countries would add to the economic vitality and political stability of the whole world.

In the second and third views, poverty and hunger alleviation and eventual elimination not only are possible within the process of expansion of trade and globalization in general, but would be helped by such a process (for instance, if the poor were assisted and supported so that they could participate in the technological developments that are making industrialized countries richer).

In summary, the background for many of the debates is the existence of different visions of the operation of the world economy, the role of poverty in this economy, and the conditioning factors for food and nutrition (in)security. A person who believes that poverty is “functional” or “necessary” for the operation of the international system cannot accept (whatever the evidence) that the expansion of trade and other forms of globalization could help the poor, and would rather consider that it would accentuate the problem. People holding this view see few alternatives to “changing the system”.

[38] Marx recognized the importance of technology in development, and struggled to accommodate the implications of technological change with some of his “absolute laws” for wages, which projected a constant deterioration in workers’ conditions.

7. Conclusion

This paper has speculated on the reasons for the fractured and antagonistic debate about trade and food security, in the hope that a better understanding of these reasons may lead to more convergent views about adequate policies and approaches. It has argued that part of the misunderstandings emerge from: (i) the different meanings attached to "trade" (Section 2); (ii) the multidimensional nature of food and nutrition security and the large numbers of potential indicators for both concepts (Section 3); and (iii) the variety of channels that may link food and nutrition security to trade issues (Section 4).

All three aspects complicate empirical assessment of the interactions between trade and food and nutrition security, as discussed in Section 5. As well as the multidimensional nature of trade and food and nutrition security, and the variety of channels of interaction, empirical assessments also have to contend with different impacts that a single trade policy may have, depending on a series of contextual and structural characteristics of the national economy and the global economy in which it is immersed, and on the other elements of the policy package of which the trade policy is part.

However, comprehensive empirical studies (e.g. Thomas, 2006; McCorriston *et al.,* 2013) clearly show more cases of positive than negative food security outcomes emerging from trade liberalization events. In most countries, trade has also helped food security by stabilizing domestic consumption versus more erratic domestic production (while self-sufficiency tends to lead to more instability in domestic prices and availability). In addition, the greater availability through imports appears to have complemented rather than displaced local production. Finally, although the nominal value of food import bills has increased in most developing countries, increases in world trade have helped to reduce the economic burden of these imports measured as a percentage of total exports, while the ratio of food imports has remained stable as a percentage of GDP for the aggregate of low-income countries.

It also seems that more open economies tend to grow faster, and countries with successful growth stories have been those that – among other factors – have fully exploited the trade opportunities offered by the world economy. In addition, in broad economic terms, and contrary to common perceptions, closed economies have been prone to suffer from more economic instability for the variety of general-equilibrium reasons discussed in Section 5.

Section 5 also reviewed other potential channels through which trade may affect food security, such as changes in land tenure, concentration in product and input markets, gender impacts, and consumption of junk food. Empirical evidence suggests that any potential negative effects on these dimensions have been related to factors other than trade expansion per se, such as precarious land tenancy for the poor and vulnerable; inappropriate competition policies of governments (which sometimes create or reinforce monopolies and reduce competition in general); legal, administrative or social discrimination against women; and the lack of an integrated approach to malnutrition (allowing the expansion of food that is high in sugars, salt and unhealthy fats). These issues must be addressed directly; protectionism and self-sufficiency would not solve them and may aggravate them.

However, the current period of higher nominal prices has also led to more interest in food self-sufficiency. An instinctive reaction of many policy-makers and civil society observers in debates about the links between trade and agriculture is to advocate for protectionist measures. Sometimes investments in human capital, infrastructure and technology (all allowed without restrictions under the AoA) are dismissed with the argument that they cost money and are difficult to administer, implying that protection does not cost money and is easier to implement (see the discussion and references in

Díaz-Bonilla, Thomas and Robinson, 2003). However, protectionism does cost money. It is important to realize that protectionism for food products operates as a privately collected and regressive tax on food; this implicit tax is paid relatively more by poor consumers (given the incidence of food in their expenditures), and the benefits accrue relatively more to large producers (considering that protection is a mark-up received per unit produced). High tariffs and related import restrictions also increase the prices of agricultural inputs to other sectors (primary and agro-industrial), affecting production and employment in these sectors. Protection for food products means higher costs of wage goods and may lead to higher salaries, affecting other labour-intensive export industries. Large trade protection also tends to overvalue the real exchange rate, with negative implications for other tradable sectors. Increased trade, rather than protectionism, seems to have greater positive effects on technological advancement, investments and productivity.

On the other hand, a policy of completely free trade in agriculture and food production may not necessarily increase national welfare if it leads to increases in unemployment or disuse of factors of production that are not easily transferred to other activities, particularly if the newly unemployed are the poor and vulnerable and if there are no other policy instruments available to facilitate the (probably long) transition to other employment opportunities or to support incomes during this process. This possibility highlights the need for carefully modulated policies supporting poor producers and consumers. The aggregate production, consumption and employment effects need to be analysed in a general economic setting that considers how labour and other relevant markets really operate in a given country context.

It is remarkable that the defenders of many protectionist measures present these measures as job creators in the activities protected, without considering their general equilibrium effects and, in particular, what happens to aggregate employment, which may well decline because of the trade intervention suggested. On the other hand, many standard analyses of free trade assume that there is always full employment, without considering the significant increases in unemployment that ill-conceived liberalization experiments can generate well beyond the short term, affecting aggregate demand in the economy and leading to the deterioration of human capital (as well as the social, family and individual problems related to lack of employment).

In this regard, and not only with respect to trade policies, it is important to focus on workers and producers, providing employment opportunities and helping these people during unemployment and serious shocks, while at the same time allowing stagnant and unviable industries, companies and jobs to be restructured or to disappear (Commission on Growth and Development, 2010).

A particular topic in the trade and food security debate is whether international agreements such as the WTO framework may constrain governments in their policy space for supporting agricultural and food production. Clearly, developing countries would be well advised to invest more in expanding and stabilizing their domestic agricultural production. As noted, the instinctive reaction of some policy-makers and civil society advocates (in both the previous context of low world food prices and the new context of higher prices) has been to resort to protectionist measures. However, green box measures linked to investments in public goods are the true basis for competitiveness and productivity. In this regard, the AoA does not constrain the good policies used by developing countries to address poverty and food security, such as the variety of programmes aimed at supporting poor producers or consumers. However, it does not significantly constrain policies with negative efficiency and equity effects either, in either industrialized or developing countries. There are certainly also imbalances in the AoA, because industrialized countries have been able to secure exemptions for some of their policies and have been

allowed to continue using significant amounts of money to distort domestic and export subsidies. Some large developing countries are now using their policy spaces to increase their own protection of and support to agriculture. Under some proposals by WTO members, these asymmetries may continue even if the Doha Round is completed.

Overall, in lower-income developing countries, the most important constraints to designing and implementing adequate trade and non-trade policies to help food security continue to be the countries' limitations in financial and human resources and institutional capabilities. A particularly relevant problem for achieving food and nutrition security in several developing countries is domestic conflict and war.

It must also be remembered that general trade policies are not necessarily the main factor affecting food security and that, in any case, trade policies are just an instrument, and a blunt one at that, with a variety of potential aggregate and distributive impacts that need to be considered when addressing the challenges of poverty and hunger. Trade policies can make a positive contribution to poverty alleviation and food security within a properly defined global programme of macroeconomic, investment, institutional and social policies in which differentiated approaches and instruments target households and individuals suffering from poverty and food insecurity, noting that poverty and hunger materialize at the household and individual levels. Therefore, protection and related trade policies aimed at specific food products – even those labelled "special", "food-security staple" or with any other name that suggests the need for particular consideration – do not necessarily represent the most effective, efficient and even equitable way of addressing the poverty and food security challenges of affected households. Instead, poor countries need adequate policies that operate at the household and individual levels. Investments and safety nets should target the poor and vulnerable, as both consumers and producers, rather than protecting and subsidizing crops in general, which usually benefits larger-scale farmers.

In general, it is necessary to take a multidimensional approach and develop an integrated framework for food security and poverty alleviation. Because of the multiplicity of policy objectives and instruments, there may be a wide variety of complementarities, but inconsistencies, incompatibilities and unwanted side-effects may also emerge. Policy-makers sometimes tend to present policies to the public by listing a variety of objectives, as if they were all achievable at the same time. However, it is usually very difficult to avoid inconsistencies and trade-offs altogether. It is very important to be aware of this challenge and to identify potential conflicts clearly.

In aligning objectives and instruments, it helps to remember two general policy notions (see Díaz-Bonilla, 2015b for a more detailed discussion): the Tinbergen rule, which says that it is usually necessary to have at least as many instruments as objectives; and the Bhagwati principle (Bhagwati, 1971), which argues for the need to tailor policy interventions as closely as possible to the source of the problem in order to minimize unwanted side-effects. For example, as mentioned previously, when a government wants to help the poor and vulnerable, it should use policy instruments (such as cash transfers) that focus directly on the poor. Targeting specific food products (even those called "food security crops") may not be the most efficient and equitable way of reaching the intended objectives of poverty reduction and food security. The previously noted triple burden of malnutrition also has implications in this regard, as when policies for food security are based on a limited number of products selected mainly for their calorie content, even though lack of dietary diversity appears to be more correlated than calorie consumption with the prevalence of child stunting and wasting and underweight mothers

(Arimond and Ruel, 2006). If lack of dietary diversity is a more relevant indicator of nutrition problems, food security programmes focusing on a limited number of staple crops will not address the main issue.

In summary, the best approach for developing countries is to follow a relatively neutral trade policy across products, with a level of import tariffs that balances the needs of consumers – particularly the poor – for affordable food with some price margin preference to avoid the disadvantages in size, natural resource endowments and similar factors that affect small producers in developing countries and may leave them without alternative employment (assuming that within the short to medium term, the poor may be relatively immobile across activities and that there are no better targeted policy alternatives to help the eventual transition).

Other complementary policies for poverty alleviation and food security will also be needed, such as support for land and water ownership by small producers and landless workers; investments in human capital, infrastructure, climate change adaptation and mitigation, and agricultural R&D; appropriate management of natural resources; strengthened safety nets for the poor and vulnerable (conditional cash transfers, school lunches, nutrition programmes for women and infants, food-for-work programmes); women's empowerment programmes; community organization and participation, particularly for the poor and vulnerable; adequate functioning of product and factor markets, curbing abuses of dominant market positions; macroeconomic stability; elimination of institutional, political and social biases that discriminate against vulnerable groups; and overall good governance, including strong efforts to reduce corruption and ensure public safety and peace.

As a single policy can have a variety of potential effects depending on the context, the best advice to policy-makers, rather than "it depends", should be "know your country and its circumstances". It is also necessary to recognize that there are differences in values and ideological lenses. Economic analysis must consider more differentiated impacts on the poor and vulnerable, including gender issues, rather than using only the aggregate welfare measures evaluated by the Pareto principle. On the other hand, if some people continue to oppose trade simply as a proxy for the expansion of an economic system that they dislike, the policy differences will never be bridged, and the fracture between those who think that trade causes hunger and those who argue that free trade reduces poverty will continue.

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