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Water for Food Security and Well-Being in Latin America and the Caribbean

Social and Environmental Implications
for a Globalized Economy



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Chapter 5

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GLOBALIZATION AND TRADE

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Highlights

- The world's economy and agriculture have become ever more intertwined, reinforcing interdependencies, and multiplying network connections. The Latin America and Caribbean (LAC) region has experienced an accelerated growth of imports, exports and inward foreign investment.
- The expansion of the middle class in LAC and Asia and the associated changes in eating habits are adding pressure on agricultural commodities markets, with LAC itself becoming a leading exporter of calories and vegetal proteins required to sustain the expanding livestock sector in the world.
- LAC is still relatively isolated from the rest of the world, in terms of personal air traffic and major port activity, yet well connected through raw materials markets.
- Significant production increases can be obtained in many LAC regions with both rain-fed agricultural practices and farming systems under irrigation.
- LAC's main trading partners are now in Asia, especially China and India, but Central America and the Caribbean still export primarily to North America.
- LAC's increasing exports and imports may have rendered certain social advances in terms of poverty reduction in Argentina, Brazil, Chile, Mexico and Peru. And yet, 174 million people in LAC are considered poor, and 73 million of these are extremely poor (FAO, 2013b). However, causality between trade and poverty cannot be clearly established.
- International trade can make an important contribution to global decoupling (economic growth independent of resource use and impacts) when guided by appropriate environmental and trade policies. These have hitherto been managed separately at country and global levels.

5.1 Introduction

By all accounts, the world has never been more globalized since World War II. Improvements in transportation, logistics, telecommunications and global production systems attest to increasing worldwide economic integration. Furthermore, world food systems have never been as integrated and developed as they are at present (Prakash, 2011) with production specialization, technological advances and the wide dissemination of knowledge. However, doubts exist as to whether agriculture has the potential to feed the

world when the population goes beyond 9 billion unless significant improvements are made in production efficiency and food habits change. In 2012, the FAO estimated that 852 million people were undernourished, which is equivalent to 14.9% of the world's population (FAO, 2013b). To this end, the National Intelligence Council of the US has identified the nexus of food, water and energy as one of its four 'megatrends', which are likely to transcend all future scenarios, demonstrating that a growing global population will place more demand on these inextricably linked resources (NIC, 2012).

Globalization is an ambiguous concept without a widely accepted scientific definition. It involves trade relationships and the movement of capital, ideas and even people. It also encompasses the sharing and expansion of risks (such as epidemics or terrorist attacks) and global environmental threats. Agricultural trade has been accelerated by the rapid decline in the costs of cross-border trade of farm produce and other products, driven also by reduction in transportation costs, the information and communication technology (ICT) revolution and major reductions in governmental distortions. As a result, it has altered global agricultural production, consumption and hence trade patterns (Anderson, 2010), not least in the Latin America and Caribbean (LAC) region.

This chapter will review some facts and data that describe what globalization is and what shape it may take in the future. We focus primarily on the LAC region but also provide a global perspective and, in coordination with other chapters of this book (Chapters 4 and 7), we will focus on trade looking in more detail at agricultural commodities. We begin by providing the context of international trade and identify the resulting major trends. In the second section we present the most significant trade data reported at a regional level, again, specifically concentrating on the agricultural context. The third section discusses the main drivers behind the observed trade data and trends in the LAC. The chapter closes with an overview of issues more closely related to social and environmental sustainability.

5.2 Global context and major trends

Recent popular press media has disseminated the trajectory of the world's economic centre of gravity.¹ Two significant points can be identified in the last two millennia. Firstly, the world's economic centre of gravity in 2012 is in almost the same longitude than it was in the year AD 1. Secondly, during almost 2000 years it moved westwards to where, in 1950, it reached the North of Iceland and since then it has moved extremely rapidly to a position in Russia and is projected to continue to a point north of Kazakhstan in 2025. This shift attests to the growth of East Asia and the Pacific area.

Table 5.1 shows the changing percentage of the world's economy and population among the world's regions. LAC's economic importance grew from 5.3% in 1990 to

¹ Published in *The Economist* (The world's shifting centre of gravity 28 June 2012, 14:34 by The Economist online). Calculated weighting national GDP by each nation's geographic centre of gravity; a line drawn from the centre of the earth through the economic centre of gravity locates it on the earth's surface. (see McKinsey Global Institute, 2013)

8.3% in 2011, whereas its share of the population remained stable at 8.5%. The most significant changes are the increasing share of the world's GDP in South and East Asia, the population decline in North America and the slight decline of Europe and Central Asia.

Table 5.1 Percentage of GDP and population of each region with respect to the world

		1990	2000	2011
SOUTH EAST ASIA	% of GDP/world's GDP	23.2%	26.9%	30.1%
	% of Pop/world's Pop	56.0%	56.3%	55.5%
EUROPE & CENTRAL ASIA	% of GDP/world's GDP	39.0%	29.7%	31.6%
	% of Pop/world's Pop	15.9%	14.1%	12.8%
LATIN AMERICA & CARIBBEAN	% of GDP/world's GDP	5.4%	6.6%	8.3%
	% of Pop/world's Pop	8.3%	8.5%	8.5%
NORTH AMERICA	% of GDP/world's GDP	28.8%	32.9%	23.9%
	% of Pop/world's Pop	5.2%	5.1%	5.0%

Source: World Bank (2012)

A major driving force of the world's economy is the level and instability of commodity markets. Figure 5.1 plots the commodities price indices, showing composite indices of energy, food and metals and minerals, between 1960 and 2011. All three exhibit a long and stable trend between 1978 and 2007, and a rapid escalation after this year. This has been accompanied by increased volatility for all specific products and markets, and the extreme financialization² of the commodity markets around the world.

The increasing importance of trade in the world's economy is also a major driver of globalization. Figure 5.2 shows the percentage of trade as a share of the world's GDP. Since 1960, trade value has almost tripled in relative terms in the world and the expansion of trade has been greater in East Asia and the Pacific than in LAC, whose relative trade volume grew less than the world's average.

The growth of trade goes hand in hand with the expansion of transportation. The world's container traffic grew between 2000 and 2010 by a factor of 2.3, and LAC's participation in this traffic augmented from 6.8% in 2000 to 7.4% in 2010. Despite this, the LAC region still lags behind other regions in the world as shown in Table 5.2, which reports the LAC's main port's activity relative to the fifty busiest ports in the world in 2011.

² 'Financialisation refers to the increasing amount of liquid funds which have become engaged in agricultural commodity markets over the past years. Often, the role of hedge and index funds is emphasised in particular for price formation on futures markets. Speculation is an even less clearly defined term. Major notions in the literature are speculative bubbles, when asset prices deviate systematically from their fundamental values, speculative hoarding, when stocks are built in the expectation of ever higher prices, and market manipulation, where price movements on less liquid markets are deliberately triggered by some market participants. The economic concept of speculation is yet defined differently; speculators in this meaning are market participants who are willing to take over price risks from hedgers at a premium (and thus fulfil an economically desirable function).' Brummer et al. 2013, p. 3.

Note that Colon and Balboa ports are related to the operation of the Panama Canal and are thus not so involved in operations of loadings and shipments.

The fact that LAC is still weakly connected within world trade circuits is also shown by the statistics of air travel and air passengers. In 2011, only São Paulo-Guarulhos International Airport, ranking 45th, appeared amongst the fifty busiest world airports. In 2010 no LAC airport appears in the list and in 2009 Mexico International Airport is the only LAC present on the list, in 50th position (Airports Council International, 2012).

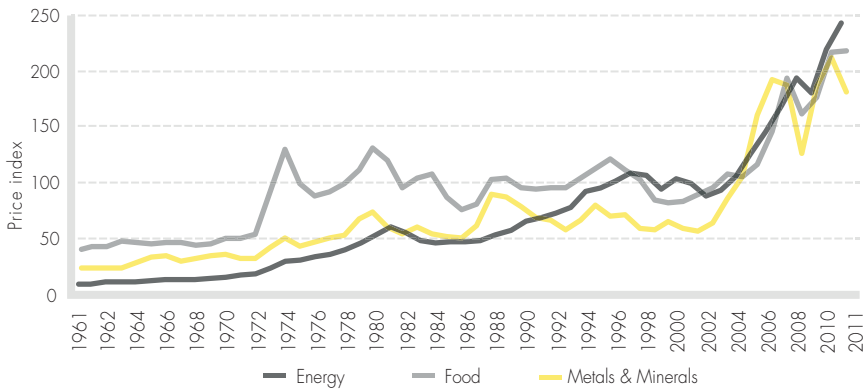


Figure 5.1 Commodities Price Indices (1960–2011) (Average =100). Source: World Bank (2012)

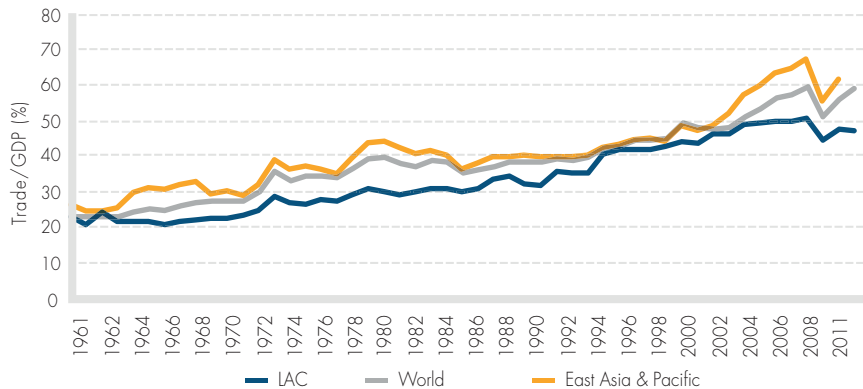


Figure 5.2 Trade as a share of gross domestic product (GDP) (1961–2011). Source: World Bank (2012)

Table 5.2 LAC’s busiest ports in thousands of TEUs (twenty-foot equivalent units) in 2011

Busiest LACS ports	Rank In world	1000 TEUs	Activity with respect to busiest port (Shanghai) In %
Colon (Panama)	37	3,370	10.6%
Balboa (Panama)	39	3,230	10.2%
Santos (Brazil)	43	2,990	9.4%

Source: Journal of Commerce: The JoC top 50 world container ports (2012)

These data seem to suggest that LAC’s growth expansion is primarily based on commodities and industrial products as opposed to the service sector, which could also account for the fact that LAC is relatively less densely populated and the few large populous areas are widely spread across the continent compared to Asia and Europe.

Figure 5.3 shows data for inward foreign direct investment in the region between 1970 and 2011. Foreign direct investment has seen unprecedented growth in the last ten years, but has been very volatile.

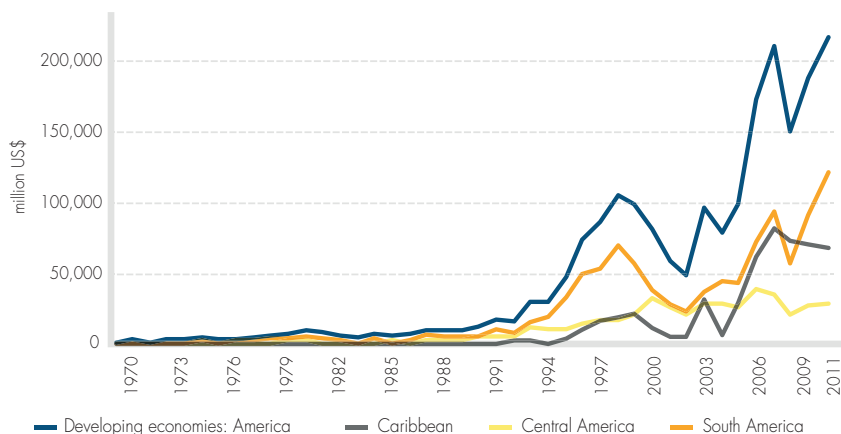


Figure 5.3 Inward foreign direct investment flows, annual, 1970–2011 in million US\$. Source: UNCTAD (2012)

Figure 5.4 shows that LAC has not been a principal beneficiary of official development assistance in agriculture and infrastructure whereas since 1995 East Asia and Pacific, South Asia and sub-Saharan Africa have received significant aid. However, the region’s increasing political stability and economic potential have certainly given an extraordinary push to private investment in infrastructure, making LAC the world’s primary recipient in 2002 and 2009 (Figure 5.5).

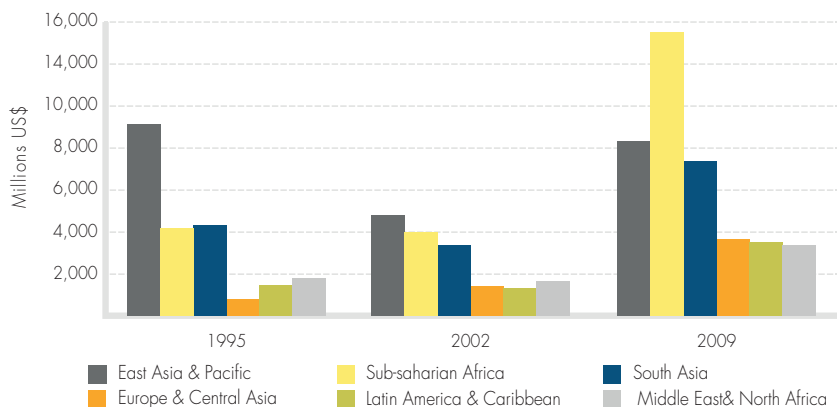


Figure 5.4 Official Development Assistance in agriculture & infrastructure by area, in 1995, 2002 and 2009. Source: OECD (2012)

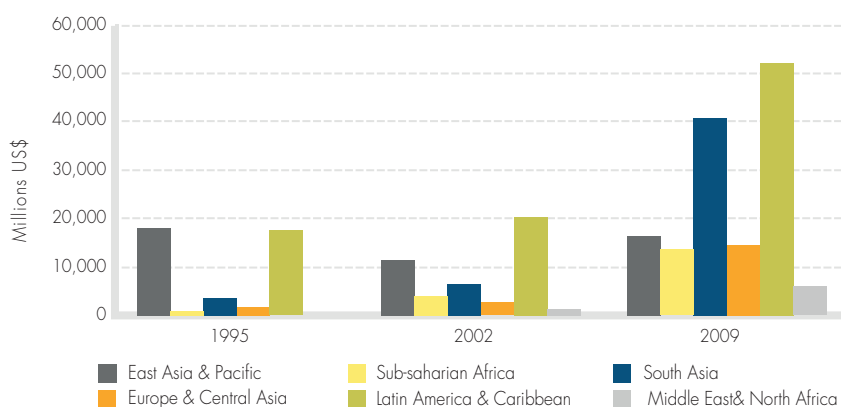


Figure 5.5 Private participation in infrastructure by area in 1995, 2002 and 2009. *Source: PPIAF (2013), World Bank (2012)*

5.3 Trends of trade in the LAC region

LAC has historically established a trade model characterized by intensive goods exports, particularly associated with the region’s natural resources (land, minerals, oil and water) and the import of capital-intensive goods and knowledge. While it plays a modest role in world market (10–12%) in recent years some growth has been reported although this is largely due to the increased value of commodities (UNEP, 2010) (Table 5.3).

Table 5.3 Participation of LAC in world agricultural trade in dollar terms

	1980	1985	1990	1995	2000	2005	2010
Agricultural commodities	9.50%	13.58%	11.43%	13.90%	16.29%	16.51%	18.10%
Food commodities	8.40%	9.44%	7.04%	7.98%	9.22%	10.37%	11.55%

Source: WTO (2012)

LAC’s trade model has been strengthened by the trend towards an increased integration of the countries with the rest of the world. Indeed, the international integration of the region, especially in South America, is determined by a pattern where natural resources are seen to account for over half of total exports. These are minerals, hydrocarbons (notably natural gas and oil), agricultural, livestock, forestry and fishery products with little or no processing (UNEP, 2010).

Approximately 54% of the region’s exports are raw materials. However, there are important sub-regional differences such as Mexico which shows a pattern of exports strongly linked to manufacturing (about 74%). Thus, excluding Mexico, of the remaining

Latin American exports, almost 73% are commodities based on natural resources. In some countries, exports of primary goods exceed 95% of total exports (UNEP, 2010).

A dependence on a few products is also observed. In effect, the ten principal export products of most countries are mining and agricultural goods. At the regional level, the main products exported are crude oil and its derivatives (UNEP, 2010).

In the last twenty years (1992–2012), international trade has been conditioned by economic opening based on minimizing the presence of the government through the liberalization of trade forces (Washington Consensus, Williamson, 1990). These policies are considered key tools for development and opening national trade to international competition and elimination of regulations associated with international trade. This has resulted in trade agreements between the countries of the region and has allowed for an open regional market under competitive conditions that promotes trade growth. This situation is clearly shown in the graphs in Figure 5.6.

The composition of exports and imports amongst agricultural and mining products and other merchandises has been quite stable between 1992 and 2011. Agricultural and mining products represented a maximum share of exports of 38% in 1992 and a minimum of 31% in 2001. In terms of imports, 10% were agricultural and mining products in 2011 and 5.8% in 1991 (Inter-America Development Bank, 2012).

Figure 5.7 provides the breakup of agricultural and mining goods exports in 2000, 2005 and 2011 to different world regions. In 2000, North America was the main importer of goods from the three regions of LAC (South America, Central America and the Caribbean). In 2011, Central American and Caribbean exports were still concentrated on North America, but exports from South America were destined primarily to East Asia and the Pacific, followed by the EU and LAC, with North America being the fourth largest importing region.

China and other countries in Southeast Asia are the main importers of Latin American commodities such as copper or soybean. The increasing demand for inputs from emerging economies like India and China has had a noticeable impact on the region's exports. Consumption in Asia, and particularly in China, explains the continued commercial importance of extracting natural resources. In 2007 goods imported from Latin America and the Caribbean were mainly soybean (grain and oil), followed by copper ore (gross and concentrate), copper alloys, fish meal, leather and paper pulp (UNEP, 2010). South American major exports were to East Asia and the Pacific in 2011, whereas Caribbean and Central American major trading partners were in North America. Internal regional trade in LAC's reduced in percentage terms from 2000 to 2011.

The agro-industry has also witnessed strong growth in the region due to increased global demand and international prices for both agro-foods and raw materials to produce biofuels. Agricultural production is being reshaped by an expansion of oilseeds, especially soybean, while there is stagnation in some grains and a reduction in other more traditional products such as coffee and cocoa. There is also an increase in sales of meat, i.e. beef, pork, and poultry, that creates additional demand for grain for animal feed (UNEP, 2010).

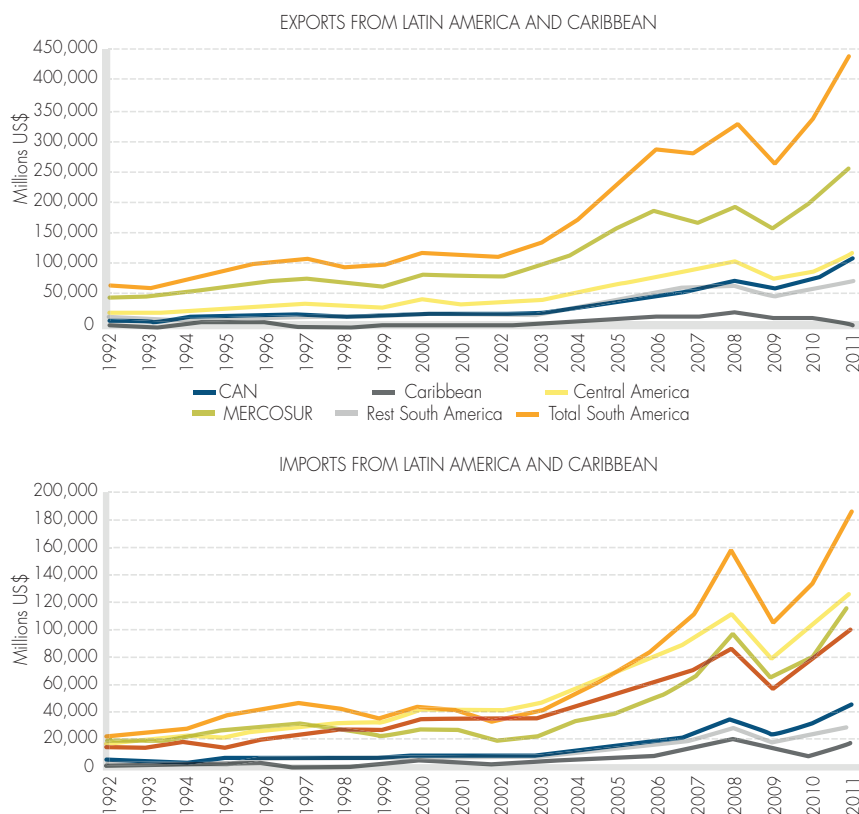


Figure 5.6 Value of imports and exports of agricultural and mining commodities of LAC between 1992 and 2011 expressed in nominal US dollars. Source: Inter-America Development Bank (2012) Note: CAN (Andean Community of Nations): Bolivia, Colombia, Ecuador and Peru. Caribbean: Antigua and Barbuda, Bahamas, Barbados, Dominica, Dominican Republic, Grenada, Jamaica, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago. Central America: Belize, Costa Rica, Guatemala, Honduras, Nicaragua, Panama, El Salvador. MERCOSUR (Southern Common Market): Argentina, Brazil, Paraguay, Uruguay, Venezuela. Rest of South America: Chile, Guyana, Suriname. Total South American (CAN, MERCOSUR, Rest South America): Argentina, Bolivia, Brazil, Colombia, Chile, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela.

At least ten countries – Argentina, Bolivia, Brazil, Colombia, Ecuador, Guatemala, Honduras, Mexico, Paraguay and Peru – produce biofuels, and four countries export biofuels produced from their own crops with Brazil being the largest exporter. There are smaller sales from Bolivia and Guatemala and, recently, from Argentina. However, programmes are underway in almost all countries and so the list of producers is constantly increasing (*ibid.*).

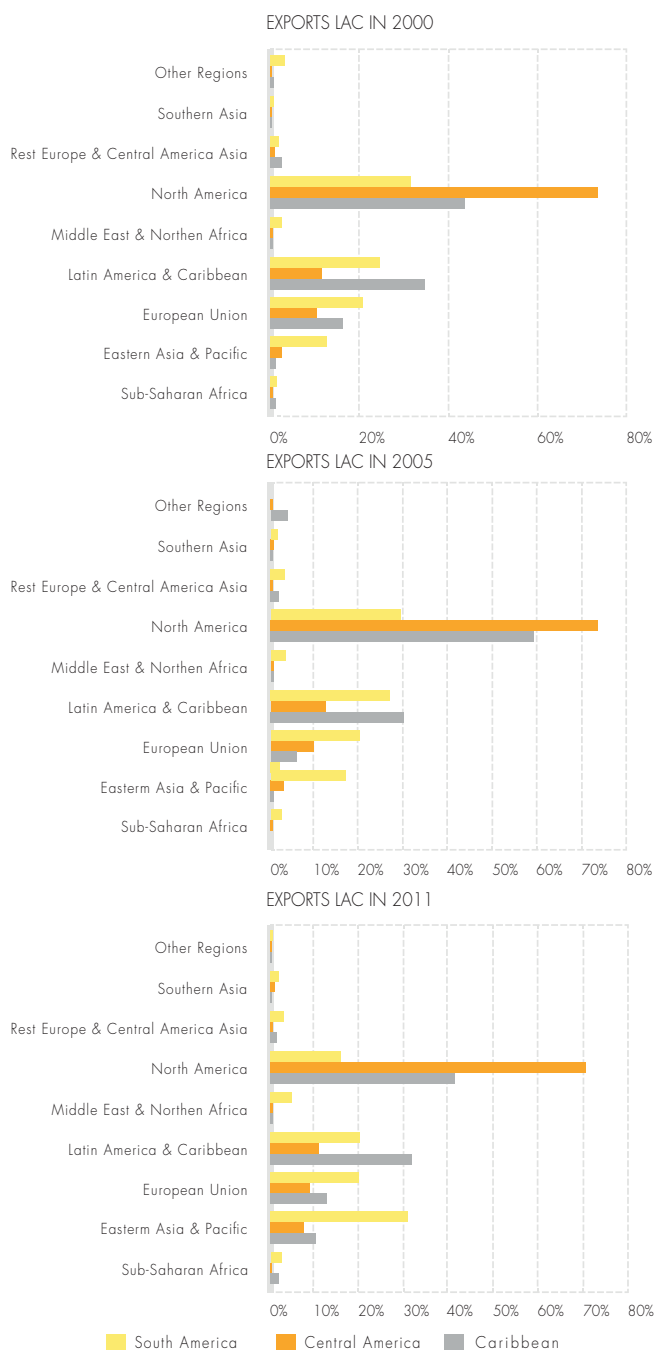


Figure 5.7 Breakup of exports from Latin America and the Caribbean to different world regions in 2000, 2005 and 2011 (%). Source: Inter-America Development Bank (2012)

5.4 Main drivers of LAC's increasing globalization and trade

5.4.1 Abundant water and land resources

LAC has the greatest agricultural land and water availability per capita in the world. With 15% of the world's land, it receives 29% of precipitation and has 33% of available renewable resources (Mejía, 2010). In 2007, LAC had about 10.8% of the world's cultivated land, but its growth has lagged behind other regions and the world in general since 1961. Annual growth of LAC's cultivated land between 1961 and 1997 was 1.62% against 4.49% globally, and between 1997 and 2007 annual growth was 0.71% in LAC and 3.04% in the world (Deininger, 2011). This suggests that the expansion of the agricultural frontier has grown at a slower pace in LAC than in other continents. As Chapter 3 explains, the proportion of primary sector activity devoted to agricultural production in LAC remains below the global average despite the net positive deforestation trend.

However, agricultural export growth in LAC has been the result of the expansion of land rather than yields (Deininger, 2011), since most exports come from areas in which yields are at their maximum with little or no yield gaps (Deininger, 2011; Foley et al., 2011). Chapter 10 shows that there are countries in LAC where yield gaps are still significant, and output from cultivated land can still be improved.

5.4.2 Consequences of liberalization and dismantling of tariffs, other trade barriers and the role of Free Trade Agreements

LAC exports represent 6% of world trade (18% of agricultural products), but are affected by 30% of measures of border protection (Giordano, 2012). However, tariffs have been reduced in the region, and freight costs have become more relevant. Tariffs range from 7% in Nicaragua and almost 0% in the Caribbean states, whereas freight costs range from 18% in Ecuador to 7% in Antigua and Barbuda, and between 10% and 15% in most South American countries. Upon the collapse of the third WTO Ministerial Conference of Seattle in 1999 and the standstill of the Doha Round, most LAC countries have adopted free trade agreements (bilateral/plurilateral) in order to pursue export growth and diversification (Dingemans and Ross, 2012).

According to the Information System on Foreign Trade of the Organization of American States (OAS, 2012), there are 111 trade agreements active that involve one or more of the eleven countries with the largest trade volume and population in the region³ (sixty-three Free-Trade Agreements (FTA) and forty-eight Preferential Trade Agreements (PTA)) with 241 worldwide trade partners (countries).

3 Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay, Venezuela.

FTAs are presented as a key policy and economic tool to achieve economic growth and integration. However, the long-term results of these agreements are not wholly positive. Indeed, according to an analysis of the intensive and extensive economics margins,⁴ the FTAs have focused on the formalization of existing trade links within natural existing markets, without seeing any real incentive in order to achieve the diversification of production, markets and trade for the region. This situation is clearly shown in Figures 5.8 to 5.10. For instance, Figure 5.10 shows that the large majority of exports have been in the form of increased exports to an already existing market (Intensive Trade Margin). As Dingemans and Ross (2012) conclude, FTAs have not accomplished significant diversification in LAC's exports, despite the significant growth exports shown in Figure 5.8.

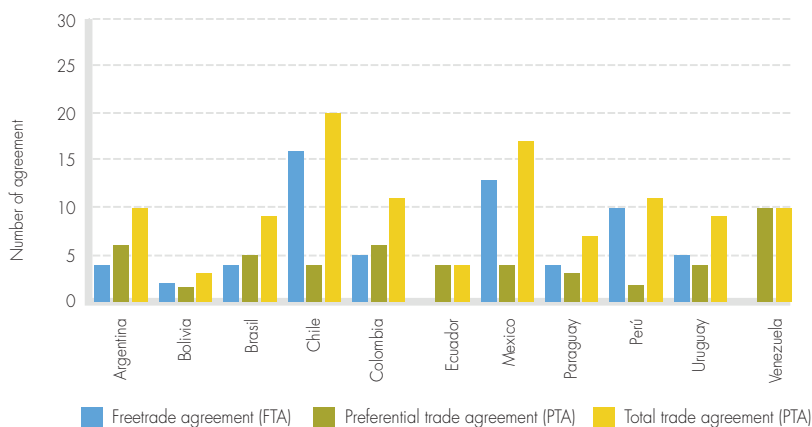


Figure 5.8 Trade agreements in the LA region. Source: Dingemans and Ross (2012)

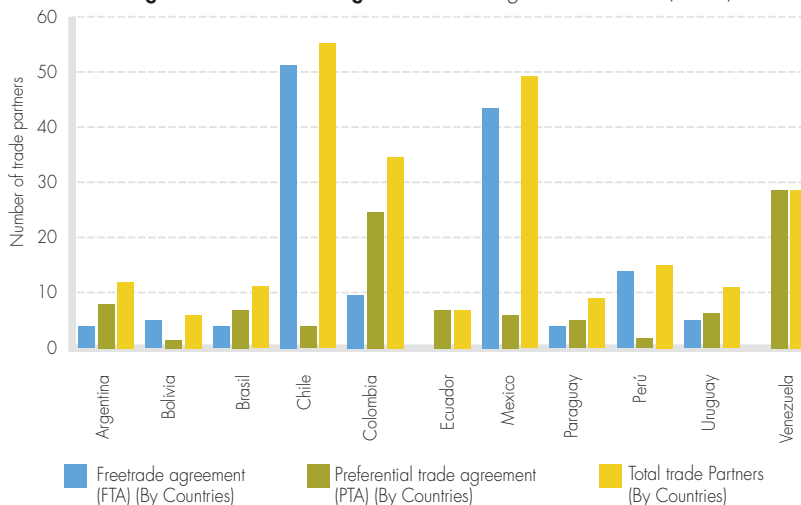


Figure 5.9 Trade partners in the LA region. Source: Dingemans and Ross (2012)

4 Intensive margin is the increase of trade with the same products and with the same partners, and extensive margin is the increase of trade of new products with new partners (Brenton et al., 2009).

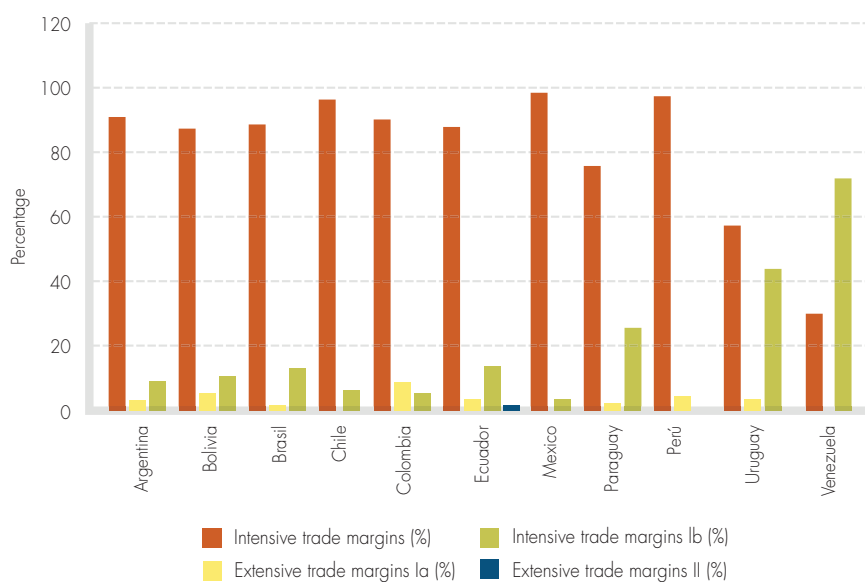


Figure 5.10 Changes in extensive and intensive trade margins in the LA region. *Source: Dingemans and Ross (2012).* Note: Intensive trade margin: expansion of export of a product to an existing market; Intensive Trade Margin Ib, increase of exports to a new market; Intensive Trade Margin Ia, export of a new product to an existing market; Extensive Trade Margin II, increased export of a new product to a new market.

5.4.3 Increasing competitiveness

For many products, LAC exports have been fostered by increasing competitiveness against many other trading partners. In terms of commodity prices and competitiveness, for instance, soybean in Brazil is more efficient than in the US. Annual yield growth in LAC has surpassed others: 2.9% in 1987–2007 and 3.6% 1997–2007, versus 2.1% and 2.2% relative to the world (Bruinsma, 2009). Chapter 10 provides a more detailed overview of trends of agricultural yields for the main products and most of LAC’s countries.

5.4.4 Meat demand in emerging countries

More affluent populations have tended to diversify diets towards animal food items which require several multiples of water per calorie of dietary energy. The consumption of calories has also increased significantly in the last four decades in many developing countries. For example, meat demand (including demand for beef, meat, eggs and dairy products) or calorie consumption has grown in the Chinese diet from less than 100kcal/capita/day to more than 600kcal/capita/day between 1961 and early 2003. All of this increase in calorie consumption requires large amounts of grain and fodder (as extensive pastures are relevant for changes in land use) to feed livestock. In addition to calories, meeting growing meat demand requires supplementary production of protein crops for feed. The

main growth of protein crop production has been obtained from soybean cultivation, and a significant part of it from soybean produced in Argentina and Brazil.

China alone may account for 43% of additional meat demand worldwide in 2020 compared to 1997, placing higher demand on world water resources and upward pressure on commodity prices in the longer term. But meat demand has also grown in the EU and many other countries. The population of EU27 grew by 20% between 1961 and 2007, whereas consumption of animal protein increased by 80% (Westhoek et al., 2011). It is worth noting that these are the main trading partners of LAC and hence any proposed change in trade patterns should bear this in mind.

Since 2000 there has been a massive change in the composition of the middle class in many world regions. There are various sources to define middle class. With the International Futures model middle-class membership is defined as per capita household expenditures of US\$ 10–50 per day at PPP (power purchasing parity). Goldman Sachs used a comparable GDP per capita of US\$6,000–30,000 per year, which yields a similar estimate of 1.2 billion middle-class people in the world in 2010 (NIC, 2012). While in this year, the US, EU and Japan made up 70% of the world's middle class, in 2030 this percentage will shrink to 30%. Except for India, which will make up 25% of the middle class in 2030, in the other growing regions, increased meat consumption is associated with increased affluence. LAC is one of the world's main producers of vegetable protein required to feed the animals, particularly in Argentina and Brazil.

5.4.5 Biofuel use in the EU and US

The expansion of biofuel production and consumption in the EU and US has resulted in significant and sustained pressure on agricultural markets worldwide. World biofuel production increased by a factor of five between 2001 and 2011, reaching 100hm³ /year. About one-third of corn production in the US is used to produce bioethanol. The literature disagrees on the impact of biofuels during the surge of prices between 2007 and 2008. In quantifying the impact of biofuel production on price variability, Mueller et al. (2012) quote sources varying between 3% and 30% (Von Braun, 2008), reaching up to 70% (Mitchell, 2008, who included the indirect consequences on stocks, large use shifts, and speculative activity).

Other evaluations found impacts of 60–70% price increase in corn and 40% in soybeans (Headey and Fan, 2008). About 2% of the world production of grains is used for ethanol production, representing about 14 million hectares in the US, EU, Brazil and China. Rosegrant et al., (2008) found that biofuels were responsible of 30% of the food price increases. Perhaps the most significant effect of the use of biofuels comes from the impact of prices rather than needs of agricultural land, which is expected to grow from 30 to 60 million hectares (Ajanovic, 2011). Pressures to keep on producing more biofuels will grow in the future, to such an extent that oil prices will also grow, in turn further pushing up commodity prices.

However, this prognosis may change if the shale gas expansion in the US were to generate an excess capacity of up to 8 billion barrels, making the OPEC (Organization of

the Petroleum Exporting Countries) lose control of oil prices (NIC, 2012). With a breakeven price as low as US\$44–68 per barrel, world energy markets may see profound transformations in the upcoming decades, including a reduction of first-generation biofuels.

5.5 Issues of concern

In view of the previously presented data and facts, we have identified five issues of concern for LAC, concerning; (1) implications of trade on water use and access; (2) unregulated access to agricultural land from foreign countries (land-grab); (3) the role of trade on the world's food system; (4) the potential impact of trade on the poor in LAC; and (5) whether trade may hamper the equitable access to land and water resources.

5.5.1 Implications of trade on water use and access

World trade patterns are extremely dynamic and unstable. Specialization, technology adoption and market prices volatility and growth have given rise to fundamental changes in agricultural production and trade worldwide and in LAC. Building on the pioneering analyses of virtual water trade (VWT) (Hoekstra and Chapagain, 2008), a recent literature strand has been analysing trend connections, with a view to observe patterns and draw relevant conclusions for the world's food system today and in the coming decades. Trade connections have been evaluated in physical units (tonnes, monetary units and virtual water), but recently the focus has been placed on the analysis of the networks' formation, stability and configuration. The role of LAC in the world's trade has been presented in Part 3, but Chapter 7 reviews the most recent literature, which offers conflicting views of the role of virtual water trade.

5.5.2 Is land-grab a source of concern for LAC?

Based on the assessment of Rulli et al. (2013), land grabbing is a global phenomenon, which involves at least sixty-two grabbed countries and forty-one grabbers. Africa and Asia account for 47% and 33% of the global grabbed area, respectively. About 90% of the grabbed area is located in twenty-four countries, which includes Argentina, Australia, Brazil and Uruguay, among non-African and non-Asian countries. The grabbed area is often a non-negligible fraction of the country area (up to 19.6% in Uruguay, 17.2% in the Philippines, or 6.9% in Sierra Leone). The countries that are most active in land grabbing are located in the Middle East, Southeast Asia, Europe, and North America.

A key feature of the Latin American case is its intra-regional land grabbing driven by (trans) Latina companies (TLCs). These are companies that involve mainly national capital, as in the case of many Chilean companies, or alliance with companies from different countries in the region, or, finally, alliances of Latino firms with capital from outside the region (Borras et al., 2011). Another particular feature of Latin America is that land grabbing occurs in settings marked by more or less liberal-democratic political conditions, such as those of Brazil, Uruguay and Argentina; not necessarily in fragile states marked by weak governance as is generally believed (*ibid.*).

However, land-grabbing is a concept that requires finer analyses and conceptualization. The cases of grabbed Latin American countries seem to be closer to foreign direct investments than to actually grabbed land (see Zetland and Möller-Gulland, 2013, for a systematic analysis of land taken as grab or as foreign direct investment). Argentina, Brazil, and other countries are passing legislation in place to control foreign investments to control land grab. Much of the ongoing problem is also related with the land tenure.

5.5.3 Does increased world food demand pose risks for sustainable land and water use in Latin America?

In comparison with other regions, LAC is the region with the greatest land and water resources per capita. As mentioned earlier, the increase of agricultural production has been primarily in terms of land expansion, and less in terms of increased yields. The region's low penetration of irrigation and relatively low utilization rates of fertilizers suggest that agricultural sustainable intensification must be developed in the region, before it can close the gap with North America, Western Europe and South and Southeast Asia (Mueller et al., 2012).

Foley et al. (2011) claim that there are significant opportunities to increase yields across many parts of Africa, Latin America and Eastern Europe, where nutrient and water limitations seem to be strongest. Better deployment of existing crop varieties with improved management should be able to close many yield gaps, while continued improvements in crop genetics will probably increase potential yields into the future. Pfister et al. (2011) show that in LAC the ratio of water and land stress (Relevant for Environmental Deficiency) are clearly less than 1 (being land stress greater than water) in most production regions, except in Chile, Mexico, Peru and northeast Brazil. And yet, the main exporter areas in Argentina, Brazil, Chile and Mexico have yields close to their potential ceiling. This means that agricultural expansion will have to occur in Central America and the Andean region, where intensification still has a lot of potential.

Most serious concerns about continuing agricultural expansion in LAC are related to the reduction of regional and global ecosystem services, chief among these are CO₂ emissions, regulation of the water cycle and biodiversity losses. This is elaborated to a much greater extent in Chapter 3.

5.5.4 Do trade and globalization benefit the poor in LAC?

Trade-poverty linkages are complex and diverse, but according to economic theory and empirical findings, they can be divided into a few important pathways: (a) trade-induced growth; (b) effects of trade on prices, income and consumption patterns; (c) effects of trade on wages and employment.

Trade generally stimulates growth since more open markets lead to access to new technologies and appropriate intermediate and capital goods, which in turn cause increases in production, scale economies and competitiveness. The economy specializes in industries in which it has comparative advantages, meaning that resources are allocated

most efficiently (Edwards, 1993; Duncan and Quang, 2002). This is especially important in the agricultural sector, as in LAC a large portion of the poor live in rural areas. If more open agricultural trade generates growth in this sector, it is likely that the rural poor will benefit (Bakhshoodeh and Zibaei, 2007; Cain et al., 2010; Cervantes-Godoy and Dewbre, 2010). Some empirical studies underpin the trade-growth nexus in LAC; for example, Castilho et al., (2012) studied the impact of globalization on household income inequality and poverty using detailed microdata across Brazilian states from 1987 to 2005. Results suggest that trade liberalization contributes to growth in poverty and inequality in urban areas and may be linked to reductions in inequality (possibly poverty) in rural areas. Edwards (1998) analyses comparative data for ninety-three countries, among them ten LAC, and finds that trade openness favours growth and that capital accumulation plays an important role in reducing poverty. Dollar (2005), however, counters that those countries being increasingly integrated into world markets are those where poverty has increased most since the 1980s.

We investigated this relationship in five LAC countries between the mid 1990s of the past century and 2010. Figure 5.11 shows that there is a correlation between the degree of trade openness and GDP growth in the agricultural sector. However, results seem to be very side-specific, depending on each country's development level and on whether it has a net importing or exporting position in agriculture. It seems that in Mexico the correlation between economic growth and trade openness is weak, while Chile even shows a negative correlation. Mexico is a large net importer with comparative advantages in other sectors due to its scarce natural resource endowments. Therefore, open trade in agriculture might not enforce growth in this sector. Chile's is rather shifting away from agriculture, because it is already a developed country in comparison with the other four. Especially in Peru, agricultural trade openness seems to favour GDP growth in agriculture.

Secondly, trade affects agricultural prices and relative prices in an economy, and in turn the real income of poor households, since agriculture represents their main livelihood source and their main consumption expenditure. To what degree price changes transmit to poor household's income depends on market access and their ability to benefit from the trade environment. Hassine et al. (2010) and Taylor et al. (2010) find that lower tariffs reduce nominal incomes for nearly all rural household groups in El Salvador, Guatemala, Honduras and Nicaragua, but they also lower consumption costs substantially leading to a positive net effect on rural households' welfare. Field and Field (2010) and Finot et al. (2011) came to the conclusion that tariff reductions in Chile and Peru between 1994 and 2006 increased total household incomes.

We investigate the relationship between trade openness and income of the 10% poorest population group in five LAC countries. Figure 5.12 shows that the direct effect of liberalizing agricultural markets on the development of the income of the poor is rather small, with the strongest correlation within a 95% confidence interval in Chile and Peru. Both countries have been increasingly exporting high value products and importing lower value staple food. The results show that the poor have probably benefited from these market-driven changes in the sector of agriculture.

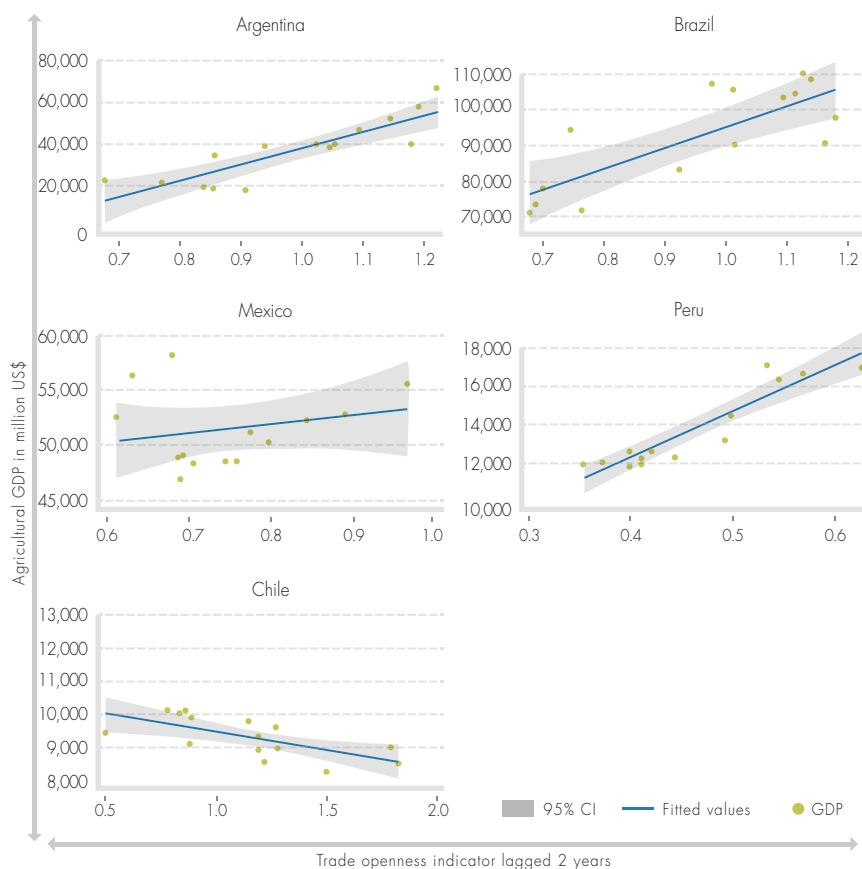


Figure 5.11 Trade and agricultural growth nexus in five LAC countries (1995–2010). Source: own elaboration, data from WBDI (2012) and FAO (2013a)

Thirdly, the impact of trade on wages and employment is grounded in the Heckscher-Ohlin model. With labour as an input factor, developing countries will specialize in the production of labour-intensive products which boosts demand for labour and in turn leads to higher wages in these sectors and thus poverty reduction. One of the reasons why agricultural trade liberalization is so important for poverty alleviation is that low-skilled workers in rural areas will benefit through production responses. For example Bussolo et al. (2011) found that the losses and gains in agricultural wages exhibit strong regional patterns: real wages of unskilled farmers rose in Latin America, the Middle East, and East Asia and Pacific, while declining in other developing regions.

Due to missing data, a direct analysis between agricultural trade and wages would not deliver reliable results. Thus we directly view a possible connection between agricultural trade liberalization and poverty rates in five LAC countries (Peru, Mexico, Chile, Argentina and Brazil). Figure 5.13 shows a clear trend between more liberalized trade and declining poverty rates.

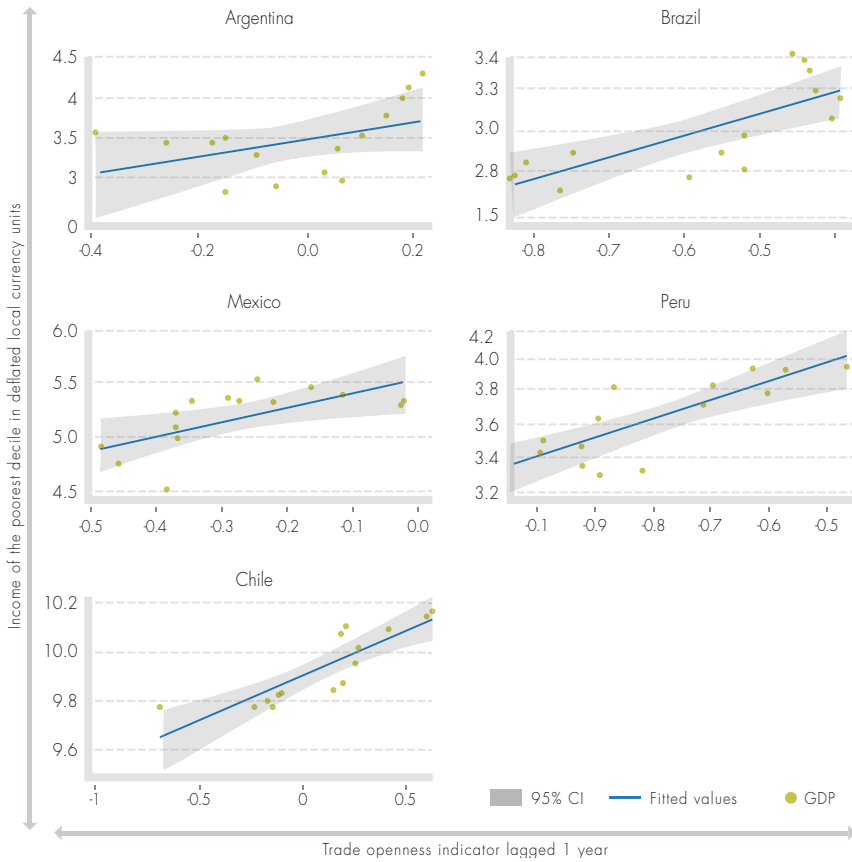


Figure 5.12 Trade and income of the poorest decile in five LAC countries (1996–2010). Source: own elaboration, data from WBDI (2012) and SEDLAC (2012)

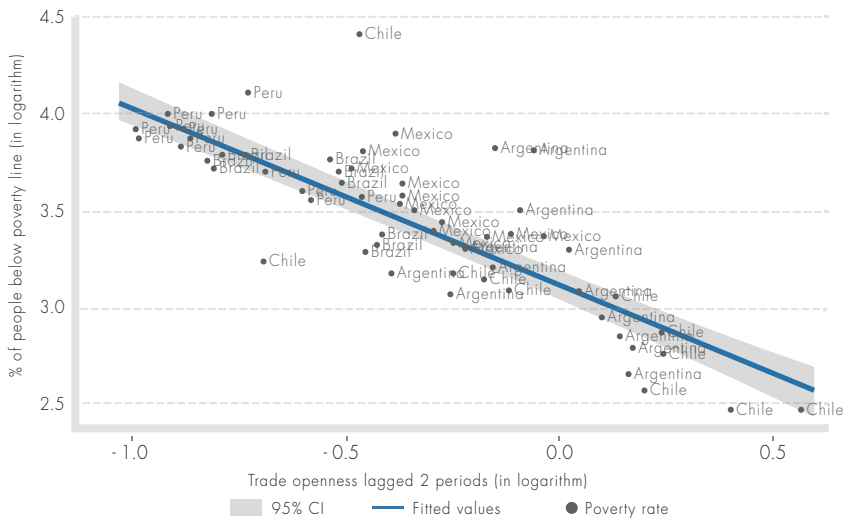


Figure 5.13 Trade and poverty rates in five LAC countries (1996–2010). Source: own elaboration, data from WBDI (2012) and SEDLAC (2012).

5.5.5 Do increasing trade and globalization impair or hamper the equitable access to resources (land and water)?

There are conflicting views about the role of trade regulations over water use. Gawel and Bernsen (2011) advise not to look at water footprint differences to support international trade regulations. The need for water governance at the global scale results from growing concerns over, firstly, water security in many parts of the world, and secondly, whether the existing commodity market system can deliver security as well as the necessary stewardship of water resources (Allan, 2011; Sojamo et al., 2012). Even if international trade presently involves products for which a significant part of the production is water-intensive, and virtual water flows are mainly subordinated to world trade rules, the policy linkages between international trade and impacts on freshwater have rarely been analysed. Chico et al. (2014) discuss options to improve global water governance through trade.

It is well known that water is seldom the dominant factor determining trade in water-intensive commodities. Many factors influence virtual water trade, such as direct or indirect subsidies, availability of land, labour, technology, level of socio-economic development, national food policies and international trade agreements (Aldaya et al., 2010; Rogers and Ramirez-Vallejo, 2011). Currently, virtual water flows are mainly subordinated to world trade rules (Hoekstra et al., 2011). The European Single Market and WTO frameworks are potentially suited to address the link between international trade and sustainable water use. Hoekstra et al. (2011) identifies several mechanisms to better ensure that trade and sustainable water use go hand in hand, such as product transparency or an international water pricing protocol. Trade will never contribute to optimal production and trade outcomes, from a water perspective, as long as water remains so underpriced (*ibid.*). There is a need to arrive at a global agreement on water pricing structures that cover the full cost of water use, including investment costs, operational and maintenance costs, a water scarcity rent and the cost of negative externalities of water use. Without an international treaty on proper water pricing it is unlikely that a globally efficient pattern of water use will ever be achieved. However, finding a harmonized water pricing mechanism may be so elusive that second-best solutions may be more feasible.

More recently, the WTO has started looking at the trade interventions that can influence water-related policies on either the production side (irrigation subsidies) or the consumption side (water footprint labelling) (Jackson et al., 2014). More work is needed to clarify key concepts and to enhance transparency in order to have a more comprehensive understanding of the ways in which these rules alter water resource outcomes.

Even if it is not yet widely recognized, the private sector has also a vital role to play in ensuring food-water security. Food supply chains operate beneath a complex pact between the state and the market. The agents in these food supply chains – mainly farmers – determine whether food-water is managed sustainably and securely (Allan, 2011; Sojamo et al., 2012).

Water and food security is today much more related to economic capacity and trade, than to physical water scarcity. Knowledge about the virtual water flows entering and leaving a country can cast a completely new light on the actual water scarcity of a country. This shift in perception forces a reconsideration of what are the main problems of food security, away from pure physical scarcity and technological fixes. The main issues that have to be addressed globally in relation to food security are: the hidden monopolies that currently exist in the WTO, the potential threat of political embargoes and the need for domestic social changes to be fulfilled.

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