



Trends and Policy Innovations for Agriculture in
**Light of the 2030 Sustainable
Development Agenda**

Joaquín Arias

Inter-American Institute for Cooperation on Agriculture (IICA), 2017



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Mechanical editing: Christina Feeny
Layout: Karla Cruz Mora
Cover design: Carlos Umaña

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Contents

Foreword	vii
Acronyms	ix
List of Contributors	xi
Acknowledgements	xiii
Introduction	xv
I. Market-Oriented Agricultural Policies	1
Introduction	3
What makes policies more market-oriented?	3
- <i>Fewer price distortions</i>	3
- <i>Stock Accumulation</i>	5
- <i>Policies decoupled from production decisions</i>	6
- <i>Conditional decoupled payments</i>	7
- <i>Demand-driven policies</i>	8
- <i>Relaxing self-sufficiency requirements</i>	9
The structure of agricultural support is changing	9
- <i>Lower agricultural support over time</i>	11
- <i>The evolution of support with respect to economic development</i>	12
Policies move towards integrated approaches to risk management	13
- <i>Subsidized risk management programs</i>	13
- <i>Risk transfer</i>	15
- <i>Yield or Crop Risk Management</i>	16
- <i>Price risk</i>	16
- <i>Revenue Risk Management</i>	17
- <i>Profit margins</i>	17
- <i>Shallow loss</i>	18
- <i>The need for State intervention for catastrophic risk</i>	18
Challenges and opportunities for more market-oriented policies	19
- <i>The challenge for small and medium countries</i>	19
- <i>Challenges for more market-oriented policies</i>	19
- <i>The challenge of being competitive in the world market</i>	21

II. Regional Integration and Market Development 23

Introduction	25
Regional Integration in the Americas	26
- <i>A new Regionalism in Latin America and the Caribbean?</i>	26
- <i>The Caribbean Regional Integration</i>	27
- <i>Regionalism in Central America</i>	30
- <i>The Common Market of the South (MERCOSUR)</i>	31
Market development and access to international markets	32
- <i>Expansion and integration of internal markets in Canada</i>	32
- <i>Chilean export market development</i>	33
- <i>Support for commercialization in Brazil</i>	35
China as an export market for LAC countries	35
- <i>Opportunities for exporting into the Chinese market</i>	36
- <i>Risks involved when exporting to China</i>	37
- <i>Challenges for LAC's entry to the Chinese market</i>	38
China's interest in investing and engaging in development activities in the LAC region	39
- <i>Challenges ahead facing China's investment in Latin America</i>	40
Concluding remarks and implications	41

III. Sustainable management of natural resources in agriculture 43

Introduction	45
The US Conservation Policy	45
- <i>Background</i>	45
- <i>Structure of US Conservation Programs</i>	46
- <i>Compulsory programs</i>	48
- <i>Cross compliance</i>	48
- <i>Voluntary programs</i>	48
- <i>Multi-functionality</i>	49
The Brazilian Environmental Policy	49
- <i>Environmental Rural Registry</i>	49
- <i>The Forestry Law</i>	50
- <i>Research and technology transfer</i>	50
- <i>Agricultural credit</i>	50
The Chilean environmental policy	51
- <i>Markets and governance</i>	51
- <i>Support for irrigation</i>	51
- <i>Support for degraded soils</i>	52
- <i>Forestry for timber</i>	52

EU Common Agricultural Policy	52
China's policy to move away from input subsidies	53
Concluding remarks on moving forward with the sustainable management of natural resources	54
- <i>Facing climate change and weather variability</i>	54
- <i>Profitability, subsidies and environmental sustainability</i>	55
- <i>Regulations versus incentives</i>	55
- <i>Monitoring and evaluation</i>	55
- <i>Big data</i>	55
- <i>Research and technology transfer</i>	56
- <i>Responding to new demand attributes</i>	56
- <i>Public and private partnerships</i>	56
IV. Efficient use of inputs and factors of production	57
Introduction	59
The context for achieving efficiency in input use	60
Integrated approaches: the case of Brazil	61
- <i>Agricultural zoning</i>	61
Input use	61
- <i>"Poor but efficient"</i>	61
- <i>Overuse of fertilizers</i>	62
- <i>Access to quality seeds</i>	62
Financial services	63
- <i>Agricultural and rural credit in Brazil</i>	63
- <i>"Equalization" of interest rates and compulsory credit system</i>	65
Land issues	65
The modernization of extension services: the experience of Canada	66
Youth in Agriculture	66
Change in demographics and the scale of farming: the case of China	68
Concluding remarks	69
V. Conclusions and recommendations	71
On the contribution of agriculture to the 2030 Sustainable Development Agenda:	73
General considerations on policy design	74
On market-oriented policies	75
On inclusion and equity in agriculture	76
On market development and regional integration	77
On the sustainable management of natural resources	78
On the role of international organizations	79
VI. References	81

Foreword

Today's agriculture is a complex endeavor that encompasses much more than the primary production of food and the traditional rural milieu; its reach is much broader, touching all aspects of modern life. As a consequence of this larger impact, the development of today's agriculture requires public policies of greater complexity and integrality.

Over the past two years, the Inter-American Institute for Cooperation on Agriculture (IICA) has been working to combine knowledge and expertise from a wide diversity of views and experiences in order to identify key elements that could be used by policy makers and actors in the agricultural and rural sectors of the Americas, in an effort to advance the development of public policies for the sector in light of the challenges and goals defined by the 2030 sustainable development agenda.

The present document summarizes the results of a hemispheric dialogue coordinated by IICA during 2014-2016 in which renowned

specialists analyzed agricultural policies in the United States of America, Brazil, Canada, the European Union, the Central American Region, China and the Caribbean. The findings and recommendations from these discussions, which at times were attended by over 1000 persons connected through the "magic" of the internet, were used to prepare the final messages that were validated by a workshop in Washington DC attended by more than 25 experts.

Public policies are dynamic and they evolve rapidly to respond to the ever changing needs of our society and our world. The findings and recommendations identified in this work should be used as guidelines to be adapted to the particular needs of each country and to the particular characteristics of its agricultural sector.

With this document we reiterate IICA's commitment to continue to promote an open dialogue to advance the development of an agricultural sector that is truly competitive, sustainable and inclusive.

Miguel Garcia-Winder, PhD
IICA Representative to the USA
Head of the Center for Strategic Analysis for Agriculture

Daniel Rodríguez
Leader
Competitiveness of Agricultural Value Chains

Acronyms

ABC	Low Carbon Emission Program	IDB	Inter-American Development Bank
ACS	Association of Caribbean States	IFPRI	International Food Policy Research Institute
ALBA	The Bolivarian Alliance for the Peoples of our Americas	IICA	Inter-American Institute for Cooperation on Agriculture
AoA	Agreement on Agriculture	LAC	Latin American and Caribbean
ATER	Technical Assistance and Rural Extension Services	MDA	Ministry of Agricultural Development, (for its acronym in Portuguese)
BPS	Basic Payment Scheme	MDS	Ministry of Social Development
BRICS	Refers to the group of countries of Brazil, Russia, India, China and South Africa	NAFTA	North American Free Trade Agreement
CAFTA	Central American Free Trade Agreement	PRONAF	Food purchasing program from family farmers in Brazil
CAN	Andean Community of Nations	R&D	Research and Development
CARICOM	Caribbean Community	SAPS	Single Area Payment Scheme
CBO	Congressional Budget Office	SCO	Supplemental Coverage Option
CCC	Commodity Credit Corporation	SDGs	Sustainable Development Goals
CCTs	Conditional Cash Transfers	SFS	Small Farmers Scheme
CFIA	Canadian Food Inspection Agency	SICA	Central American Integration System
CONAB	National Supply Company	SPA	The Agricultural Policy Secretariat of Brazil
ECADER	Territorial Rural Development, (for its acronym in Spanish)	TSE	Total Support Estimate
EMATER	Brazilian Association of State Entities for Technical Assistance and Rural Extension	TTIP	Transatlantic Trade and Investment Partnership
ERS	Economic Research Service	TTP	Transpacific Trade Partnership
FB	Farm Bill	UNASUR	Union of South American Nations
FTA	Free Trade Agreements	USDA	US Department of Agriculture
FTAA	Free Trade Area of the Americas	VCS	Voluntary Coupled Support
GDP	Gross Domestic Product	WTO	World Trade Organization

List of Contributors

The following list of professionals contributed their ideas and proposals during a series of virtual and attended seminars. However, the author alone is responsible for the content of this document, and therefore the analysis and conclusions presented here should not be attributed to IICA or any other institution that kindly contributed to this effort.

Alfons Weersink

Professor, Department of Food, Agricultural and Resource Economics, University of Guelph

Anne Efland

*Senior Economist
Office of the Chief Economist
US Department of Agriculture*

Benedito Rosa

Director of the Commercial Affairs Department of the Ministry of Agriculture Livestock and Food Supply, Brazil

Carla Hogan Rufelds

Department of Foreign Affairs, Trade and Development

Carmen Mar Monteagudo

Deputy Head of the General Sub-division for Arable and Industrial Crops, Ministry of Agriculture, Food and Environment of Spain

Cassio Luiselli

Ambassador and Professor Emeritus of the Monterrey Institute of Technology and Higher Education (ITESM), Mexico

Cesar Falconi

*IDB Representative in Suriname
Previously, Principal Economist, Environment and Natural Disasters Division at the Inter-American Development Bank, Washington D.C*

Constanza Valdes

Agricultural Economist, Market and Trade Economics Division, Economic Research Service (ERS), USDA

David Orden

*Director, Global Issues Initiative
Institute for Society, Culture and Environment (ISCE)
Virginia Tech Research Center - Arlington*

Eduardo Ramírez

Former Researcher at the Latin American Center for Rural Development, RIMISP, currently Head of Department, Market Analysis and Policy Sector, Office of Agricultural Studies and Policies, Ministry of Agriculture, Government of Chile

Elena Cores García

Technical Adviser at the General Directorate for Agricultural Products and Markets, Ministry of Agriculture, Food, and Environment of Spain

Eugenio Díaz-Bonilla

Senior Research, International Food Policy Research Institute, Washington D.C.

Fred Gale

Senior Economist, China Team, USDA Economic Research Service, Washington DC

Greg Meredith

Assistant Deputy Minister, Strategic Policy Branch, AAFC

Gustavo Alejandro Idigoras
International Consultant, former negotiator of the Government of Argentina at the WTO and MERCOSUR, Buenos Aires, Argentina

Joseph Glauber
Senior Research Fellow: International Food Policy Research Institute (IFPRI), Chief Economist, US Department of Agriculture (2008-14) Washington, D.C.

Juan Buchenau
Senior Financial Sector Specialist, World Bank, Washington D.C.

Manuel Otero
Former IICA Representative in Brazil, currently an independent consultant in Argentina

Marco Vinicio Ruiz
Ex-Ambassador of Costa Rica in China, Ex-Minister of International Trade of Costa Rica; Coronado, Costa Rica

Margaret Myers
Director, China and Latin America Program, Inter-American Dialogue; Washington, D.C

María Soledad Puechagut
Economist, Director of the Institute of Social Studies, National Institute of Agricultural Technology (INTA) of Argentina.

Martine Dirven
Former Head of the Agricultural Development Unit, Division of Production, Productivity and Management, ECLAC

Maximo Torero
Executive Director for Argentina, Bolivia, Bolivia, Chile, Paraguay, Peru and Uruguay at the World Bank Group.

Miguel García-Winder
IICA Representative in the US

Oscar Quesada
Regional Technical Coordinator, SECAC/FES, San Jose, Costa Rica

Ivan Wedekin
Former Secretary of Agricultural Policy of Brazil; Sao Paulo, Brazil

Patrick Antoine
Chief Policy Advisor to the Government of Grenada, Grenada's Ambassador to CARICOM and to World Trade Organization (WTO), Commissioner to the Organization of Eastern Caribbean States (OECS), and Trade and Economic Commissioner to Trinidad and Tobago

Pedro Caldentey del Pozo
Researcher, ETEA Foundation for Development and Cooperation, Professor of applied economics at Loyola University Andalusia, Spain

Rafael Navas
Professor, Federal University of Alagoas, I, Brazil

Roger D. Norton
Research Professor of Agricultural Economics and Regional Director for LAC at the Norman Borlaug Institute for International Agriculture, Texas A&M University

Santiago Perry
*Executive Director PBA, Coordinator, Andean Dialogue for Rural Development, Colombia Rodrigo Contreras Álvarez
Head of the Department of International Affairs, Office of Studies and Agricultural Policies (ODEPA), Ministry of Agriculture; Santiago, Chile*

Ron Bonnett
President of the Canadian Federation of Agriculture

Shingo Kimura
Economist, Organization for Economic Cooperation and Development (OECD)

Teodoro Rivas
Deputy Director of the Office of Agricultural Studies and Policies, ODEPA.

Timothy E. Josling
Senior Fellow by courtesy at the Freeman Spogli Institute for International Studies; Emeritus Professor at the Food Research Institute; Affiliated Faculty at the Europe Center, Stanford University, CA USA

Víctor Umaña
Associate Director, Latin American Center for Competitiveness and Sustainable Development, INCAE Business School

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It is worth highlighting selected background publications from the above-mentioned workshop speakers that were key sources of information for writing each chapter of this publication. Details of these may be found in the References section of the following publications: Díaz-Bonilla 2015; Díaz-Bonilla et al. 2014; Díaz-Bonilla, Orden, and Kwieci ski 2014; Díaz-Bonilla and Torero 2016; Gale 2013; Gale, Hansen, and Jewison 2015; Gale and Yang 2015; Glauber 2015; Humanes and Cores 2015; Myers and Jie 2015; Westhoff, Gerlt, and Glauber 2015; Zulauf and Orden 2014.

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Introduction

Agriculture has a major role to play in responding to the urgent need to strengthen food security, ensure inclusive economic and social development and promote environmental sustainability, in line with the 2030 Sustainable Development Agenda. This was the main motivation that prompted the Inter-American Institute for Cooperation on Agriculture (IICA) to organize a dialogue among the countries of the Americas that would facilitate awareness, analysis and identification of lessons to be learned on policy design. These lessons could then be applied to the specific conditions in each country, based on a consideration of the changes under way in different regions and countries of the world. The present initiative is aligned with IICA's institutional priorities, set forth in the 2014-2018 Medium Term Plan, and with its commitment to support the transformations required to promote competitive, sustainable and equitable agriculture in the Americas.

This publication is a collection of ideas, proposals and reflections presented during a series of seven online seminars on agricultural policies, which included those of the United States, Brazil, Canada, Chile, Central America, the European Union and China. Government officials, academics and private sector representatives from those countries or regions participated, together with commentators from Argentina, Costa Rica, Mexico, Spain and Belgium who offered their contributions. Details of the seven seminars, agendas, participants, documents, presentations and video recordings can be found on IICA's web page (see: <http://goo.gl/boFdez>).

This document also includes the valuable contributions made during a face-to-face seminar held in Washington D.C. on September 22, 2015 with the participation of experts who had taken part in the virtual seminars, plus invitees from the Economic Research Service (ERS) of the US Department of Agriculture (USDA), the Ministry of Agriculture of Chile, the International Food Policy Research Institute (IFPRI), the Inter-American Development Bank (IDB), the China and Latin America Program of the Inter-American Dialogue, the World Bank (WB), Virginia Tech, the University of Loyola Andalucía and the University of Guelph, Canada (see List of Contributors below).

The document examines four major trends that summarize the many and diverse issues discussed during the series of virtual and attended seminars:

1. Market-oriented agricultural policies
2. Regional integration and market development
3. Sustainable management of natural resources in agriculture
4. Efficient use of inputs and factors of production

Before analyzing agricultural policies in the aforementioned countries and regions, it is important to recognize that the United States, the European Union, Canada and China have been reformulating their agricultural

policies and making significant changes to ensure that their agricultural sectors are more market-oriented. In this regard, they have strengthened efforts to develop comprehensive risk management programs, and have included programs and instruments to address emerging issues that pose challenges for the future development and sustainability of agriculture. Important lessons that can be of benefit for policy design in LAC (Latin American and Caribbean) countries can be derived from those changes.

As to policies for agriculture in LAC, several aspects should be pointed out. The LAC region must be viewed in the context of the world agricultural economy. The region is the main net food exporter of agricultural and food products - even larger than Canada and the United States combined (Díaz-Bonilla et al. 2014). Given that LAC accounts for about 11% of total world agricultural production, according to FAO data, its importance in terms of international trade is great. A second point is that LAC's agriculture is based on a very inequitable agrarian structure - in fact the most inequitable in the world - and a very heterogeneous one, with an average farm size smaller than in the United States and Canada, but larger than in the rest of the world; average farm size is greater than in Europe and far larger than in Asia and Africa. A third point is that LAC agriculture benefits from better infrastructure and agricultural capital, as well as higher spending on R&D (Research and Development) for agriculture, relative to GDP (Gross Domestic Product), than the rest of developing countries, though far less when compared to developed countries (Díaz-Bonilla et al. 2014).

Turning to social issues, women in LAC have a lower participation in agricultural production as compared with Africa and Asia, (LAC is basically an urban economy, perhaps even more urban

than some developed countries in terms of the level of organization). Poverty levels have been reduced and the food security objectives of the Millennium Development Goals (MDGs) have been achieved, or are close to being achieved, compared with other regions where this has not occurred. In part, these successes are explained by the huge expansion of conditional cash transfers (CCTs) in LAC: about 50% of the lowest 20% quintile receive CCTs, a far higher percentage than in the developing countries of any other region. One critical issue is the level of violence that affects the region, given that 40 of the world's 50 most violent cities are located in LAC. Finally, with regard to the environment, LAC is probably the developing world's largest provider of global environmental goods, including biodiversity, oxygen etc., but this may interfere with the other functions of agriculture as provider of a safety margin for food security at the world level, and as a major producer of minerals and energy needed to generate foreign exchange (Díaz-Bonilla and Torero 2016).

The LAC agricultural sector performs many different functions; therefore, when managing policies, several objectives should be considered simultaneously. First of all, growth and productivity; secondly, social issues such as poverty, employment, income distribution and food security; thirdly, food safety and nutrition; in fourth place, environmental sustainability and natural resource management; and finally, agriculture's contribution to regional development. Coherent and efficient policies are crucial to achieve this set of objectives, with likely trade-offs across these (PIADAL 2013).

It is hoped that the following systematization of policy changes that have taken place around the world will support the deliberations of the Ministers of Agriculture and other international actors throughout the Americas and contribute to improving the effectiveness of agricultural policies vis-à-vis changes in the world context.



Market-Oriented Agricultural Policies

Introduction

Improving the operation of markets is particularly important given that agriculture is under great pressure to supply the food needs of a growing population with increasing income in the medium and long term. It is therefore essential to determine which policies will help agriculture respond to that need. The 2007-2008 food crisis demonstrated the vulnerability of the agricultural sector. The fact that many of the responses during that period were not necessarily market-oriented actually exacerbated the crisis instead of solving it. Contrary to expectations, the effect of the initial shock in 2007-2008 was made worse by various trade policies put in place, especially by developing countries attempting to ensure sufficient food supplies in their domestic markets. However, restricting the market made matters worse, not better. Some examples of how policies can alter the relationship between global prices and domestic prices can be found in OECD 2015. Simulations carried out by the International Food Policy Research Institute (IFPRI) show that trade restrictions, such as export bans or higher export tariffs, imposed by fifteen countries as of April 2008, accounted for almost 30 percent of the increase in prices in the first half of 2008 (Hawse and Jostling 2012; Robles and Torero 2010).

The main premise of this section is that market-oriented policies will allow farmers to respond to market signals so that they can make better decisions about what, when and how much to produce, in order to provide the required

quantity and quality of food, with the attributes that final consumers demand. More open, transparent and efficient markets will level the playing field between developing and developed countries.

This chapter is organized in four parts: the first examines the elements that make policies more market-oriented; the second part analyzes the level and structure of agricultural support across countries and over time; the third part reflects on the evolution of instruments for integrated risk management in agriculture; and finally, the fourth part considers challenges and opportunities for the future.

What makes policies more market-oriented?

Policies are more market-oriented when they do not distort prices, when stock levels are known and managed transparently, when public support is decoupled from production decisions and when self-sufficiency requirements are relaxed.

Fewer price distortions

Market-oriented policies mean fewer price distortions. This is at the heart of any market-oriented policy because the market price is the signal that sends information about supply and demand. When policies obscure market signals, producers plant the wrong crops, distorting the market even further, which means instability and repeated periods of scarcity and gluts.

The motivation for intervening in the market is often to keep food prices low by isolating the domestic market from the volatility of international markets. However, as recently shown by China's experience (Box 1), the final unwanted result is an increase in prices, creating a gap as high as 40% between domestic and international prices (Gale 2013).

Price distortions not only originate from price controls, but also from price pooling arrangements, supply management schemes, production controls or government support based on prices. In fact, government programs based on commodity output, comprising market price support, are potentially the most production and trade-distorting forms of

Box 1

Agricultural price determination in China

A major concern that influences policies is how prices are determined. One example is the soybean market. After the sharp decline in soybean prices a decade ago, which caught importers unaware and unprepared, China believed that the US Department of Agriculture (USDA) was conspiring with multinational companies to manipulate monthly reports and prices. China already had contracts to import soybeans at the high price and a number of contract holders were bankrupted and their contracts purchased by multinational companies. Even after learning about the reporting process and how prices are determined, the Chinese felt they were passive participants and needed to play a more active role in the world market to eventually gain more influence over prices. To that end, they have followed the "Two Markets, Two Resources" approach, which basically means meeting their needs through a combination of their own domestic market and the world market, and domestic resources and overseas resources. This encourages Chinese companies to go overseas and invest in virtually every country around the world, to become involved in the entire supply chain (production, processing, marketing, etc.) and to gain control over their imports (a strategy known as the New Silk Road).

Recent changes in the corn market suggest that China is moving towards more market-oriented policies and practices. Beginning in April 2016, it allowed corn prices to be determined by the market - the most recent step in overhauling its agricultural industry - by removing a policy implemented since 2007, which set a minimum price for corn produced by domestic growers. This is expected to make Chinese corn cheaper, reducing the need for farmers to buy imported corn to feed their animals. This measure, in turn, will trigger the correction of other market distortions since it affects foreign sellers of barley, sorghum, distiller's dried grains and cassava, which Chinese farmers have been buying as cheaper alternatives to corn to feed animals (WTD 2016).

In their general ambition to become a more active player in determining what happens in the global market, China is also trying to promote Chinese commodity markets, including their Dalian futures market, as places where prices are formed. However, unless market information can flow and unless people can process it properly, the entire project of freeing the market may be undermined.

support, along with payments based on variable input use (without constraints).

Policies that impose border controls, such as import quota restrictions and export restrictions, are also considered highly distorting policies. Export restrictions are market distorting because they impose an “implicit tax” on agriculture. For example, according to WTO calculations, the implicit tax on the major crops of Indian agriculture represented approximately 38% of their value in 1995-1996. Farmers were receiving subsidies on fertilizers, power and irrigation systems which, in the end, were far lower than the “implicit tax” from export restrictions (Hazell, Sharma, and Smith n.d.). The main reason that these are so distorting is because export restrictions reduce domestic prices, thereby affecting farmers, and also have a negative effect on the world market by raising prices and potentially producing food shortages. They may also discourage investment in products since farmers cannot export their surpluses.

History teaches us that isolating rural producers from fluctuations in world prices and markets is virtually impossible. This is valid for China, Brazil, the United States and, for that matter, any other market. It is an impossible task in a value system geared toward the final consumer, which must continually respond to the changes and characteristics of supply and demand for agricultural products. Attempts to insulate producers through price policies that are set too high, almost always translates into market inefficiencies with elevated costs to society and to the country.

Stock Accumulation

When support prices are set too high, countries begin accumulating stocks, and when world prices are trending down, complications arise in

managing those stocks or getting rid of them, thereby distorting markets. The United States, for example, has gone through two major cycles of that nature since World War II. In each case, government-held stocks increased (under the CCC -Commodity Credit Corporation), in tandem with acreage reductions under both long term conservation set-aside and short-term annual set-aside (whereby each year the government announced how much acreage should be out of production in order to be eligible for government payments). Eventually, the United States found itself in a gridlock because stocks were building up while as much as 25% of planted acreage was out of production. Export subsidies were then put in place to help reduce these stocks. This is an example of how a policy resulted in a management crisis and considerable market interference, which affected not only local markets (Zulauf and Orden 2014).

After two cycles, one in the 1960s and another in the 1980s, land set-aside and CCC stocks fell, to later increase again. In 1983, for example, 77 million acres (31.2 million hectares) of land were out of production. The United States began to work its way out of that situation by introducing at least five different policy instruments, each with different characteristics, to allow producers to make planting decisions based on market expectations and to move away from stock accumulation and supply management through acreage reduction and the use of export subsidies. There was a wide array of instruments¹ and some interplay between them, in the sense that one instrument might depend on what was occurring with another instrument (Zulauf and Orden 2014).

Limited information on stock levels is another major source of market instability. In some countries, stock levels may be unknown even to the government, due to factors such as organization and decentralization and also because grain depots do not always accurately

1 Fixed Direct Payments (1996 – 2014), Countercyclical Support Programs –such as Price-Based Deficiency Payments on Actual Output (US marketing loan program), Price-Based Deficiency Payments on Fixed Historical Production (US CCP and PLC programs) and Moving Average Revenue Benchmark Programs (US ACRE, ARC programs), and Conservation Programs (US CRP, EQIP, CPS and others).

Box 2

Price interventions and stockpiles in China

China joined the WTO in 2001 as part of a decades-long, market-oriented reform process, shifting away from administrative pricing toward a more open and market-oriented economy. This strategy was consistent with “Green Box”-type support for agriculture, going from taxing agriculture, to supporting agriculture. However, China began to raise price supports after the country was affected by the price spikes in 2006, 2007, 2008. For the past 2 years, the county has been hit by another price shock, this time the downward trend in international prices. As a result, China is now exhibiting all the classic problems alluded to earlier: high domestic prices (around 20-30% above world prices), massive stockpiles of grains, cotton and sugar, and continued high

levels of imports. To address the problem, China is now pledging to change its policies to a far more market-oriented strategy, allowing the market to play a decisive role. Price supports have gradually been abandoned, and recently a plan to move away from all price supports (except for rice and wheat) has been announced. This plan will focus on a support strategy without price interventions, giving instead direct subsidies to farmers and experimenting with different types of index insurance and various new approaches to supporting farmers. China intends to move forward in a positive direction, overhaul the farm sector in order to raise productivity, improve services to farmers, and finally begin to address environmental and sustainability issues.

report the amount of grain in storage, making it difficult to determine the accumulation of stocks across the country. A sudden release of stocks when these get too high, especially by countries with high market shares in terms of imports, like China, can change the world market overnight, significantly affecting international prices.

If the level of stocks is unknown and, more broadly, market information is lacking, then markets cannot function efficiently, and consequently prices do not reflect the actual supply and demand situation. Poor market information, which may be caused by deliberately keeping stocks a secret, “sows the seeds” for further breakdowns in any attempt at market opening. Countries, especially large ones that consider themselves passive

participants in the global market and regard international prices as being manipulated to undermine their interests, may be tempted to seek greater control over trade and also use various strategies to exert greater control over prices, which in the end exacerbates the problem.

Policies decoupled from production decisions

Government programs that are linked or coupled to production decisions are also market-distorting. Potentially less distorting forms of support include payments based on parameters that are not linked to current production. Such payments can be based on non-current area or numbers of animals, receipts or income that

do not require production in order to receive the payment. These can also be based on non-commodity criteria such as land set-aside or payments for specific landscape features (OECD 2014).

The European Union, for example, has moved from government stocks and prices above world levels and export subsidies to decoupled fixed income payments. Although these are high (the EU spent almost 60 billion euros annually, a sum that will reportedly decline by 10% over the period 2014-2020), in terms of the purity of the instruments they are much more market-oriented. The European Union Common Agricultural Policy (EU CAP) includes a BPS (Basic Payment Scheme) and a SAPS (Single Area Payment Scheme). Most payments are based on historical references with no requirement to produce. The BPS is applied in EU15 plus Malta, Slovenia and Croatia, while the SAPS is applied in the other EU member countries (SAPS is a transitional program that will be progressively included in the BPS, with specific reforms of the sugar and vegetable regimes). The new CAP contemplates the redistribution of direct payments, both within and between EU Member States, so that the BPS is a progression towards a better distribution of support across the European Union through external and internal convergence (Humanes and Cores 2015).

External convergence means that national envelopes for direct payments are progressively adjusted, either upwards or downwards, to bring them closer to the average level for the European Union. Internal convergence means that the value of per hectare payment entitlements for the BPS within a Member State must move toward a more uniform level, under the reform introduced in 2013.

Decoupled payments imply that policies shift from commodity-specific support to whole farm approaches, meaning that producers receive payments regardless of what they produce. According to a USDA report, under the 2014 Farm Bill (FB), producers chose to enroll most of their corn and soybean base acres in the new

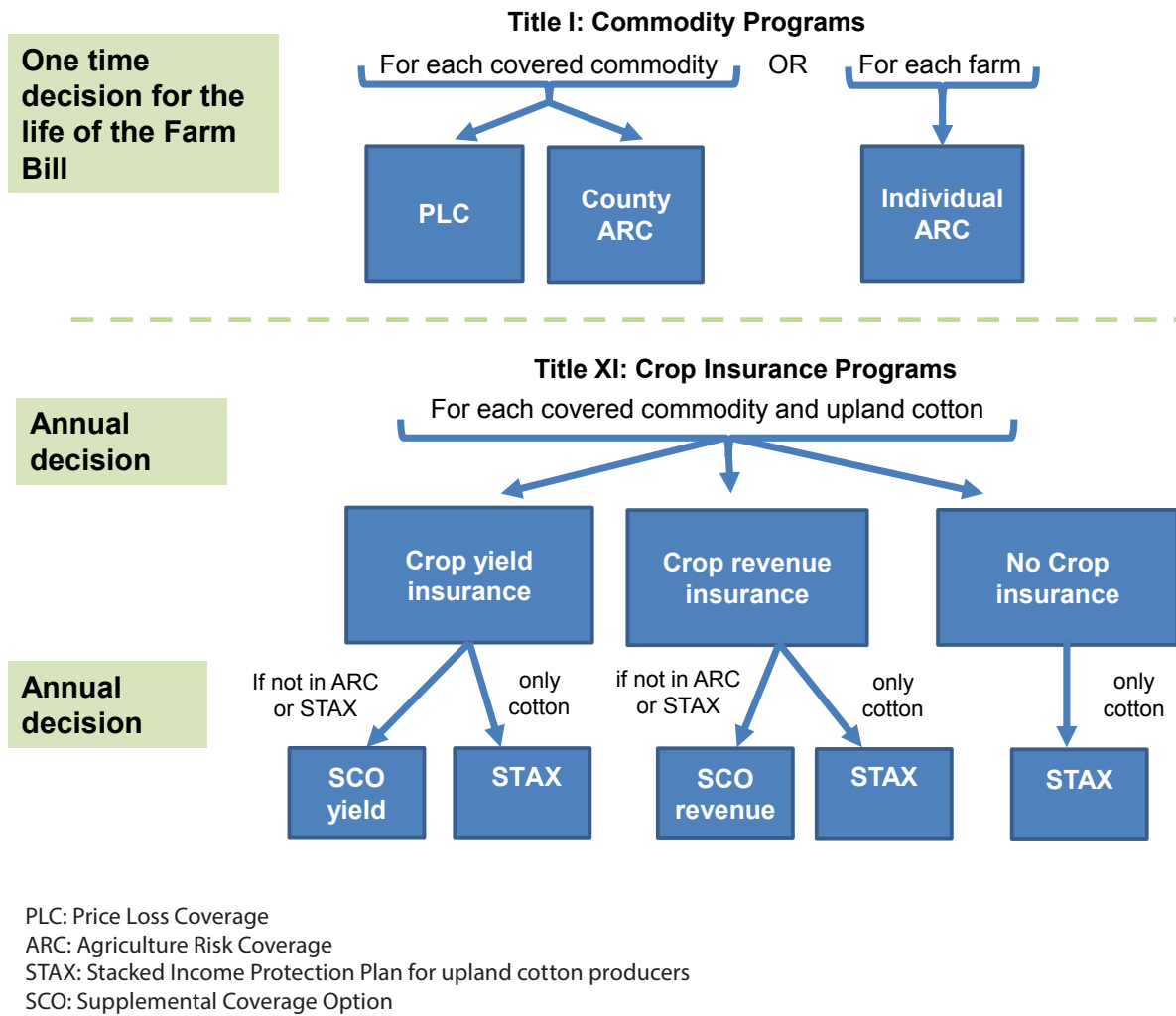
Agriculture Risk Coverage (ARC) program; for other crops such as wheat, barley and sorghum, the choice was split fairly evenly between ARC and Price Loss Coverage (PLC) programs, while for all other crops the PLC program was favored (Westhoff, Gerlt, and Glauber 2015). These programs are designed to make payments when national average prices (under the PLC program) or per-acre revenues (under the ARC program) fall below trigger levels and, depending on price and revenue expectations, farmers would choose one or the other. Farmers also have the option of choosing the individual version of ARC (Individual ARC), based on revenues for all covered crops for the whole farm, or the county version (County ARC), which is based on average revenues for each crop at county level. The revenue benchmark that triggers ARC payments depends upon a moving average of past prices and yields, which will decline by the end of the period (2018) because the moving average will no longer incorporate the high-price years earlier in this decade.

Conditional decoupled payments

One interesting modality of support in the European Union is the decoupled payment per hectare, conditional upon farmers' compliance with a set of environmentally-friendly farm management practices. Payment for Agricultural Practices Beneficial for the Climate and the Environment (known as the "green payment") rewards farmers for crop diversification and maintenance of permanent grassland and ecological focus areas. Through the Small Farmers Scheme (SFS), small farmers benefit from a simplified scheme, and are therefore exempt from greening and cross-compliance sanctions and controls. Despite these developments, the European Union still maintains a number of market-distorting provisions, such as certain types of commodity-specific support aimed at promoting the production of certain crops. These include Voluntary Coupled Support (VCS) which Member States can voluntarily provide to farmers, subject to some limitations.

Figure 1

2014 Farm Act presents producers with choices



Source: United States Department of Agriculture, Economic Research Service

Demand-driven policies

Policies are also more demand-driven in the sense that governments offer a variety of risk management choices to farmers, some of which hold for multiple years. Under this approach, farmers choose the policy instrument that best meets their risk preferences and expected

market conditions. Demand-driven policies also mean that programs are voluntary, with some offering extra incentives for their adoption. See Figure 1 for an example of some of the choices available to US farmers under the 2014 FB.

Relaxing self-sufficiency requirements

Policies are also market-oriented when they rely more on the market to achieve food security objectives. After joining the WTO, China changed its self-sufficiency ratios to become a major net food importer. Even though China had always adopted a very strict approach to self-sufficiency and basic foods, mainly food grains, requirements were gradually relaxed over the last few years. The first thing China did was to liberalize soybean imports, which grew faster than anyone anticipated. Now it is focusing on self-sufficiency in wheat and rice, although it is currently importing more rice, up to 4 to 5 million tons. Thus, self-sufficiency requirements have been relaxed to the point of raising some uncertainty about the country's increasing dependence on imports.

China's experience is part of a worldwide trend in which food security concerns are not viewed solely from the perspective of self-sufficiency.

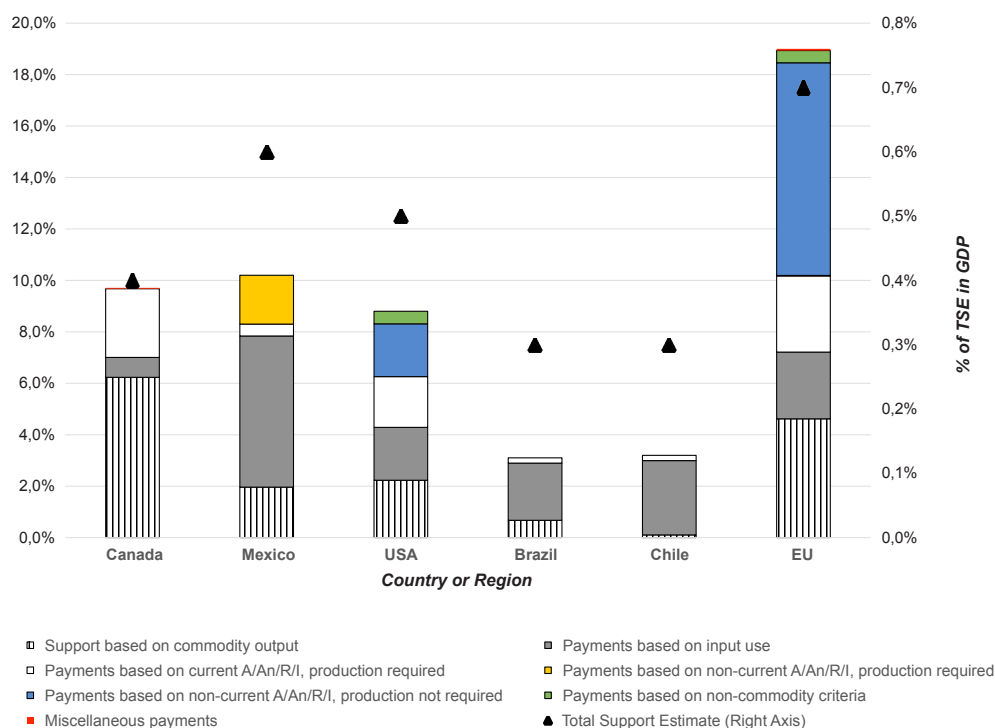
Instead, steps are taken to strengthen the role of the market in addressing food insecurity. This normally implies the re-allocation of resources to enhance productivity, innovation, environmental performance and market efficiency, as more promising means to achieve food security in the long run.

The structure of agricultural support is changing

The OECD has been monitoring agricultural policies in all its member countries, and in selected emerging economies, providing comparison between agricultural policies in developed and developing countries consistently over time, and across 47 countries, representing 80% of global agricultural production. In the Americas, this effort includes Canada, the United States, Mexico and Chile, as members of the OECD; Brazil, Colombia and Costa Rica will be also part of this exercise.

Figure 2

Producer Support Estimate (PSE) and Total Support Estimate (TSE) in 2013-2015



Source: OECD 2016

The OECD classifies monetary transfers based on their implementation criteria (see Box 3), differentiating between transfers based on output, input, current or non-current production, current or non-current area of land and those based on commodity or non-commodity criteria. In this way, the OECD

database is able to consistently compare not only the level of support but also the structure of support, over time and across countries. Knowing the structure of support (market support, input use, etc.), is fundamental to determine how potentially market-oriented, or distorting, policies can be.

Box 3

Classification of agricultural support by the OECD

Agricultural support is defined as a policy of transfers in which agriculture is the main beneficiary. The OECD differentiates between producer support (PSE or Producer Support Estimate), which goes directly to the producers, general services support (GSSE or General Services Support Estimate), which is a broader support to agriculture, such as infrastructure,

development, education and R&D, and consumer support (CSE or Consumer Support Estimate), which is support (or taxation) to first stage consumers of farm products, such as cooperatives or commercial processors. The Total Support Estimate (TSE) represents the total cost of agriculture to the economy, calculated as the aggregation of PSE, GSSE and CSE.

The level of producer support is shown as the share of monetary transfers in gross farm revenue. For example, the OECD average is around 20%, which means that 20% of gross farm revenue is generated by the producer support policies. Canada's support to producers is below the OECD average, but is higher compared with other countries of the Americas, such as the United States, Brazil and Chile (Figure 2).

Looking at the composition of support, the black-lined area in Figure 2 consists mainly of market price support, which in Canada is somewhat higher than in other countries (around 65% of producer support is market price support) due to some major market price support and a few supply managed commodities such as dairy, poultry and eggs. Although the Canadian agricultural sector is largely export-oriented and

most domestic commodity prices are aligned with international prices, some sectors are protected from competition with supply controls. Canada's Business Risk Management (BRM) program is an example of a budgetary transfer to producers, while a market price type support is an implicit support because it is an economic transfer from the consumer to the producer through border measures, plus domestic price supports that maintain the domestic price higher than the international price.

Canada has made great progress in policy reform, abolishing commodity-based policies and shifting to a whole farm approach in policy design. However, some commodities remain under a supply management system, primarily dairy and poultry. This system has three main components: import controls in the form of quotas; production controls that

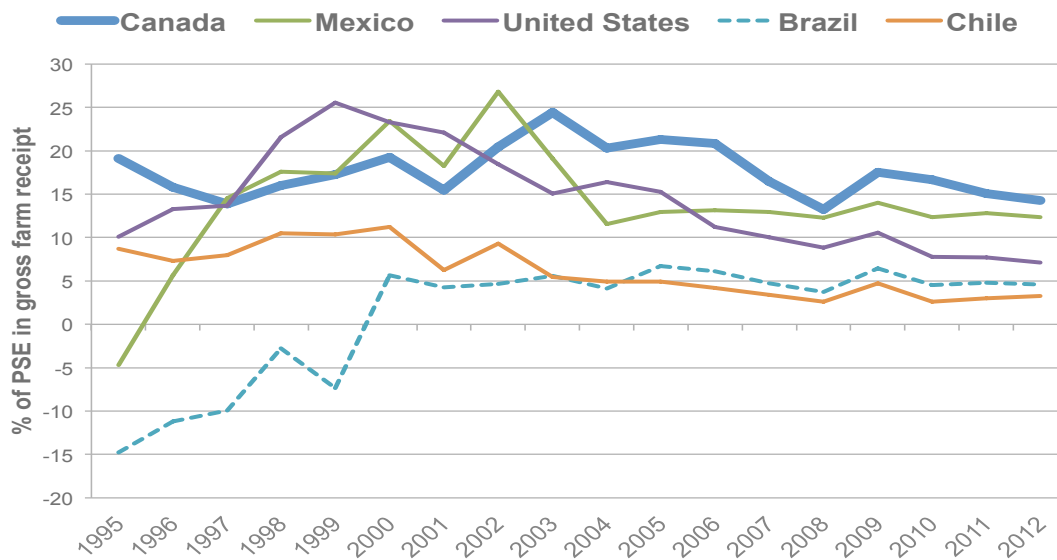
limit the supply of liquid milk, turkey, eggs and chicken; and finally, price controls applied by various marketing boards under the guidance of national parties who determine production costs and issue pricing guidance to the sector. In order to continue along the path of market orientation, and given that this type of policy creates market distortions, the OCED is recommending that Canada phase out those programs (OECD 2014). As to the TSE (Total Support Estimate), Canada's share of GDP is around 0.4%, which is lower than Mexico, the United States and the European Union (Figure 2). Therefore, the total cost of agriculture to the economy is not necessarily high compared to other countries in the Americas.

Lower agricultural support over time

It is also important to analyze how agricultural support evolves over time. In general terms, the level of support has been gradually reduced over time, while the structure of support has become more decoupled from production. This translates into a shift from price support measures to decoupled budgetary payments, which means that farmers have greater flexibility in deciding what to produce. In other words, it allows farmers to respond to market signals while the remaining income problems are addressed through budgetary measures. The general trend is a shift in policy focus from income support to productivity, innovation, sustainability and risk management.

Figure 3

Producer Support Estimate (PSE) in 1995-2012



Source: OECD 2014

Figure 3 shows the evolution of agricultural support since the mid-1990s in five countries. After a major reform in the early 1990s, Canada reduced its support level from more than 25% of gross receipts to less than 15%, and since then it has remained very stable. Similar patterns are

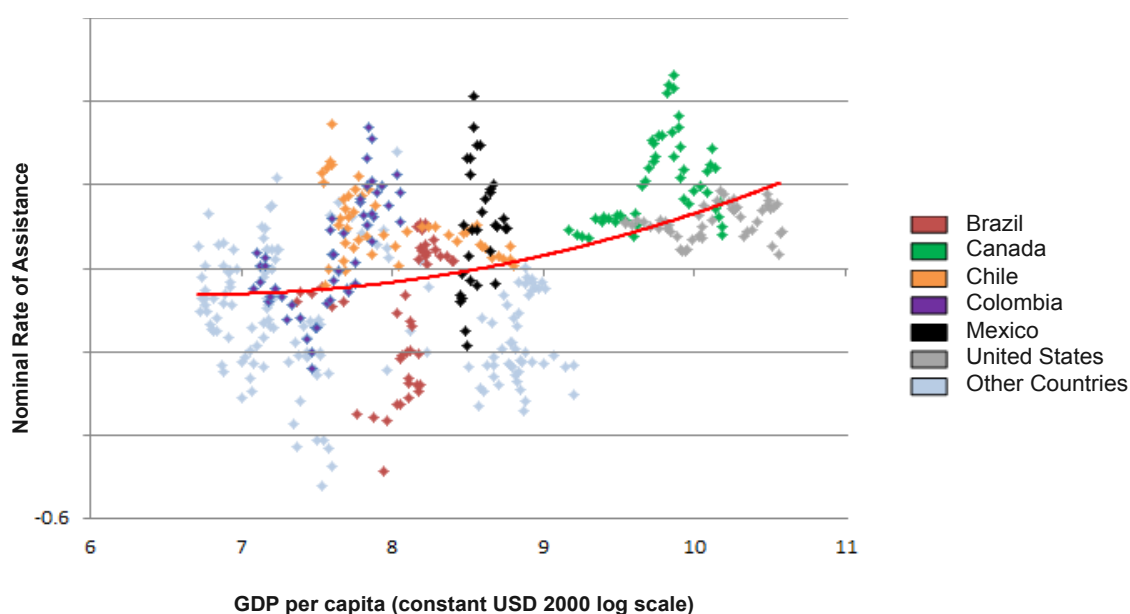
evident in the United States (8.8% PSE-Producer Support Estimate- in 2015, Figure 2) and Mexico (10.2% PSE in 2015). Over time, both countries have significantly reduced support based on commodity output and increased payments not requiring production.

Likewise, the level of support to farmers has trended down in Chile, going from 8.1% in 1995 to 3.2% in 2015, switching from commodity-based support to input use support (OECD 2016). The European Union has also lowered the level of support from nearly 40% of farm receipts in the mid-nineties to 19% in 2015 (Figure 2), with a significant share of that support allocated to payments decoupled from production and other payments, such as lump sum payments to all farmers. By contrast, Brazil shows a completely different pattern over time, moving from negative

support in the mid-nineties (PSE of -15%) to a support level of 3.1% in 2015, mainly in the form of payments based on input use. A negative PSE means that agriculture was taxed by keeping the domestic price lower than the international price. Similarly, China (not shown in the graph) shows a positive trend in agricultural support. It increased the PSE level from 5.5% in 1995 to 20.6% in 2014 and is moving in the opposite direction to other countries to provide increasing payments based on commodity output (OECD 2014).

Figure 4

Income level and agricultural support in America



Source: OECD 2014

It is interesting to note that in recent years emerging economies, such as Brazil and the Eastern European countries, have become net supporters of agriculture, moving from negative support levels in the mid-1990s to subsequently become net supporters of agriculture.

The evolution of support with respect to economic development

Figure 4 shows a positive relationship between income level and agricultural support. The positive trend means that a higher level of income is associated with a higher level of

support. As income grows, agriculture becomes a net receiver of support, rather than a provider of income tax. Initially, agriculture is taxed in order to finance the budget to promote other industries, but as the economy develops the disparity between farm and non-farm income increases and agriculture becomes a net receiver of support.

When countries move away from distorting policies (essentially paid for by consumers, and government stock-holding), a major transformation occurs in terms of the fiscal cost. As observed in the United States, payments to farmers as a percentage of net farm income peaked in the 1960s, with the move away from land set-aside and high CCC stocks, and then declined in the 1970s with high global prices. Payments peaked again in the 1980s, when global prices fell, stocks built up and export subsidies were implemented to compete with the European Union. Although another peak occurred in the late 1990s, by that time the United States had already moved to all-cash support, away from CCC stock accumulations and, except for the long-term Conservation Reserve, no land was set aside other than that contemplated under the conservation programs.

Policies shift toward integrated approaches to risk management

As market distorting policies gradually disappear and the effects of climate change are accentuated over time, farmers become more exposed to risk and agricultural policies must progressively focus on supporting farmers' risk management strategies. Innovations in this area translate into an impressive array of instruments and methods to protect farmers against losses due to a decline in prices, yields, income (prices and yields) and margin (income minus cost), plus insurance instruments to cover catastrophic and shallow losses. Modernization of these instruments is still in progress to determine the optimal percentage of coverage and minimize

premium subsidies and basis risk. The idea is to ensure that risk transfer mechanisms are sustainable and viable for governments (given their limited budgets) and profitable for the private sector, without undermining the proactive role farmers must assume in managing their own risk. For a review of sources of risk in agriculture and risk management strategies and policies see Arias-Segura et al. 2015.

Regarding risk management, it is worth making a distinction between commodity support programs (such as PLC or ARC in the United States) and insurance programs. Both are risk management instruments, but operate in different ways. Insurance programs only address intra-year risk (from planting to harvest) and price and yield expectations are adjusted each year. In the majority of countries, the farmer pays a premium for insurance while government also provides premium subsidies. In the United States, commodity programs provide within-year risk assistance if prices happen to fall within a year, but they also provide multi-year risk assistance with their fixed reference prices (PLC) or moving average of past revenue (ARC) programs. Farmers do not pay a premium for the commodity program risk assistance, as in the case of insurance programs (See Zulauf and Orden 2014 for a good discussion of how insurance and commodity risk support programs can overlap).

Subsidized risk management programs

In conceptual terms, subsidized risk management programs appear to be market-oriented, but to be so they must be decoupled from prices and production decisions. An assessment is needed to determine whether this type of government intervention is in fact affecting the performance of markets. Clearly, with prices declining, many of these programs must pay out money, and some may have large outlays over the next couple of years. Given that lower prices were anticipated when the risk programs began² in the United States, large

2 Note that prices for insurance are set each year based on futures, so expectations at the time of planning insurance programs would not be relevant to the program's design.

indemnities are not expected, even though large subsidies are involved, provided that the penetration rate of these programs is very high (85% of eligible areas enrolled), and premium subsidies are roughly 60%.³ There is evidence to suggest that these risk management programs are less distorting than some of the other classic Amber Box programs, such as marketing loans

and others mentioned above. However, being reported as Amber Box, they must be ultimately monitored and disciplined. This is because the most important change in US programs has been the move from yield-based insurance (which pays farmers for an individual yield loss) to revenue products (which pays farmers when revenues are low⁴).

Box 4

WTO classification and compliance

Under the WTO Agreement on Agriculture (AoA), domestic subsidy programs are categorized based on the degree to which they are trade-distorting and referred to familiarly by colored boxes. Programs in the Green Box have minimal impacts on production and trade and are exempt from reduction commitments, while Amber Box programs are judged to have larger trade-distorting effects, and are capped under the AoA. In addition, trade-distorting programs may be placed in the Blue Box and be exempt from reduction if those programs require farmers to limit production. The United States, for example, has committed to limiting expenditure on trade-distorting Amber Box measures to no more than USD 19.1 billion each year. The total current aggregate measurement of support (AMS) includes crop insurance premium subsidies, marketing loan benefits and a measure of

the value to producers of the sugar price support program (Westhoff, Gerlt, and Glauber 2015).

With regard to WTO compliance of US programs, Counter-Cyclical and ACRE payments could have been large in extreme circumstances, but in practice were very small between 2008 and 2013. In contrast, spending under the new ARC and PLC payments (see Figure 1 above) is also very sensitive to market conditions. If prices or yields are high, payments may be small or even zero; if they are low, payments may be in the billions of dollars. If prices or yields are persistently low, the moving averages used to determine ARC benchmark revenues will adjust over time and payments will decline, but PLC payments will not because they depend only on reference prices that are fixed in law (Westhoff, Gerlt, and Glauber 2015).

3 The actuarial basis for the crop insurance premium structure sets premiums to equal indemnities across the program on average over time. In any given year, however, indemnities can be large based on yield losses or price changes.

4 Revenue insurance balances yield and price—low prices + high yields can lead to low or no payments even when prices are low.

The challenge ahead is to move away from counter-cyclical payments and from any type of payment tied to reference prices. Some consider it unfortunate that the United States gave up the fixed direct payments, since these were a Green Box type policy that better positioned the United States internationally and domestically in favor of market-oriented agricultural policies (See Box 4 for WTO classification of policies). The problem was that money was going to many recipients who were not even farmers but owned the land, and also because the payments came at a time of very high prices. Consequently, those programs looked like welfare payments, with little or nothing to do with agriculture and with no ties to economic need, therefore requiring a safety net program that is counter-cyclical.

As far as insurance programs are concerned, lowering subsidy levels is also important in making these more market-oriented. If insurance programs are properly subsidized at lower levels (though there is no consensus or absolute measure of what the appropriate “low level” of subsidy would be), and if they go back to being more yield-related instruments, they will be far less distorting and more in tune with markets, allowing for less government interference with market prices and producers’ production decisions.

Subsidies may be more justified in poorer countries where historical weather data is insufficient, and therefore predicting losses is more difficult. However, why subsidize 60% of the premium in more developed countries, where good information allows loss estimates to be more accurately determined? Probably, as with all insurance, to ensure program solvency and lower costs, there is a need to ensure participation by less risky businesses. Money transfers should be restricted for purposes such as moving people out of poverty or solving problems of malnutrition, which create an economic loss to societies. More transparency is needed in the objectives pursued by each instrument, so as not to create budgetary pressures, especially in developing countries where public resources are limited. This is often difficult because policymakers have to deal with the strength of different lobbies.

Risk transfer

A major evolution in several countries is that policies are moving toward safety net programs, particularly insurance programs. Crop insurance and revenue insurance have grown significantly, not only in the United States, but also globally. When the Uruguay Round was launched, the premium volume in the world was around USD 2 billion, located mainly in Japan, Canada and the United States. The most recent figure (for 2014) was closer to USD 35 billion (Glauber 2015). The United States still has the largest program, but since 2007 there has been a dramatic growth in China, which has become the number two market. The insurance market is also large in Spain and is growing significantly in a number of other countries such as Mexico and Brazil.

To cite some examples, in the United States agricultural insurance programs total around USD 9 - 10 billion annually, of which about two-thirds goes to farmers and the rest to insurance companies. On the other hand, the program in China is now under USD 4 - USD 5 billion in subsidies (Glauber 2015).

Most people extoll the benefits of insurance programs and consider them to be consistent with the WTO Green Box policies. Indeed, under Annex 2 of the AoA (Agreement on Agriculture) there are provisions that would exempt subsidies for qualifying insurance programs. But looking at the variety of insurance programs around the world we find that none of these programs really meets the criteria of Annex 2, and consequently most programs are notified as Amber Box policies (Glauber 2015).

The question is whether these insurance programs are market-oriented. The good news about many of these programs is that they tend to be tied to expected prices, rather than administered prices, as seen in the classic price and income support programs. In most insurance markets, as farmers make planning decisions, losses will be indemnified subject to expected market prices, not current prices. This means that if prices are declining, those expected prices over which losses will be

indemnified are also declining, which certainly makes these programs more market-oriented. However, there are enormous subsidies connected with these programs.

The fact that insurance programs are so large raises the question of whether they are really not market distorting. Do they obscure market signals so that producers grow the wrong crops? The evidence from countries and the literature itself is fairly mixed regarding what the actual impact is. These programs will probably be tested, not so much in the WTO's domestic support regulations, but rather in countervailing measures and possible dispute settlements.

Yield or crop risk management

Yield or crop insurance are more commonly adopted and are becoming an important risk transfer instrument in developing countries. Yield insurance is normally divided into four categories: i) single risk insurance, providing coverage against one peril or risk, or even two; ii) multi-peril insurance offering protection against two or more risks, such as hail, drought or others; iii) comprehensive insurance which provides coverage against all natural hazards for a single crop; and iv) whole-farm insurance which covers against all natural hazards for the entire farm (CMCC 2014). There are also crop risk management instruments (as well as price and revenue instruments) that are single-crop or multi-crop based and that use county, regional or national averages as references, such as the County-ARC in the United States. Since the ARC program is not based on current production, it cannot be considered an insurance program, but it is certainly a risk management tool.

Price risk

Price risk coverage is crucial for farmers since it has been demonstrated that output price volatility acts as a disincentive, negatively affecting a producer's resource allocation and investment in yield improvement (Arias-Segura et al. 2015; Haile, Kalkuhl, and von Braun 2015). Protection against price variations is more common in developed countries since

most developing countries do not have a good market price reference, such as that offered by futures markets in United States and Canada, or are unable to forecast expected prices for the following harvest year. In Canada, for example, agricultural insurance is offered at the provincial level with the support of the federal government. The AgriInsurance program includes price insurance known as the Spring Price Endorsement (SPE) in Alberta (AFSC 2016), which provides protection for price decreases of 10% or more between the spring insurance price and the fall market price. Farmers also receive compensation whenever there is a price increase and, at the same time, a loss in yields, through the program called VPB or Variable Price Benefit (it should be noted that if the fall market price relative to the spring insurance price increases, but there is no loss in production, farmers will not receive any compensation). Since price insurance is normally complemented with yield loss insurance, farmers in Canada are in fact protected against income variations.

In the United States, farmers have the choice of enrolling in the PLC program that replaced the previous counter-cyclical program. Enrolled farmers receive a payment if the average market price during the marketing year is less than the reference price for each covered crop for which the farm has historical base acres. The indemnity is equal to 85% of the base area times the difference between the reference price and the effective price times the historical yield. This program does not pay based on planted acres of the commodity, but rather on the historical acres that have been used to decouple payments in the past. Therefore, a farmer is not obliged to grow the commodity for which he/she is receiving payments. This decouples it from the production decision even though it remains coupled to price, making it a somewhat hybrid program. The level of budgetary payments will depend mainly on the future real gap between the reference prices and effective market prices, and will also depend on the number of farmers enrolled in the program. As of 2016, the preferred program has not been the PLC but rather the ARC. The United States has reported the PLC (and also the ARC) to the WTO as non product-specific-Amber Box.

*Put options*⁵ is a private risk management alternative to deal with price risk, which has been adopted in the United States, Canada, Mexico and Chile (and is also being considered in Peru). Its adoption is easier than the alternative of hedging in futures markets, especially for countries that do not have, or are not included in a futures exchange. In Chile, through the government-subsidized AgroSeguros program, corn and wheat farmers can fix a minimum price in local currency by combining a put option on futures contracts and an option on the exchange rate (since the international price is in dollars). The list of commodities covered is limited to those that have an international market as reference, such as the Chicago Exchange for corn and wheat, where there is a high correlation of futures prices with local Chilean prices, liquidity and the high volume of transactions (AgroSeguros n.d.).

Revenue risk management

Income or revenue risk management instruments are those that provide coverage for both price and yield risk. The ARC in the United States is an example of this type of program. The ARC, under the Commodity Title of FB-2014, uses a five-year moving average of past revenues as a basis for payment. Farmers are paid as long as revenues fall 14% to 24% below the revenue guarantee. Payments go up when revenues included in the average are high and current prices come down over time, or if high yields give way to lower prices for some years. These payments are not coupled to current production. Farmers who choose ARC (who cannot enroll in the PLC) must select from among two types of programs: one specific to one commodity and based on county averages, and the other related to their individual farm.

In the European Union, the Community income stabilization tool has been adopted “in the form of financial contributions to mutual funds, providing compensation to farmers who

experience a severe drop in their income” (EC, 2011). Mutual funds are also eligible for ex-ante subsidization (EC, 2011, 2009b). As a result, mutual funds have recently been promoted in different Member States to complement predominant insurance systems.

Profit margins

The US Agricultural Act of 2014 replaced dairy product price supports and counter-cyclical income support payments with a new program called the Dairy Producer Margin Protection Program (DPMPP), aimed at compensating dairy producers for low margins in periods of low milk prices or higher feed costs.

Under the DPMPP, farmers pay an annual flat fee of USD100 to participate in the program, which provides catastrophic coverage of their historical average production if margins between milk prices and feed costs are below USD 4/cwt. This also gives dairy farmers the option of insuring up to 90% of their historical milk production by paying a premium according to the desired level of coverage, which goes from a margin of USD 4/cwt up to a margin of USD 8/cwt (details of the program and premiums for each coverage level are available in Novakovic 2014; USDA 2016).

The program is voluntary for dairy producers who must take an active role in selecting their coverage options each year. The margin is defined as the difference between the national average all-milk price and the formula-derived estimate of total herd feed costs (Newton, Thraen, and Bozic 2015). The premium, subsidized by the government, is fixed to prevent producers from trying to maximize compensation, and the program benefits and premium costs are independent of actual milk production. A margin for the previous two months of less than USD1.06/gal (USD4.00/cwt.) triggers a Dairy Product Donation Program, so that low-income groups will

5 A put option is an option contract giving the owner the right, but not the obligation, to sell a specified amount of product or security at a specified price within a specified time.

receive dairy products under domestic nutrition assistance programs.

Producers in the United States can opt out of the DPMPP and buy commercial insurance administered by the Federal Crop Insurance Program under the LGM-Dairy (The Livestock Gross Margin Insurance Plan for Dairy Cattle), which provides protection when feed costs rise or milk prices fall. Under this plan, the gross margin is the market value of milk minus feed costs, which is estimated using futures prices of corn, soybean meal and milk. This program is similar to buying a call option to limit higher feed costs and a put option to set a floor on milk prices (further information USDA 2015a).

In Canada, the AgriStability program assists farmers in cases of large margin declines caused by circumstances such as low prices and rising input costs. The reform introduced in 2013 lowered the percentage of margin coverage from 80% to 70% (i.e. increasing the payment trigger from a 15% to a 30% margin decline) and limited producers' reference margins to historically allowable expenses and harmonized compensation rates at 70% of producers' margin loss (previously there were three different compensation rates depending on the degree of loss). All these changes were adopted to enhance farmers' proactive risk management strategies (OECD 2014).

In the case of the European Union, direct payments helped to shield European farmers from strong fluctuations in revenues. Since payments account for nearly 20% of the income of European farmers, they are a source of income stability. Farmers also benefit from subsidized insurance programs, which compensate against losses which, under the CAP, may comprise yield, revenue or income (revenue minus cost) losses, caused by adverse climatic events, animal or plant diseases, pest infestation or an environmental incident (CMCC 2014). As a good complement, the new CAP for the first time includes a Community income stabilization tool based on risk-sharing schemes, which is primarily for mutual funds. The financial contributions to mutual funds (eligible for ex-ante subsidies) provide compensation to

farmers who experience a severe drop in their income (more than 30% of average income). Further details on the regulations for mutual funds may be found in Janowicz-Lomott and Łyskawa (2014)

Shallow loss

From 2015 onwards, US farmers who opt for the PLC and participate in the federal insurance program may take out an additional policy (SCO -Supplemental Coverage Option), designed to cover part of the deductible of the insurance. To receive an indemnity, farmers must provide evidence of losses incurred up to the level of coverage provided by their crop insurance policy. However, unlike individual-based revenue insurance coverage, SCO coverage is based on county revenues and yields. Participation in SCO has thus far been negligible.

The need for State intervention for catastrophic risk

When risk is correlated or shared by a large number of producers or economic agents, it is considered systemic. In general, systemic risk can cause so much damage that State intervention is required, because the private sector would be unable to cope or provide profitable protection instruments against it. Agriculture, in particular, is highly subject to systemic risk due to its exposure and vulnerability to natural disasters (droughts, excessive rain, high winds) which can affect contiguous territories or communities. (Arias-Segura et al. 2015)

In the case of the European Union, the Community has established preconditions for subsidizing insurance premiums. The European Union co-finances 75% of the Member States' financial contribution to farmers in the event of a formally recognized natural catastrophe, and when losses represent more than 30% of a farmer's average annual output. The financial contribution per farmer cannot exceed 65% of the insurance premium, and the insurance payments cannot compensate for more than the total cost of replacing the losses (CMCC 2014).

The State should minimize interventions when risks are not systemic, allowing the private sector to play its role or for farmers to assume any risk they can manage themselves. Risk transfer will be efficient and viable only within the framework of a comprehensive management strategy that includes preparing, anticipating, adapting to, and protecting against risks. When used in isolation, risk transfer instruments will produce inefficient interventions that are economically untenable for the private sector and unsustainable for governments (Arias-Segura et al. 2015).

Challenges and Opportunities for more market-oriented policies

The challenge for small and medium countries

The question is what can a small, medium or large country in LAC -with different levels of agricultural development, import dependence and stability - do to make agriculture more market-oriented? At the same time, these countries must protect their farmers in light of the situation in Europe and the United States, with larger scale farming and more technologically advanced producers, and where more public money is spent on protecting farmers.

First of all, with regard to expenditure on research, especially in larger countries, taking 10% or even 20% of the money that goes into trade distorting programs and allocating it to research on productivity, will make the world much better off. A study by the IDB finds that more than half of LAC countries are allocating over 50% of their agricultural budgets to direct support; therefore, a good recommendation for the Ministers of Agriculture in LAC would be to reallocate their budgets from private goods (direct support) to public goods. Empirical evidence shows that investing in public goods yields higher returns to society. In future, policies should be more targeted toward conservation programs, strengthening conservation reserves and related programs

that deliver broad environmental benefits to a country. For example, the EU's direct payments incorporate a compulsory greening component to support agricultural practices beneficial to the climate and the environment, but also include voluntary coupled support. A larger number of countries offer producers, on a voluntary basis, payments requiring the adoption of specific farm practices. Most of the conditions are linked to agro-environmental practices.

Secondly, insurance programs are potential approaches that are not intended to provide full guarantees but offer basic support in the event of major systemic losses, allowing farmers to quickly return to normal activity.

Thirdly, there are real gains from investing in infrastructure to improve competitiveness and boost the impact of research over the long term. Much needs to be done to strengthen markets and essentially to reduce transaction costs, so that producers and consumers alike benefit. Clearly, more problems arise if a country starts holding prices above world levels. Despite the criticisms leveled against China, the country has made significant progress in the last few years investing in infrastructure, especially in building roads. For a long time, China has also focused on building wholesale markets and retail markets, which do not always function perfectly, though the infrastructure is there. Just as the United States took steps in the 1940s and 1950s to deal with a period of low prices, China is now placing emphasis on marketing, and especially on research, trying to help farmers succeed by knowing how and when to sell their produce, how to address food safety issues and how to create a market where all interests are served. For China, an important task clearly illustrated above, is to find ways of improving public information so that more knowledge on prices is available, not only related to basic staples but also to input markets.

Challenges for more market-oriented policies

Despite the generally positive reforms toward a more market-oriented agricultural sector, there are still doubts regarding the distorting nature

and sustainability of certain policy instruments, especially in situations where prices trend downward, to the point of falling significantly close to the levels of 2009 or earlier.

In the United States, loan rate programs are still in place, which guarantee a minimum price for every bushel of output depending on what is produced, and are therefore not decoupled from production decisions. Since the mid-1980s, support levels had been well below market prices, but during the 1999-2002 crisis, loan rate payments went up, and were directly distorting because farmers received a higher price than in the market place. However, since 2006, loan rates have been well below observed market prices.

On the other hand, counter-cyclical payments based on fixed production are counted as non-product specific Amber Box if producers are free to plant other crops (or allow the land to be left for conservation). Since these payments are fixed on a base acreage and yield, they are really unconditional income transfers, in the same way that fixed direct payments are unconditional income transfer. Although these payments vary from year to year with prices, producers are not constrained to grow a specific crop.

The question still remains: if US payments to farmers as a percentage of net farm income were roughly 20%⁶ in 2014, how can they not be considered market-distorting? First of all, if one believes in pure theory, then lump-sum transfers do not influence economic decisions (in a sense, fixed direct payments are like lump-sum transfers)⁷. Secondly, the selection of payments to farmers in 2014 reflects the introduction of moving average revenue instruments, which are expected to decrease as prices decline. Lastly, in terms of degrees of distortion, risk management instruments and direct fixed payments are less

distorting programs. A likely scenario would be that those programs end up paying out even less than the fixed direct payments if markets were strong, and farmers chose the revenue guarantee programs. When market prices are high, there should be no problem because the world would be perfectly content to make farmers adjust to those higher prices. However, when prices are low, the distortionary elements come in, requiring more discipline in programs that tend to distort and insulate producers who, on average, are far better off than many other producers around the world.

It is worth mentioning that the newer programs developed in the 2008 and 2014 US FB are moving average revenue programs. Their key feature is that the guarantee moves down with market prices, so they behave like crop insurance⁸ which depends on expected prices. Therefore, if a program begins during a period of high prices (as in the 2008-2014 period), the moving average catches the first downturn, and once the first downturn is accounted for, if prices stabilize at a much lower level, these moving average programs do not provide much support. Based on this fact, the projection is for lower support levels in the United States by 2018, given that many farmers signed up for these types of programs. One key element to consider is that the Congressional Budget Office (CBO) already anticipates that farmers will be allowed to make new enrollment decisions in 2018; therefore it is likely that if prices remain low in 2018, the moving average program will fade out and the preferred policy instrument will be higher payments tied to fixed prices provided by the PLC program, over market prices. This means that there is still a risk of going back to market distorting instruments, despite recognition of the need to move away from policies such as stock accumulation, huge acreage set-aside and the export subsidies of the 1960s and 1980s.

6 More accurately, US payments include conservation payments as well as commodity program payments. A more appropriate average is 10% to count only Producer Support Estimate as a percentage of farm income (OECD 2016).

7 Even though in the real world many questions may arise about their possible effects on production.

8 However, these differ in two ways from crop insurance—they do not pay on current production and the moving average ties payments to multi-year fluctuations in prices and yields, rather than within-year changes, as in crop insurance.

The European Union has also made substantial progress in reducing the level of trade distorting support. Nevertheless, the CAP 2014-2020 allows Member States to use an increased share of up to 13% of the national envelope for commodity-specific payments (Blue Box policy) and in addition 2% can be allocated to protein crops. The VCS ceiling per Member State is currently 8% (2% for protein) of national direct payments, but a higher share of up to 13% (+2% for protein) is possible under specific conditions, and with the Commission's approval.

The challenge of being competitive in the world market

Given that developing and emerging countries often point out that farmers in developed countries obtain a large proportion of their income from subsidies, countries like China respond by increasing subsidies in order to compete with farmers from developed countries in the world market. However, more and more countries are pursuing policies aimed at dismantling some of the institutional barriers

that have prevented their farms from becoming more competitive. This sets a good example to other countries because they address productivity and competitiveness issues at their root, rather than trying to manipulate prices or incomes through very complex programs that are often subject to moral hazard and exploitation, not only by farmers, but also by other economic actors.

Even developed countries examine each other's policies and wonder whether they should adopt similar crop insurance and other counter-cyclical programs, despite the fact that such programs may be costly, especially if prices go down. In this context, the European Union deserves credit for having gradually evolved, since the early days of the Uruguay Round, towards more uniform and more market-oriented policies, though still with high subsidies. However, for a number of countries involved in the EU reforms, total payments are divided into a single farm payment, while the other portion is tied to a commodity, and that can be worrisome because it is market distorting.



 Regional Integration and
Market Development

Introduction

When referring to market development⁹, at least four levels of analysis or interventions, and their interactions, should be taken into consideration (Díaz-Bonilla, Orden, and Kwieciński 2014):

- The first level of analysis is the supply side at the farm level;
- The second level is the demand side, which depends on the functioning of the whole economy and trade opportunities;
- The third level is the value chain, which covers the flows of products, inputs, equipment and services related to primary production activities, processing, transportation and marketing of agricultural products, and their linkages. Farmers are geographically embedded in the rural and regional economy, and economically, in agricultural value chains.
- The fourth level of analysis is the rural/ regional economy, which establishes

linkages between agriculture and the non-farm economy.

The implication is that many objectives and potential instruments and actors are at stake in market development and regional trade. All these levels of intervention are encompassed by the general economy and country-wide governance and institutions, policies, investments and regulations (Díaz-Bonilla, Orden, and Kwieciński 2014). The exchange rate regime is one of the most important policies affecting economic integration (see Box 5), although other macroeconomic conditions are also critical, such as infrastructure, remittances (an important factor for change in Central American countries), or the changes in the oil industry, which greatly affect countries like Trinidad and Tobago and Venezuela. Therefore, countries must address microeconomic issues and at the same time integrate regionally in a context of greater macroeconomic dynamism, more evident with the increasing exchange rate volatility.

9 Market development can be understood as expanding the market for a product, company or country, by identifying or entering into a new geographic or demographic segment of the market, discovering new users or new uses for a product, or by promoting an increase in current demand.

Box 5

Exchange rate policy

The Caribbean sub-region has different exchange rates, but at the same time several smaller countries have a common currency. In the case of Central America, El Salvador is dollarized, while other countries have different types of floating exchange rates. In the case of MERCOSUR (Common Market of the South), at one time, the Brazilian real was equivalent to 1.3 per US

dollar, but five years later it was nearly 4 per dollar, reflecting high market volatility. The problem is that there is no clearing facility for exchange rates amongst LAC countries. Therefore, to obtain products from any country in the region, the price must first be converted into US dollars and then to the local currency, which can be cumbersome.

It is worth emphasizing that for integration processes to be positive and serve as allies of domestic agricultural policies, they must improve the incomes of producers and actors throughout the value chain. Without this direct relationship, agricultural policies generally move in a direction contrary to the integration process.

The first section of this chapter examines the experience, trends, challenges and opportunities for regional integration in the Americas; the second part deals with domestic market development; the third part discusses access to international markets, with special emphasis on China; and the fourth part summarizes China's interest in investing and engaging in agricultural development activities in the LAC region. The focus on China is explained by its importance as an export market for LAC agricultural products, and the recent changes in its agricultural policies, trade and investment strategies, which can significantly affect Latin America and the Caribbean.

Regional Integration in the Americas

A new Regionalism in Latin America and the Caribbean?

Regionalism is an important domain for development in LAC, but is somewhat challenging to understand when trying to map LAC integration and the participation of countries in different initiatives, resulting in the so-called "spaghetti bowl effect." This expression was first used by Jagdish Bhagwati to describe products and parts circulating around various FTA (Free Trade Agreement) networks using tariff differentiation (Bhagwati 1995), and more recently, different rules of origin, making geographical trade relations very complex. It is a confusing context in which countries that participate in the Mexican integration system also wish to form part of the Pacific Alliance, which can sign trade agreements with third parties that do not always harmonize with their customs rules. Far more debate is needed in LAC about regionalism, which is often considered the same when referring to the Pacific Alliance as when discussing ALBA (The Bolivarian Alliance

for the Peoples of our Americas) or the SICA. In fact, each case is very different, and therefore requires different approaches and instruments.

The range of agreements is huge and very different in nature and scope. On the one hand, there are FTAs or tariff preference areas such as the Pacific Alliance, CAFTA (Central American Free Trade Agreement) or NAFTA (North American Free Trade Agreement). On the other hand, there are regional integration processes which have aspirations - not always successful - to build customs unions or common regional policies, such as MERCOSUR, CARICOM (Caribbean Community), SICA (Central American Integration System) and CAN (Andean Community of Nations). There are also collaborative regional initiatives of a complementary nature, such as ALBA, the ACS (Association of Caribbean States) or UNASUR (Union of South American Nations). These three types of regional initiatives are of enormous interest to the region but are different in scope and approaches.

Trade among the LAC countries is not as great as expected, in terms of market access and high prices for certain commodities, suggesting that many aspects of integration are still 'on paper'. Some countries, such as Brazil and Argentina, have developed overseas markets and export heavily to the Chinese market, which is great for them. However, this is creating a degree of division within the LAC region between countries that supply their local markets and those that have developed overseas markets. Nevertheless, the markets in Europe and the United States remain important for LAC countries.

There has been a clear transformation in the process of regionalism in LAC. This is the result of the exhaustion of the predominant model of open regionalism, associated with the debate on the limits of globalization, the crisis in multilateral negotiations, the emergence of mega-regional trade agreements such as the Trans-Pacific Partnership (TPP) and the Transatlantic Trade and Investment Partnership (TTIP), the decline in opportunities in North-South trade and the unconsolidated-South-

South trade that demands new functions from regionalism. There is also a new and growing consensus on the need to move beyond the traditional view of regionalism as an instrument for sales, to a new regionalism as an instrument for production and insertion in global value chains.

Regionalism is becoming more strategic and pragmatic in the LAC region. It is moving away from the fake dilemma of intergovernmental versus supra-national approaches, toward initiatives centered around a development agenda, beyond trade, and more focused on thematic and relevant social, economic or environmental issues. It must be recognized that other more recent developments add further complexity to the evolution of regionalism. The recent US withdrawal from the TPP, the possible renegotiation of NAFTA, and Brexit (British exit from the European Union), are just a few examples of how difficult it is to anticipate the shape of future trade negotiations and regional integration.

The Caribbean Regional Integration

A common theme across the region is the existence of many agreements that have underperformed for agriculture. It is a contradiction that most agreements give preferences to the developed countries, but when it comes to implementing those same agreements among countries within the hemisphere, those preferences are not granted. For instance, the Dominican Republic (DR) has given preferences to the United States and the European Union, but those same preferences are not available to CARICOM countries entering the Dominican Republic market.

The "spaghetti bowl effect" has created such confusion, that countries in the region are at a trading disadvantage *vis à vis* developed countries. The disadvantage is even greater if we take into account the subsidies, income support measures and domestic support programs available in developed countries. Some preliminary computations, based solely on the CARICOM, indicate that if some of these

regional preferences, given only to the developed countries, were eliminated and made available to CARICOM, an additional USD 1 billion worth of trade could be created in five years. To cite some examples, beer, which is CARICOM's third largest export, is at a disadvantage when exported to most LAC countries, but duties fall rapidly when imported from the United States. A similar situation applies to glass bottles with 14% duty-free from outside the region, even though CARICOM is the largest in terms of production going to the Dominican Republic. More broadly, there is virtually no trade in animal and meat products taking place between the countries of the hemisphere and CARICOM. Products must normally pass through the United States. Examples of trading opportunities are Chile and Argentina, which are keen to export beef to the CARICOM; Jamaica is interested in exporting chicken into Brazil, and so on. This is not trivial because poultry is CARICOM's largest import, so the question is whether it is really feasible to create these markets.

One major drawback is the lack of a regime for investment, services and technology transfer in any of the agreements among CARICOM countries. Thus, returning to the previous argument, the fact that such regimes are in place with the EU naturally poses the question of why there has been such limited progress on regional agricultural market development.

It is necessary to focus on re-orienting the regional integration systems away from an inward-looking approach, in which efforts are still being made to develop input supply systems in a world where demand systems essentially call for an opening up. This requires progress in specific areas. For one thing, there should be no restrictions on attracting inputs, technologies and other factors of production from all over the world because it is what consumers demand. LAC countries must revisit their own trade policy systems to change rules of origin, tariffs etc. which have been in place for 30 years, in the case of CARICOM, and for 15 to 20 years in other cases.

Box 6

International Standards and Regulations

Some changes that are occurring rapidly in the TPP and TTIP negotiations may have significant impacts on the future of markets. One has to do with regulations, a source of tension between the United States and Europe, and a topic that has taken over from commodities issues (such as price supports) as the main area of negotiation. As a result, discussions are taking place within those mega-negotiations on issues such as the use of hormones in animal production, antimicrobial washes (for sanitizing poultry against microbial contamination), genetically modified organisms (labelling and production), and the issue of geographical indications and names

of specific products that the Europeans in particular wish to protect in their markets.

Convergence or progress on these regulatory issues is important to LAC countries because it would be affected greatly by any policy changes in the United States and more likely in the European Union.

Although it is important to keep an eye on the EU CAP, it is equally important to pay attention to regulatory issues that have become so important to global agri-business and even to small producers, as they try to access specialized markets.

Secondly, countries must look at their consumer rights. The current system is somewhat archaic because it focuses on derived demand across producers, without a mechanism to take on board consumer rights and consider changing consumer demands and needs. Doing this can certainly unlock the hidden potential of interregional trade.

Thirdly, and in some way related to consumer rights, there are no internationally accepted standards and regulations. Therefore, implementing sub-regional mechanisms for formulating, agreeing on and enforcing standards and regulations is a matter that requires major attention. One issue that stands out is animal health and phytosanitary regulations; statistics show that there is virtually no trade taking place in meat products, and as regards phytosanitary regulations, a number of trade barriers still exist. Another key aspect is how to deal with the issues of dumping and unfair trade practices. In many countries, the institutional architecture for addressing these matters is simply not there (see Box 6 for more details on international standards and regulations).

Fourthly, an urgent matter is infrastructure in all its dimensions. Every country in the region has tremendous potential but the infrastructure for delivering services, including transportation, remains very deficient. It is noteworthy that products transported from Guyana to Brazil, which is “next door”, must first go to Miami, and then travel south. It is still the case that products transported from Jamaica to Belize, which is just across water, must first travel north before heading south again. The difficulties involved in moving goods from one Caribbean island to another are due to a lack of infrastructure, but are also related to the issue of information. On any given day, tremendous opportunities arise in one market while in another within 200 miles, there is over-supply. Clearly, any transportation problems are exacerbated in the case of small countries and small suppliers.

Finally, there is another issue related to the institutional framework: the Secretariats and

the regional integration processes do not hold internal meetings. In fact, there is no “intra-mechanism” for discussion between the integration processes and the Secretariats. In other words, there is no longer a framework for CARICOM to talk to SICA, or for SICA to talk to the Central American group, and no talks are going on with MERCOSUR or with UNASUR.

This represents a larger problem for countries such as Suriname, a member of CARICOM and also of UNASUR, because without coordinating mechanisms between both bodies, these countries are not sure which commitments they should follow and this creates confusion. Another example, is Belize which belongs to SICA and CARICOM. Therefore, mechanisms for policy dialogue must be established across the regions if the process is to make sense. This will facilitate discussion of technology transfer, renewable energy, the role of youth and other topics across each other’s domains. The fact that these topics are not included in a process of information exchange prevents a policy dialogue from taking place.

A framework for dialogue and exchange is needed to bring together the developments occurring in Central America, with 56 million people, and those occurring in the enhanced CARICOM, with 17 million people, and with rapidly growing incomes in Barbados, the Bahamas, Guyana, Suriname and other countries. The framework should be used for intra-regional trade growth, not just in Central America or the Caribbean, but also among countries where agreements already exist, but are not being used. A framework is needed for establishing a dialogue and creating a common vision, in order to define a set of common actions. The political framework will not be sufficient, unless the private sector provides support with concrete political actions on the ground.

Finally, it is worth noting that although CARICOM continues to regard intra-regional trade as stagnant, several initiatives are under way that will hopefully make a difference. One is the Caribbean Community’s Common Agricultural Policy, which IICA helped to

develop. A second initiative is the Regional Food and Nutrition Security Policy (CARICOM Secretariat 2011) in which IICA, FAO and the CARICOM played a strong role in bringing all the countries together around a common agenda, within the CARICOM integration framework. A third initiative is the recently signed CARICOM Strategic Development Plan (CARICOM Secretariat 2015), which establishes a very clear role for agriculture, setting up a framework for agricultural policy cooperation. A fourth initiative is the OECS Growth and Development Strategy. The OECS is the economic union of the Eastern Caribbean that promotes integration, focusing not so much on trade-related benefits, but rather on those derived from functional cooperation, including benefits for agriculture. The last of these five key actions is the Jagdeo Initiative (or the Regional Transformation Programme for Agriculture) which, along with the other four initiatives, underpins the CARICOM agricultural policy.

Regionalism in Central America

Central America is a unique example of regionalism, reflecting a balance between interests and incentives, development agendas, institutions and institutional competencies. Since 2004, five main policies have been designed in Central America, which stand out in terms of their potential.

The first consists of a set of regulations -not limited to market access- on customs harmonization, derived from the negotiation of regional agreements among member and non-member countries of SICA (the Central American Integration System). The second is the integration policy on fisheries and aquaculture. The third is a joint negotiation for medical procurements in the health systems of Central American countries. The fourth is the Central American Security Strategy in the context of addressing violence in the region. And the fifth is the Central American Strategy for Territorial Rural Development (ECADERT), which is a political framework of interest for the future.

The integration process in Central America encompasses agricultural and rural policies with specific benefits for a region that shares common problems. Central America has produced three regional common policies in last few years. One is the Central American Agricultural Policy based on competitiveness and agribusiness. The second is the Regional Agro-Environmental and Health Strategy, which is an inter-sectoral strategy based on agro-environmental management; and the third is the Central American Strategy for Territorial Rural Development (ECADERT, for its Spanish acronym), mentioned previously because it does beyond the agricultural sector and encompasses a territorial approach.

In thematic terms, seven regional priorities have been established by the Ministers of Agriculture of Central America: climate change and risk management; family agriculture; rural area-based (territorial) development; agricultural health and food safety; technology and technological transfer; competitiveness, trade and agribusiness; and food and nutrition security.

The experience of the Central American Agricultural Council (CAC) as part of the Central American Integration System is valuable, not necessarily because of its success, but because of its importance as a platform for action in the region. For one thing, it has a distinctive method of work compared with other sectors, with consensus on how to share competencies among national and regional institutions, giving greater participation and leadership to national institutions that had very limited roles in the past.

At the national level, the Ministers of Agriculture in Central America have had little presence and political weight. Their participation in trade negotiations has been secondary with respect to that of Ministers of the Economy; therefore, the agricultural sector has been more relevant at the national level than in the regional domain. Regional policies

on rural territorial development have inspired domestic policies; one example is the timing and alignment at the regional and national level, between ECADERT and the national policies of Costa Rica, Dominican Republic, Belize and, to a lesser extent, those of Guatemala and El Salvador.

Given that the Central American countries are relatively small, the external conditions of the agrarian sector have a regional dimension that must be incorporated into policy design. Without a regional scope, countries are very limited in what they can do to address problems such as infrastructure, natural disaster management, energy dependency, trade negotiations and technology transfer.

As a final thought, it is pertinent to ponder whether regional public policies derived from the above-mentioned new regionalisms are effective or not. We need a critical evaluation of the outcomes of policies from the regional integration process. One critical element is that the institutional framework must evolve to effectively give content to policy guidelines and strategies, because there has been much discussion on how to do it, but little on what to do. The need for capacity-building is particularly evident in trade negotiations on supply chains or value chains, in order to generate programs or initiatives that take advantage of created opportunities. The case of CAFTA is illustrative: after 10 years of implementation, more needs to be done to ensure that it becomes a factor for the modernization of the agricultural sector, and to turn agriculture into an instrument of productive transformation in Central America. To be successful, CAFTA must have significant impacts in terms of employment or poverty reduction. Furthermore, it is important to place its ineffectiveness in the context of domestic public policies and international cooperation programs that need some rethinking. International cooperation in Central America

faces the challenge of becoming an incentive to optimize the lack of efficiency in the use of financial resources, rather than contributing to the dispersion and disconnection of initiatives in the region.

The Common Market of the South (MERCOSUR)

Despite the fact that MERCOSUR was established with the aim of creating a customs union through the Treaty of Asunción and various international agreements to promote a single market, for ten years the Common Market of the South has focused more on political integration, lagging behind in economic integration in agriculture. However, MERCOSUR has the potential to generate far greater benefits for the agricultural value chains of its member countries.¹⁰ With an increase in benefits, wealth, or wellbeing, the Ministers of Agriculture will become more interested in participating in and promoting the harmonization of MERCOSUR, which faces significant challenges in terms of economic and trade integration, with perforated common external tariffs, and with over 3,000 harmonized technical and sanitary measures that are difficult to comply with.

MERCOSUR is envisaged more as a forum for coordination to send political messages to the world; however, it also has great potential to provide solutions to producers and generate added value to productive and commercial chains in the sub-region. In a scenario where prices are trending down, economies have weakened and countries are going through complex political situations, the challenge is to avoid the temptation of introducing more subsidies and spending more public money. Instead, innovative solutions should be offered to promote intra-regional trade, competitiveness and market efficiency. A natural alternative would be to wait for agreements at

10 Full members of MERCOSUR include Argentina, Brazil, Paraguay and Uruguay. Chile, Bolivia, Colombia, Ecuador and Peru are Associate members of MERCOSUR, while New Zealand and Mexico are Observers.

the multilateral level, but the Doha Round is currently facing major obstacles which have limited its progress.

Without a multilateral response, a likely scenario is one of more distortionary agricultural policies, with policy instruments for the development of markets that will run counter to the process of regional integration in the coming years. The promotion of free markets leading to regional integration is an alternative to the application of domestic subsidies and import restrictions.

In a sense, the international transition from a unipolar world to a multipolar world, and then toward an undefined one, is lacking the maturity to adopt multilateral compromises. In this transition, net food exporters like the MERCOSUR countries need to find formulas to increase their international insertion. One alternative is to reformulate the regional integration processes, so that the current vision of political articulation can coexist with historic, traditional and anachronistic schemes of economic-trade integration. Future integration processes must be redefined to respond to the specific needs of agricultural producers in relation to shortcomings in infrastructure, transportation and services. This implies real physical integration beyond just economic-trade integration, which will make Ministers of Agriculture feel more comfortable about promoting regional integration rather than opposing it. However, we must also recognize the progress made, with the collaboration of international organizations, in generating public goods to reduce information asymmetries and transaction costs, among other efforts.

MERCOSUR can promote investment funds and financing for infrastructure, transportation and services, so that politicians feel more comfortable and can redefine their agricultural policies in favor of a real integration. This is the real challenge ahead - otherwise, each member country of MERCOSUR would be tempted to negotiate alone with Europe, the United States, China, or the BRICS (group acronym for Brazil,

Russia, India, China and South Africa), and this will halt the process of regional integration.

Despite the difficulties, MERCOSUR can achieve coexistence between political articulation, short-term policy objectives and physical integration to produce improvements in value chain incomes in the region. Thus, the challenge- without waiting for solutions at the multilateral level – is to find ways to attract sufficient public and private investment in infrastructure, transportation, services and innovation technology, another fundamental pillar of regional integration.

Market development and access to international markets

The development of domestic markets is a necessary condition for regional integration and, in general, for a country's competitive and efficient insertion into the world economy. A country must also consider the capacity of its domestic market to compete with imports. This is not only true for more export-oriented countries, such as Chile and Canada, but also for countries that are more focused on their domestic markets, such as Brazil and China. Below are examples of policies and actions that countries in the region have implemented to achieve market development and improve access to international markets.

Expansion and integration of internal markets in Canada

Given that Canada's agricultural sector is very export-intensive, it is no surprise that its government engages in a great deal of trade promotion. Aligned with this effort are policies to develop the internal market. Part of the strategy is to shorten the supply chain between the farm and the end consumer, giving Canadian farmers an advantage in terms of adaptation to consumer-led changes in tastes and demand for their food products.

The Agricultural Competitiveness program recognizes that farming is a business in the context of a market-driven economy, and that producers are in business for profit and income. The program's actions address pressure points such as value-added to consumers, value for money, overall production costs and the tailoring of specific products to new markets. The role of the national government is very important in areas such as quality assurance, food safety and inspection of incoming and outgoing products. Quality assurance is essential, both from the point of view of Canadian consumers, and also to assure trading partners of the quality of Canadian products. At the federal and provincial levels, governments spend a lot of time trying to ensure that the legislative and regulatory environments are robust from a health and safety point of view, but also dynamic and responsive so that the sector can grow.

In terms of shortening the supply chain, considerable resources are invested in studying consumer habits. In the developed world, consumers are increasingly demanding quality assurance and higher standards, specific attributes in their food (usually related to health) as well as nutraceutical properties. Some are becoming ever more selective and demanding about the food they wish to consume. Certainly, in North America, over the past five years, people have shown a very high degree of interest in the provenance of food, how it is made, the type of production system used and its safety, which has become particularly important. Consumers often trust a particular brand; Canadian companies know this and worry considerably about maintaining their reputation, and ensuring that the brand expresses the kind of values that consumers want. However, value for money continues to be an important factor for most consumers, so in a sense they want to "have their cake, and eat it too."

Chilean export market development

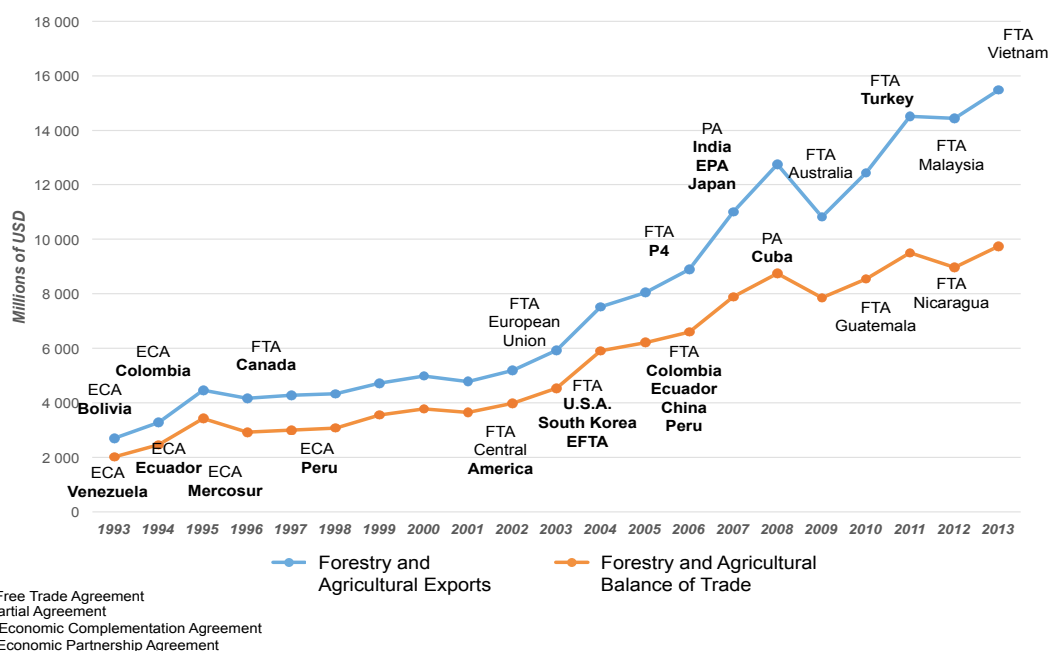
Chile is probably the leader in LAC in terms of opening up its domestic market to international competition by lowering tariffs and signing trade agreements (bilateral and multilateral) with countries that represent 86% of world GDP and 62% of the world population. This means that hundreds of millions of people consume Chilean products. A country that unilaterally reduces tariffs sends a potent message for dialogue, being so small and yet open to trade.

The country has focused on consumers and on meeting their needs in terms of product quality, standards, processes, nutritional value, social values and ethics associated with the product. Policy changes and trade openness have primarily served to promote fruit exports, which account for about 40% of total forestry and agricultural exports, or USD 4.4 billion, reaching more than 1.7 billion consumers in over 100 countries around the world. Chile is the world's first or second exporter of blueberries, grapes, apples and other fruits such as plums and raspberries. Other major exports are from the forestry sector (20% of total forestry and agricultural exports), and from the wine and alcohol industry (13%). Chile has also positioned itself internationally in seed exports, in alliance with major multinational seed companies, which has prompted some internal debate about its position on seed production and its domestic commercialization.

The increase in Chilean exports has followed a clear path alongside the signing of trade agreements (Figure 5). The first economic integration agreements began in 1993, with Bolivia and Venezuela, when exports stood at around USD 2.5 billion. In 2013, with the Vietnam FTA agreement, followed by one with Malaysia, export earnings increased to around USD 15.5 billion, six times higher than 1993 exports. As to the trade balance, this has been positive and increasing, generating a major gap between the country's exports and imports. Basically, exports have increased in response to market diversification and the minimization of external market shocks.

Figure 5

Evolution of Forestry and Agricultural Exports and Balance of Trade (millions of USD)



Source: ODEPA

With regard to Chile’s imports, the main products include cereals (16%), bovine meat (15%) and oilseeds (15%), for a total of around USD 5.7 billion in forestry and agricultural imports.

By 2013, after two decades of this export policy, Chile’s GDP stood at around USD 250 billion while the Forestry and Agricultural GDP was close to USD 6 billion. However, if we include the linkages with agricultural primary products generated through the agroindustry and service sectors, then the so-called expanded agricultural GDP increases to USD 15 billion, about three times the initial amount, showing how openness has positively impacted Chilean exports of value added agricultural products. Source: ODEPA, Chile.

The decision to reduce tariffs was complemented with a series of trade agreements, which have positioned the country internationally, garnering

political will and the general support of the private and public sectors.

The experience gained by the private and public sectors, in terms of negotiating capacity and human capital, has been extraordinary. However, the connectivity of the information and communications networks has been a major institutional challenge.

The policy of trade openness has been successful and beneficial for the country in general, but particularly good for specific sectors with technological and human capacity, and access to financing, who have been able to take advantage of the opportunities generated by trade.

Nevertheless, this openness has also had its shortcomings and gaps, not only in institutional terms, but also in the social arena, with many stakeholders and sectors being left out. For example, there has been a decline in traditional

crops, according to the last three censuses. However, the reduction in cereals, oilseeds and forage plants has freed up production areas that are dedicated to more profitable crops for the export market, generating higher returns. The increase in production areas for fruits, vineyards, seeds and forestry is obviously focused on those sectors geared to the export markets. The production of vegetables for the domestic market has remained stable, and has maintained a similar area of production over time.

ProChile, a program implemented by the Ministry of Foreign Affairs for the promotion of Chilean exports, is widely acknowledged as having played a critical role in the country's export growth. Its Internationalization Plan was launched in 2001 to improve the export skills of existing small-scale exporters and to help new small and medium enterprise (SME) exporters. This program, along with the Interpyme program for industrial SMEs, provides systematic training to companies in aspects such as production, market research, logistics, marketing plans, banking, international law, searching for partners and the export process. About 90 percent of the cost for a one-year program is covered by ProChile if participants meet predefined criteria. ProChile has played a major role in boosting the country's share of exports, promoting product and market diversification and facilitating technological and management improvements (Taglioni and Winkler 2016).

Support for commercialization in Brazil

Improving the commercialization of agricultural products is a priority for market development. This is accomplished through efficient and transparent price formation, access to timely information, lower transaction costs, improving the quality of products, innovation, value added and lower food waste and losses, among other things. Brazil is a good example of inclusion of small farmers and the development of institutional markets.

In Brazil, the commercialization support programs are an important policy instrument. In addition to the procurement program, there is the PAA/PRONAF (a program for purchasing food from family farmers) run by the Ministry of Agricultural Development (MDA), the Ministry of Social Development (MDS) and the National Supply Company (CONAB), for the purpose of helping family farmers and small-scale producers to market their products. The government allocates resources to support farmers so that their incomes do not fall dramatically, and also carries out operations to reach small rural farmers to guarantee them a reasonable level of commercialization. It considers that the State should play an important and necessary role in directly supporting the marketing of agricultural products. The program's main categories include stock formation (acquisitions and procurement contracts) with a budget of USD 231¹¹ million (adjusted annually) in 2013/2014, a budget of USD202 million for the subsidy program that guarantees a minimum price to producers selling directly to the government (the PEP program), USD 99 million for the PAA/PRONAF and USD 339 million for a harvest price guarantee program. The total allocated to the commercialization program in 2013/2014 was USD 797 million, according to the Agricultural Policy Secretariat of Brazil (SPA). The purchase of products from small farmers is part of the Zero Hunger Program, which promotes school feeding programs, "eat local food" programs and the consumption of fresh fruit and vegetables.

China as an export market for LAC countries

Given China's strategic importance for Latin America, this final section of the chapter summarizes the challenges, opportunities and risks involved when exporting agricultural products to China, and reviews China's interest in agricultural investment and engagement in development activities in the LAC region.

11 Conversion rate of 2.5063 Reais/USD

Opportunities for exporting to the Chinese market

Trade with China implies both opportunities and risks. It is probably wise not to be too euphoric about the opportunities and to recognize that there are some risks to be addressed.

In terms of opportunities, China is one of the world's largest and fastest-growing economies. It is second in size only to the United States and has been growing about 4.3 times faster. At the same time, the country is undergoing an enormous demographic change with the phasing out of the one-child policy and the introduction of the new two-child policy, which went into effect in January 2016. With plenty of resources allocated to education and the development of a large middle class, a new market for agricultural products is being created because people are becoming wealthier. The Chinese are switching to diets that are higher in protein, thereby generating market opportunities for some products sourced from the Americas, especially beef, a relatively new addition to the Chinese diet, whereas chicken and pork have historically been part of Chinese cuisine.

China has a huge population base, which contrasts with a relatively small and shrinking land base due to urbanization, desertification, contamination and forest restoration efforts. A process of modernization is currently under way with the aim of improving agricultural efficiency, given that average farm size is very small (average of 0.6 hectares), even though China has the largest share of the world's agricultural area (11%, according to Lowder, Skoet, and Singh 2014). China is a vast country that devotes only 7% of its land to agriculture and contains only 6% of the world's water resources, yet it must feed 22% of the planet's population. In fact, China's demand for agrifood products is expected to grow faster than any

increase in production of agricultural products. This will result in a negative food trade balance, with a tendency to increase, due to a rapid surge in the share of urban population, fewer people dedicated to agriculture, low agricultural productivity and a middle class projected to grow 44% by 2020 (close to 600 million people). Agricultural output is growing at about 4% annually, on average, equivalent to about half the growth rate of overall GDP

The negative agrifood trade balance is almost USD 87 200 million (data for 2015, WTO 2016), and growing; therefore, China's imports greatly surpass its exports. One major sector in deficit - and therefore an export opportunity for the Americas - is the livestock sector, with rising demand for dairy products (Chile and Costa Rica recently gained access) and for all types of meat (beef, pork, poultry). Also important is the fruit and vegetables sector, which faces some difficulties given that import standards are set too high, as explained further on. China is a major export market for several countries in the Americas, including Chile, Brazil and the United States (see Gale, Hansen, and Jewison 2015; Gale and Yang 2015). For example, Chile maintains a positive total trade balance with China of about USD 3,700 million (2014), of which 60%, or about USD 2,300 million, consists of agricultural products.¹²

With China's rural populations migrating from the farms to the city centers and farmers aging, the country faces a number of challenges in its effort to increase productivity to meet its food and health goals efficiently. China still has many depressed agricultural areas that employ little technology, but has made tremendous progress in lifting more than 500 million people out of poverty, reducing the poverty rate from 88 percent in 1981 to 6.5 percent in 2012 (The World Bank n.d.). Therefore, many Chinese policies are directed at guaranteeing a certain income level in the transition process toward the transformation of the sector.

12 Despite the fact that copper accounts for a high share of Chilean exports, the country also relies heavily on imports of oil, machinery and motor vehicles, among other industrial goods from China. By contrast, Chilean agricultural imports from China are small and limited to a few products such as fertilizers, fish fats and oils and cotton.

To produce more, China faces the challenge of increasing agricultural efficiency and productivity, which will be reflected in urban salaries and incomes growing much faster than in rural areas. But in order to increase agricultural productivity, given the experience of more than three decades in Brazil and other countries, China must overcome scale inefficiencies. In response, Chinese officials recently launched a major campaign for a new agricultural growth model, moving away from the small-scale production model to a larger-scale and more market-oriented model, with greater attention paid to environmental impacts. They are also experimenting with new types of commercial-scale operations without changing the collective system of farm ownership. The scale is being increased through farmer cooperatives or what are termed family farms.

Access to and availability of formal credit is another serious problem, since there is no private property in China, but this issue is in some way compensated by the high savings ratio in the country. Without collateral guarantees for banks, credit is not available to farmers. By contrast, the experience of Brazil is worth mentioning. It has been fifty years since the national system of rural credit established a provision requiring all banks and Brazilian financial institutions to provide credit to farmers. Nowadays, 80% of agricultural families have a credit contract through the national financial system. Credit availability and access are a must when confronted with the efficiency challenge that requires a greater use of modern inputs such as fertilizers, certified seeds and transgenic services etc.

Another problem that has arisen over the last few years is the lack of trust among China's more sophisticated consumers in their own domestically produced foods, due mainly to food safety concerns. Indeed, Chinese consumers are prepared to pay more for a product that they feel meets higher standards, giving an advantage to countries that are internationally recognized for their products' high quality and safety standards. These challenges constitute opportunities for countries in the Americas that export agricultural products to China.

The risks involved in exporting to China

Despite the huge potential offered by the Chinese market, there are also some risks. One major risk is the political interventions that affect market prices and create volatility. Associated with this are a number of regulatory issues concerning the recognition of international standards, such as the use of GMOs or agreements on regulatory processes. For example, to ensure low-level presence of pesticides, testing facilities should match the testing carried out in countries that export to China. Unfortunately, political interventions are sometimes used as a tool to keep products out of the marketplace. Therefore, a more transparent regulatory system is needed, based on science, not on politics.

Other risks are market-related. For example, a country like New Zealand develops a production system around juice and milk and becomes a major supplier of those products to China. Everything goes well until China builds up huge stockpiles of milk and other commodities, which basically results in imports of those products being cut. Clearly, if countries tie themselves too closely to the Chinese market, they become extremely vulnerable to such market decisions. Therefore, market diversification is the key to coping with market volatility caused by policy changes in China. Chile, for example, exports not only to China but also to a number of East Asian countries that are members of ASEAN; thus, a downtrend in one market can be compensated with an uptrend in another market in Asia, the Americas or in the European Union.

An issue of particular interest to countries in the Americas is the type of trade agreements that are being put in place. Australia, for example, now has a trade agreement with China, which makes Australia more competitive, based not on quality but on lower prices. Once an exporting country loses market share, getting it back is not an easy task. Therefore, an efficient monitoring system is required to keep track of market changes, as well as any changes in domestic production, in order to understand whether or not China is going to meet domestic demand for food, and long-term strategies should then be

developed for exports, avoiding high volatility of exports into China, in terms of value and volume.

Still on the market side, China's exchange rate policy is a risk that importers and exporters alike must face on a daily basis. After years of appreciation of the yuan, in 2015 China devalued its currency thereby affecting the markets. This was a reminder that China can make its currency play an important role in the global context. Immediately after the incident, Chinese officials explained that there was no express policy for devaluation of the currency and that the yuan was responding more and more to market forces. This removes the pressure from a likely currency war or a confrontation in the region due to the yuan's devaluation.

Despite China's efforts to implement market reforms leading to its entry to the WTO, many do not regard it as a market economy. It remains to be seen how China will manage its subsidies and antidumping policies, which are a source of uncertainty for any country trying to compete with China in the world market.

Challenges for LAC's entry to the Chinese market

The LAC countries (especially those with a FTA with China) are not coordinating their efforts to access the Chinese market. Although the LAC countries cannot match the number of officials that the United States or Canada have installed in Beijing, they could nevertheless establish some kind of coordination or trade facilitation mechanism in China that would provide the necessary support to gain access to institutions, address difficulties and comply with the complicated paperwork, permits and formalities required to enter the market.

Even Costa Rica, which has signed a FTA with China, does not enjoy preferential treatment in relation to sanitary and food safety requirements. Since China is a WTO member, one would think that it would be sufficient to comply with standards such as the Codex Alimentarius, but the fact is that China has its own protocols for each product imported into

the country. The standards for entering the Chinese market are even higher than those of the European Union and the United States, representing a dichotomy between the need to attract imports and the difficulty of entering the market. On the other hand, the complex standards and high tariff rates tend to coincide fairly well with China's import preferences. For example, the processes for soy are relatively simple and the tariffs are relatively low. However, this is not necessarily the case for fruit, given that China has been working to develop its own labor-intensive fruit production capacity. It took five years for Costa Rica to export dairy products, bovine meat, orange juice and teak wood to China; other products, such as bananas and melons, with huge opportunities, also face difficulties in gaining access to the market. Bananas are considered a sensitive product in China because the island of Hainan in southern China (almost the size of Costa Rica -38,000 km- and with a tropical climate) produces bananas. One possibility is to establish a coordination mechanism to facilitate procedures for countries such as Costa Rica, Peru and Chile that have a FTA with China.

China is an evolving market that does not have a single import channel. The traditional channel is through a major importer that helps with customs requirements; however, the real opportunity lies in directly accessing the consumers of what is considered the world's largest market. E-commerce is an effective alternative for reaching the Chinese consumer directly, but with enormous challenges in terms of logistics, food safety and proven quality. An example of a good practice seen in China is the meat exported from Uruguay with a barcode that contains the history of where and how it was produced, which provides tremendous confidence to middle-income consumers with the greatest concerns about quality and food safety. Another example is Chile, which has done an excellent job marketing Chilean wine to the point where it is available in many major stores in Shanghai.

Finally, an important message is that in order to enter the Chinese market, it is essential to have a partner (private or public-private), because no

single company can enter this market by itself, and sometimes it even requires the support of a government. The size, complexity and diversity of the Chinese market is so overwhelming that this task is best managed through a joint effort between the private and the public sector.

China's interest in investing and engaging in development activities in the LAC region

An important new trend directly related to market and international supply chain development is China's role in promoting agricultural production, efficiency and productivity in Latin America and the Caribbean. While it may be true that China has little to teach LAC countries in terms of agricultural productivity, mechanization and, above all, food safety - mainly because production is more advanced in certain parts of the LAC region than in many areas of China - Chinese aid to LAC countries over the past few years has focused on agriculture, and especially in the 1990s, on rice cultivation and other projects in Mexico, Cuba and elsewhere, but not so much in the Southern Cone. China is investing extensively in domestic and international supply chain development, including novel approaches to marketing, distribution, technical cooperation and the development of GMO technologies, explicitly to compete with other multinationals doing the same.

There are several ways in which China and LAC can work together to facilitate the process to increase efficiency and productivity in the region. One obvious way is through finance, not small scale, but large scale finance. The China - Latin America Finance database (developed by the Inter-American Dialogue and Boston's University's Global Economic

Governance Initiative 2015) has tracked Chinese government-to-government lending to LAC countries since 2005, calculated at about USD 125 billion between 2005 and 2015. The vast majority of this finance went to infrastructure associated with natural resources, basically the mining and oil sectors. The interesting point is that despite slowing economic growth on both sides of the Pacific, there is a general sense that at least in 2015 and 2016 there will be considerably more finance for Latin America.¹³ This fits into the One Belt, One Road (OBOR) strategy, also known as the new Silk Road mentioned earlier, albeit in a somewhat different form when applied to Latin America. China's motivation is essentially to use up excess steel, facilitate trade, encourage economic upgrading and export a wider variety of goods.

The main interest across the entire region is in transport infrastructure, mostly for mines, oil fields and agricultural production centers in Brazil and Colombia.¹⁴ China has also shown tremendous interest in transregional infrastructure development, such as a tunnel proposed in Chile, the Belgrano Cargas railway line in Argentina and the Peru - Brazil railway. These investments are basically intended to transport goods to the Pacific because those maritime routes are considered to be better once they go through the Gulf of Aden and the South China Sea.

In addition to transport infrastructure, China is increasingly active in developing communications infrastructure, including electricity transmission infrastructure, Internet and phone lines that could expand technology use and presumably contribute to the expansion of user access to technology and information dissemination for small producers. When China's Prime Minister, Li Keqiang, visited the region he talked about the "1+3+6 cooperation framework": "1" means "one plan", referring to the establishment of the China-Latin American

13 In Latin America specifically, some new credit lines have been recently announced. One is related to the China-CELAC Forum, and the other, for USD 10 million, is to improve productive capacity in Latin America. It is difficult to know whether or not these will materialize.

14 Two ports have been recently announced.

Countries and Caribbean States Cooperation Plan (2015-2019) with the aim of achieving inclusive growth and sustainable development; “3” means “three engines”, and refers to promoting the comprehensive development of China-Latin America practical cooperation with trade, investment and financial cooperation to scale up China-LAC trade to USD 500 billion and the investment stock to Latin America up to USD 250 billion within ten years; and “6” means “six fields” and refers to the areas of China-LAC cooperation in energy and resources, infrastructure construction, agriculture, manufacturing, scientific and technological innovation, and information technologies. It is very difficult to know whether or not this initiative will go forward, since much will depend on China’s own domestic economic situation and the interests of Chinese companies, but it is a stated commitment.

Another way in which China can help promote greater efficiency and higher rates of production is by improving market access. This is a tremendous challenge for those who represent Latin American countries in Beijing and calls for a commitment on both sides of the Pacific. China will be required to facilitate these agreements and simplify some procedures, such as the byzantine phytosanitary approval process. Free trade agreements are something China is very interested in, so their proliferation in many forms would be helpful. Latin America, for its part, will be required to create and enforce production standards, regulations and coordination mechanisms with Beijing. This will be challenging because in many cases only a handful of people in Beijing represent a given Latin American country and trying to navigate the system is a demanding task. Finally, familiarization with the Chinese market is really important, and some Latin American companies have done a much better job than others. One encouraging example is that of Colombia’s Juan Valdez coffee brand, which in recent years has worked to adapt to the Chinese market and increase sales, mostly on a website called Yihaodian.

Challenges facing China’s investment in Latin America

It remains to be seen, in the near future, how the LAC countries adapt to the investments that China is pouring into the region and also how Latin America will integrate these investments into local policies, and whether or not they will drive local policies. One key question has to do with the allocation of resources, how these interact with Chinese investments, which are very substantial, and how they align with local policies. One example is the land purchases that China has made in Latin America (see Myers and Jie 2015), directly or through third parties. Most of the original investment attempts fell through altogether. As of 2014, there were only 10 examples of confirmed Chinese investments in LAC. Another example is the financial investments made across an entire value chain by COFCO (China National Cereals, Oils and Foodstuffs Corporation), a state enterprise, not fully supported by the Chinese government. As part of this process, the Chinese have already made some acquisitions, for example, they hold a majority stake in the Nidera and Noble Group. The China Investment Corporation (CIC), China’s Sovereign Wealth Fund, has operated the same way. Once companies are acquired, it is not clear whether or not they will employ the same standards, and how operations will be carried out after the acquisition. It is still too early to foresee the changes, but there are many concerns. The adaptation process will depend on the extent to which a country has developed its own integration strategy or its relations with China, defining areas in which China can invest and ought to invest, according to that country’s own interest. Chile is a very good example of a country with a defined a strategy, while others, especially smaller countries, have less leverage with China, are more dependent upon Chinese finance, have less control over what is happening on the ground or are less capable of enforcing certain standards.

Concluding remarks and implications

With respect to market development and regional integration, the expansion and integration of the internal markets are crucial to the discussion. There are basically two visions of regional integration. One vision is the EU experience, which is mainly about infrastructure and solidarity, in the sense that the idea is to ensure a certain equality in the region. The second vision is an approach closer to the WTO or the FTAA, which are more about legal discussions of border measures, regulations, domestic support, and so on, and are more complicated and difficult to achieve. As a region, LAC should continue to work on developing infrastructure and on regional solidarity, so that the very high levels of inequality can be evened out.

Domestic reform of agricultural policies is essential for market development, but this does not mean switching to larger and more expensive direct payment policies that may be unnecessary for certain countries. The alternative is shifting from financing that results in higher consumer prices to more payments for infrastructure, marketing, quality controls and so on. As the Agromonitor database shows, this process has already begun in some innovative countries such as Chile, where support in general services has increased (IDB n.d.). LAC countries have the motivation and the need to make appropriate policy changes to improve transportation and other logistical aspects, given the increased competitiveness of Europe and other regions that are implementing policy innovations.

One motivation to re-engage in a process similar to the one begun some years ago, of moving towards a closer form of integration like the Free Trade Area of the Americas (FTAA), is the emergence of mega-regional agreements. The

Transpacific Trade Partnership (TTP) and the Transatlantic Trade and Investment Partnership (TTIP) are basically about bringing together in one 'pack' countries that do not have the same preferences. This will erode the preference margin for countries or regions that already have preferential access to the European Union or the United States, such as CARICOM and Central America.

In a sense, within the emerging global trade system, the TTIP is bringing back the old ideas of a FTAA but perhaps in a different form. The Pacific Alliance, NAFTA and MERCOSUR together are a kind of Americas Program. However, the United States' change of direction toward unilateralism signals a different environment for trade negotiations and regional integration. An example is the TPP (whose 12 members included Chile, Peru, Mexico, the United States and Canada), which had been negotiated but now seems unlikely to be ratified since the United States decided to withdraw from the agreement. At present, the future of the TPP is uncertain. Some of its members are keen to follow through without the United States, hoping that other countries, such as China and some European countries might join. Finally, there is still a possibility of strengthening ties with Europe by completing the EU-MERCOSUR agreement, after a very lengthy negotiation process, in order to build on existing bilateral agreements with Central America, the Andean countries and the Caribbean countries (under the EU-CARIFORUM Partnership Agreement). International organizations, such as IICA, must become relevant to the integration processes by creating a forum for the exchange of technical ideas, at the appropriate level, among technicians who can contribute to the work of the integration secretariats. The forum could serve as a mechanism for high-level technical discussion aimed at activating agriculture within those integration processes.



 Sustainable
Management of
Natural Resources
in Agriculture

Introduction

Latin America and the Caribbean is a region that stands out for its wealth in natural resources. It contains one-fourth of the world's forest cover and more than 30% of its fresh water. In this context, agriculture is one of the region's main economic sectors, accounting for 11% of global production, 28% (almost one-third) of the planet's arable land and 14% of world food exports. Therefore, the LAC agricultural sector now plays, and will continue to play, a critical role in providing food for a global population that is expected to grow by more than a third (2.3 billion) by 2050, while the LAC population will grow from 650 to 900 million people. The challenge is to accomplish this task in a sustainable way, producing more with less and conserving the quality of natural resources.

Empirical evidence suggests that secure land ownership rights promote greater productivity, a more sustainable use of natural resources and help to fight rural poverty. Property rights are essential to ensure the efficiency of irrigation systems, which depend not only on an appropriate management system, but also on the right investments. They also greatly affect the exploitation and governance of the natural resource sector, and therefore, are essential to ensuring the sustainability of agriculture, and particularly of fisheries and forestry. In terms of policies, the LAC region has some experiences in the use of environmental service payments (ESP) as an effective instrument for the management of forest resources, but there is still limited empirical evidence regarding their efficacy.

This chapter discusses the main issues related to natural resource and agricultural sustainability, and presents some potential policy instruments for promoting agricultural sustainability. Among the many questions that need to be answered are: What hinders sustainable agriculture in the LAC region? Is it a lack of governance, the policy framework, the implementation of property rights, a lack of information, investments and incentives, limited commitments from the government and private sector, including farmers, and limited access by small farmers to sustainable and user-friendly technologies? Or, is it due to high transaction costs in implementing sustainable agricultural practices? Many of these questions and issues can be explored based on different experiences in the Americas.

The US Conservation Policy

Background

The United States has a long history of interest in conservation efforts, beginning with the process to restore fertility and appropriate land uses in older agricultural areas of the country. Along with the great depression of early 1930s, came an unparalleled ecological disaster known as the Dust Bowl. This was characterized by severe and sustained droughts in the Great Plains that caused the region's soil to erode and blow away, creating huge black dust storms that engulfed the countryside. This led to an interest in soil conservation, which became part of US farm policy in 1936, associated

with the commodity policy, directly linking soil conservation -for the purpose of reducing soil erosion- with policies to support farmer incomes. The issues of soil erosion, flood control and watershed protection to reduce water runoff and sedimentation have been part of the mix of US conservation policies for a long time. These have been tied together with income support, or rather, price support programs, the research and information dissemination system and the model for federal, state and local distribution of technical assistance, financial assistance and farm assistance at the producer level. The United States has special soil conservation districts (the first established in 1937, with nearly 3,000 districts today) which provide some control over how conservation policies are implemented on the ground.

The change in orientation toward agricultural conservation came about in the 1970s, when the United States moved from soil fertility and other production-oriented conservation practices to thinking more broadly about the impacts of agriculture on the environment. In response to high global prices in the 1970s, there was a call to “plant fence row to fence row”, as one of the Secretaries of Agriculture used to say, undermining many of the conservation practices that had already been implemented in the previous 40 or so years. Areas that had once been protected with contour plowing, grassed waterways and other terracing techniques were plowed up and used for production, and there was a recurrence of flooding, soil erosion and other problems that had been dealt with before. In response to this situation, attention shifted from erosion and watershed and flood control to much broader issues, such as the impact on urban areas and downstream communities, and concerns that went beyond agricultural fertility. These concerns included water quality, wildlife habitats, air quality (more recently greenhouse gases) and land preservation, all essential issues that primarily originate outside agriculture, but that require agriculture to respond to the needs of those who are not engaged in farming. This is a major transformation in the way agricultural conservation is viewed today in the United States.

Structure of US conservation programs

This section outlines the structure of the policies implemented by the United States under the current Farm Bill for agriculture, conservation and environmental impacts (Figure 5). Under the US FB the Conservation title provides support for voluntary conservation using three different approaches. One is for land in agricultural production and seeks to encourage or support environmentally beneficial farming methods. The second is land retirement, the largest program, which takes environmentally fragile land out of production in order to advance conservation goals. And the third is the easement program, which protects high value agricultural land that has specific uses, usually associated with protecting water quality or some other particular environmental issue.

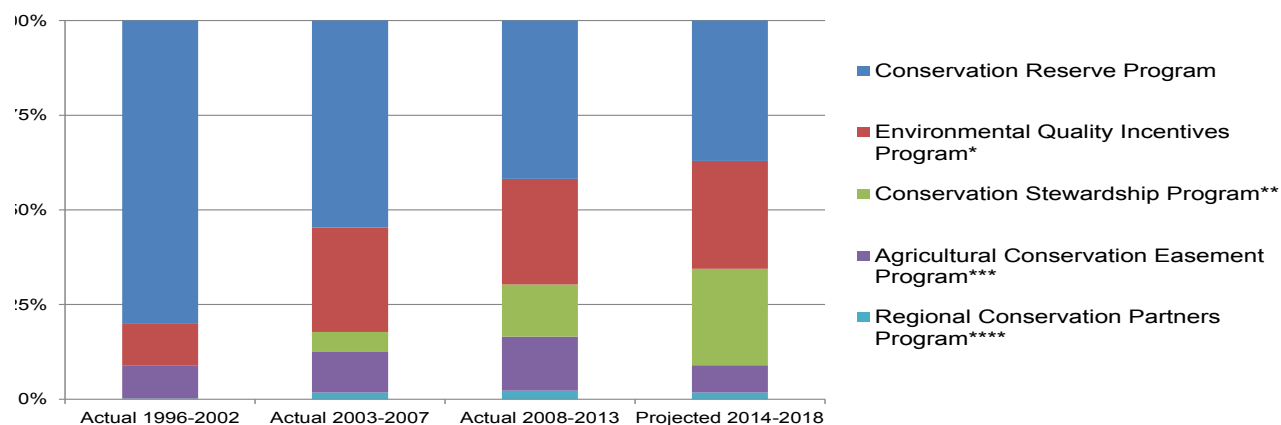
The prevailing trend is to provide more support to working lands. Funding is shifting (as seen in the blue bars of Figure 5) from land retirement to working land programs (red and green bars). The lower bars (in purple) are primarily easement programs. The funding is being consolidated in fewer programs in order to simplify its administration.

In terms of public spending, in inflation-adjusted terms, US conservation program expenditures increased by roughly 70 percent between 1996 and 2012. Much of the increase in real spending over this period occurred in working land programs and agricultural easements. While real spending increased under the 2002 FB and the 2008 FB, the 2014 FB reduced mandatory spending, with expenditures for 2014 and 2015 seemingly levelling off (USDA/ERS 2016).

One important change in US environmental policy is the shift away from retiring whole fields, and even entire farms, from production. This measure was originally promoted by the CRP to deal with wind erosion on the plains and water erosion in some southern areas, where production was not as profitable and full land retirement was an appealing alternative. Since then, environmental policy has focused

Figure 6

Conservation in the 2014 Farm Act: Funding shifts from land retirement/easements to working land programs



*Includes EQIP and the Wildlife Habitat Incentive Program (WHIP) for 1996-2013.
 **Includes the Conservation Security Program for 2002-2007.
 ***Includes the Wetland Reserve Program, Farmland Protection Program, and Grassland Reserve Program (easement portion) for 1996-2013.
 ****Includes the Agricultural Water Enhancement Program, Chesapeake Bay Watershed Program, Cooperative Conservation Partnership Initiative, and Great Lakes Basin Program for 1996-2013.
 Sources: ERS analysis of Office of Budget and Policy Analysis on actual expenditures for 1996-2013; spending levels provided in

Source: United States Department of Agriculture / Economic Research Institute

on protecting smaller tracts with high environmental sensitivity, such as buffers along waterways, and providing funds to working land programs, i.e. to provide cost-sharing incentives for producers to farm the land in more environmentally friendly ways. Thus, as production continues, some land is preserved and cared for, while other land is farmed. Farmers are also applying long-established conservation practices on farmlands, such as conservation tillage, terracing, counter plowing, grass waterways and a wide range of structural methods to reduce erosion. In the meantime, there are also agreements to maintain wildlife habitats and grasslands on farmland, and other programs that actually seek to preserve land as farmland in order to keep it from being developed for other uses.

Although relatively less funding is available for land retirement, the important point about these programs is that the acres covered are essentially richer in their environmental returns, since they target specific sensitive areas, such as water waste and environmentally sensitive areas within a farm or working land instead of taking whole farms out of operation.

The United States is currently reaching a point of equal distribution between land retirement programs and working land programs. Furthermore, the retirement programs themselves are moving toward what is termed partial field retirement, with a higher rental cost and higher payment levels, but also higher environmental benefits. These include buffers along streams, fences to keep livestock out of streams, protecting very specific water quality

issues, tree planting and many intensive practices that do not take a whole field out of production but protect the most sensitive areas.

Compulsory programs

In general terms, there are two types of conservation programs. One is compulsory and the other is voluntary. In compulsory programs, there are regulations on pesticide use, nutrient management, water quality issues in particular regions, and regulations regarding concentrated large-scale operations, mainly for animals. Regulations are not used heavily in the US agricultural sector, primarily because the country's environmental policy instruments have focused on voluntary incentive-based policies.

Cross-compliance

Cross-compliance is a program sub-category that is compulsory, but partially voluntary, and requires producers to adhere to certain environmental quality standards in order to receive payments through commodity programs and crop insurance. Almost all US programs, especially those associated with crops or concentrated animal operations, must comply with requirements to prevent soil erosion and disruption of wetlands. Cross-compliance is effective in meeting certain requirements in highly erodible soils. Not all producers are required to employ these practices to receive payments, but those who have sensitive lands that are prone to either wind or water erosion must prepare plans and apply practices that reduce erosion. In addition, farms that contain wetland areas are required not to disrupt those wetlands. Under a more recent regulation, native grasslands that are plowed up are not eligible for certain program payments for a period of time. This is known as the "Sodsaver" provision, and is aimed at reducing the areas of grasslands plowed up after high corn prices made them very profitable.

An important conservation innovation in the new US FB is the linking of crop insurance premium subsidies to environmental compliance. Since 1985, participation in commodity programs has required producers to meet soil erosion and wetland protection requirements and, since 1996, crop insurance has been excluded from cross-compliance requirements. However, the 2014 FB determined that in order to receive subsidies from crop insurance premiums, producers had to meet the same conservation requirements.¹⁵

Voluntary programs

Most US programs are voluntary given that producers choose to apply conservation measures to their land, and are provided with assistance in doing so. Producers have the choice of enrolling in two types of programs. One is the land retirement program in which farmers offer to withdraw some of their land from production. The largest and better known of these programs is the CRP mentioned above. In the second type of program, farmers have the choice of implementing environmentally-friendly practices on working land.

Each voluntary program is subject to budget and area limits, which generates a competitive enrollment pressure and allows for an interplay between producers interested in implementing these practices or moving their land from production as an incentive. However, because the acceptance rate is low, there is an opportunity to target programs toward the best cost-benefit balance. Unlike older land retirement programs, producers can now offer, through an auction system of bidding, the amount they are willing to take for land retirement, the rental rate they will accept, specifying the practices applied or describing the land sensitivity, which makes it possible to target most of the funds towards the most sensitive land, thereby obtaining greater environmental benefits.

15 The number of new areas brought into cross-compliance by this change was not large, since most land covered under crop insurance had also been subject to cross-compliance because of overlapping enrollment in the commodity programs.

The advantage of this program is that it allows for better targeting, though the voluntary aspect makes it harder to reach all the most sensitive areas. Recent research suggests that a balance needs to be struck between profitability/benefit to the producer and environmental outcomes, and therefore it may be necessary to devise new types of incentives that will increase enrolment of farmers in the most sensitive areas. Those incentives could include labelling schemes and environmental markets to give additional value to the producer for implementing best practices.

A balance must also be reached between compliance, regulation and voluntary targeted benefits. Compliance has high impacts initially and then levels off. For example, according to Claassen et al. 2004, the reduction in soil erosion was significant in the United States during the initial period of the Highly Erodible Land Conservation Compliance provisions in 1985, which lasted about 10 years, after which it leveled off. These programs, which apply to all producers, resolve the initial problem by addressing it immediately, but do not necessarily provide additional benefits over time; therefore, other types of interventions are needed to bring further benefits. This is one of the reasons why voluntary programs targeted at specific environmental sensitivities can be useful, in that they channel funds towards the problem, as opposed to spreading the funds across all users.

Multi-functionality

One last point concerns the idea of using conservation programs as an alternative mechanism for supporting producers. This appears to be the model favored in the EU, where income support payments are tied to requirements to apply certain practices on land, but are not necessarily targeted to specific problems in a region. Conversely, some of the strictest US policies at the state and regional level, in areas such as Chesapeake Bay or coastal zones, require producers to refrain from spreading manure before a certain date in the

spring, or to comply with regulations to control water runoff, dust or any other problem in a particular place. On the other hand, compliance linked to income support requires a much broader income distribution and the same kinds of practices to be applied, though not necessarily integrated into a particular region, and not necessarily tailored to the particular needs of one place. The consensus in the United States has been that broad income support programs tied to environmental practices are not the most effective way to target specific and geographically located environmental issues, even though it may be easier to explain to the public, for example, that farmers are receiving money because they are implementing particular environmental practices. The United States does not have quite the same public consensus on what the European Union calls multi-functionality of agriculture. The reason for this is that cultural ideas about the link between these services and farming have developed differently in the United States, which has resulted in US efforts being targeted toward specific environmental issues.

The Brazilian Environmental Policy

Environmental Rural Registry

Brazil has some the world's most rigorous environmental regulations. In 2012, the National Congress of Brazil approved the new Forest Law. One major change in the new legislation is the Environmental Rural Registry (or CAR, for its Portuguese acronym), which is an inventory of all environmental assets and liabilities held by producers, with the corresponding commitments of potential solutions to farms' liabilities. At the last count, 1.8 million farms were registered, comprising 234 million hectares or 59% of the national agricultural area. CAR is the first stage of a long journey to recover from a number of environmental problems, and is a major step forward considering that Brazil has the largest forest stocks in the world.

The Forest Law

The Brazilian Forest Law requires landowners to preserve intact forest areas on their properties as well as other sensitive sites, such as the land bordering some rivers. In the Amazon, 80% of the land must be protected by forest cover and 20% is contemplated for production. By contrast, in other regions such as the tropical savannah, the protected area is 35%. The Forest Law also contemplates an amnesty period for farmers who engaged in illegal deforestation prior to July 2008, and grants them a period of 20 years to restore the destroyed areas.

Research and technology transfer

Investment in R&D programs for the sustainable use of natural resources is a priority in Brazil, a country of enormous geographical size and considered an archipelago of diverse regions. The main challenge is to conduct basic research and, at the same time, make the research results available to farmers. EMBRAPA, a government research institution, has made an outstanding contribution to the development of new technologies in Brazil.

In 2010, Brazil adopted a new national policy for technical assistance and rural extension (in replacement of PNATER, for its Portuguese acronym), compatible with more sustainable agricultural practices. This policy recognizes that in order to achieve sustainable development it is not sufficient to consider the Technical Assistance and Rural Extension Services (ATER) as a technology transfer system only. Rather, the idea is to adopt an agro-ecology approach, in order to rescue and construct new knowledge about the different agro-ecosystems, taking into account the local, cultural and socioeconomic conditions. The new policy supports initiatives for sustainable rural development with the participation of the agricultural and non-agricultural sectors (including extractive activities), and adopts the agro-ecology approach as the guiding principle for action. Its objectives also include the diversification of production, maintaining the environmental and socio-cultural balance and respecting the values of the groups involved.

The current ATER system is the bridge between knowledge creation and agricultural production. Rural extension agents, in partnership with farmers, develop the means to incorporate research results obtained from universities, research centers and industry. Knowledge is appropriated in a manner compatible with available resources in rural areas, prioritizing agricultural practices that preserve and conserve the environment and trying to strike a balance between the profitability and sustainability of natural resources. The Brazilian Association of State Entities for Technical Assistance and Rural Extension (EMATER) is the institutional and political representative of ATER, acting as a network of collaborators from civil society, government agencies and private enterprises in the country. ASBRAER brings together more than 16,000 extension agents who provide services to 27 Brazilian States, covering 96% of the country's municipalities and 53% of family farmers or 2.4 million beneficiaries.

In 2012, Brazil launched the National Policy on Organic Production and Agroecology, with the aim of integrating, coordinating and adjusting policies, programs and actions for agro-ecological transition and the expansion of organic and agro-ecological production. The objective was to contribute to sustainable development and a better quality of life through the sustainable use of natural resources and the supply and consumption of healthy foods.

Agricultural credit

Agricultural credit has been a key issue in the history of agricultural transformation in Brazil. This has been possible because Brazilian farmers enjoy land ownership rights and can therefore access financial services. The credit system promotes the adoption of no-tillage production systems, which are used in 70% of the grain crops planted in Brazil. No-tillage systems have reversed soil degradation, allowed for the expansion of agriculture in marginal areas, improved profitability and increased the sustainability of agricultural systems in Brazil.

The credit system also finances environmentally friendly operations such as the ABC (Low Carbon Emission program). An important part of the ABC program is the integration of livestock agriculture and forestry, and the management of animal residues.

The Chilean environmental policy

Markets and governance

For the last 40 years, Chile has applied a model in which resource allocation was essentially market-based, and in which the concept of self-regulation was present in all sectors of the economy, including agriculture. This is key to the discussion of sustainable management of natural resources, since the role of the market becomes an important issue.

This question must be considered in light of the Chilean agricultural sector's desire to transition to a model of greater and permanent competitiveness, with a high degree of inclusiveness based on social and environmental sustainability. The links with natural resources basically occur in three areas. First, water is a very important topic for the country in general and for agriculture in particular. Secondly, forests are a top priority in Chile where there is great competition for their resources. And thirdly, soils are a crucial topic given the erosion and degradation processes taking place in many regions of the country. Furthermore, these are three resources that greatly affect the economic profitability of Chilean agriculture. Another very important topic is biodiversity, which cuts across all rural sectors in Chile.

In terms of governance, it is important for Chile to determine what the country's consensus or vision will be for the next 40 years. What kind of institutional framework is needed to address the problems of water, forests and soils, aimed at ensuring the sustainability of agriculture? How are those accords transferred to the private sector, which has full rights over natural resources?

Finally, an emerging issue of rising importance is the urban-rural relationship over the use of natural resources. On one side are the agro industries and urban areas, and on the other side is the use of land for agriculture versus the expansion of urban areas. Although this issue is not directly related to the Ministry of Agriculture, it is a matter of great concern in Chile, and therefore some instruments are being developed to address the problem.

Support for irrigation

Chile subsidizes credits to support investment in irrigation systems. The National Irrigation Commission manages a competitive fund to support decision-making on farm irrigation and intra-farm irrigation. About USD 15 million are available for irrigation, a relatively high sum for a small country like Chile (2015 data). It is worth considering how this instrument has benefited agriculture, but has also caused problems over the years. Twenty-five years ago it was discovered that in one of the poorest areas of southern Chile there were abundant phreatic layers that were not being used. Therefore, investments were made, with 80% support from the Ministry of Agriculture, to install irrigation systems in 25,000 hectares of dry lands, located in very poor areas. The outcome was an enormous productive transformation: the area went from being one of the poorest territories to being one of the most dynamic; from suffering unemployment and a lack of services to generating many jobs and business opportunities. It seemed to be a success story. However, 25 five years later, it has become clear that too many water rights were awarded, more than the phreatic layer could bear. Competition for ground water is of control and the water wells are drying up. It is now necessary to dig down to a depth of 140 meters to find water. This has led to an environmental crisis of great proportions. Public sector support, which provided 80% of the total investment and brought enormous growth and economic change for 25 years, has now left the government with the responsibility of dealing with a huge problem. This is an example of unintended outcomes of public policies.

Support for degraded soils

Another instrument used in Chile is the Degraded Soils Program, also in the southern part of the country. The background to this program is that soils in the south are volcanic, with the attribute of high fixation of phosphorous, which means it is not available to plants, and therefore they hardly grow. This program receives half the funding provided to the aforementioned irrigation program, but is equally important given its targeting. It is also a competitive fund where the government subsidizes 80% of soil practices, subject to evaluation.

Although the program appears sustainable, for policy design and evaluation purposes it is important to see what has occurred after many years of public investment to support phosphorous fertilization. The idea of the program was to supplement the soil with phosphorous, beginning with 12 parts per million (ppm), considered by academics as the standard for sustained plant growth. Subsequently, phosphorus was added but only in sufficient quantities to compensate for what plants were extracting. Over time, however, the limit increased from 12 ppm to the current 25 ppm. Unfortunately, this practice has resulted in the eutrophication of lakes and water sources caused by runoff containing high levels of phosphorus. Another side effect is that input providers have benefited from high sales of phosphorous for many years. Again, a public policy that supported the growth of production in a region for 20 years, had the unintended result of an environmental problem that is becoming critical in large areas of the country.

Forestry for timber

A third example of this type of policy is related to the issue of biodiversity in Chile. The government has provided a forestry subsidy since 1974, under one of the oldest programs in the country. It consists of a 75% subsidy for planting forests for timber or cellulose pulp. During the first 20 years of the program, there was an exponential growth of forest plantations in degraded soils and steep gradients. The impact

was controlled erosion and the generation of an important mass of vegetation. Given the number of trees planted, the country even complied with international climate change commitments through 2050. However, after 45 years, there is a realization that, for biodiversity purposes, it is not the same to plant 100 hectares with pines or 15,000 hectares of pine in one territory, as it is to plant a forest with different varieties, of various sizes, ages and root depths. It is clear that scale makes a difference, and compromises biodiversity in large territories of Chile, affecting water availability for urban areas.

These three examples clearly show the relative effectiveness of policy instruments for addressing specific issues, with the caveat that they can cause collateral damage that is difficult to foresee at the beginning of the program. A number of lessons can be drawn from this experience and are included in the final section of this chapter.

EU Common Agricultural Policy

The new EU Common Agricultural Policy (CAP) introduces innovative instruments to promote the environmental sustainability of agriculture. A new green payment has been introduced under Pillar I, Direct Payments, cross-compliance has been redefined and two environmental priorities are funded under Pillar II, Rural Development. In addition, the EU CAP introduces improvements to support research, innovation, knowledge transfer and the Farm Advisory System.

The EU CAP has a novel approach to improving the environmental performance of agriculture by making 30% of Pillar I Direct Payments, contingent upon certain farming practices (under a new payment scheme known as “payment for agricultural practices beneficial for the climate and the environment”, or “greening”). These practices include crop diversification (to improve the quality of soils), maintaining permanent pastures (to capture carbon) and establishing ecological focus areas (to conserve biodiversity). A payment of up to 5% of the national envelope (part of the 30% of direct payments) may be allocated to farmers

in Areas with Natural Constraints (replacing Less Favored Areas). In addition, at least 30% of the agricultural fund for rural development (Pillar II) must be allocated to investment in the environment and climate, the development of woodland and improving the viability of forests, 'agro-environment-climate' measures, organic farming and payments under Natura 2000 (a network of 25,000 sites, covering about one-fifth of the European territory, aimed at protecting Europe's biodiversity). An additional 5% of the fund must be spent on the Leader approach, to encourage people to address local issues.

Some of the mandatory practices included under the green payment scheme include the following: production of at least two or three different crops on the farm (the number of crops will depend on farm size) and the main crop may not cover more than 75% of the arable area; keeping a minimum area of land under permanent pasture or vegetation (at least equal to the amount assigned for this purpose in 2012) and preserving areas of ecological interest (up to 5% on farms larger than 15 hectares). The green payment is complementary to the BPS or basic payment scheme¹⁶, and it is a requirement to have agricultural areas that are eligible for direct payments, and therefore suitable for grazing or cultivation¹⁷.

Small farmers can be offered a single and simplified payment that waives the greening and cross-compliance requirements. Up to 10% of the national envelope can be used for this purpose and support is limited to EUR 1,250. This scheme is voluntary for small farmers. Under the Voluntary Coupled Support (VCS) the EU CAP also offers up to 8 % of the national envelope, or up to 13% with certain conditions, as mentioned above, to those sectors that are particularly important for economic, social or environmental reasons and that experience certain difficulties in ensuring the current level of production (Humanes and Cores 2015).

It is important to recognize that the basic payment scheme is also conditional upon minimum use of agricultural sustainable practices (known as cross-compliance). This means that the green payment goes beyond cross-compliance, demanding stricter measures in favor of the environment.

China's policy to move away from input subsidies

China faces serious problems with water pollution, soil contamination with heavy metals, as well as air pollution. Some are related to and created by agriculture or caused by industry and mining, but affect agriculture. After a long period, China has finally decided to deal with these issues.

One way to address these problems is to reduce excessive fertilizer and pesticide use. Last year China announced a plan for zero growth in chemical fertilizer and pesticide use by 2020 (a five-year period). The government offers a number of subsidies and demonstration programs to help farmers implement environment-friendly practices. The idea is to somehow link grain subsidies to "greener" practices. One of the measures adopted in 2015 was to restore the value added tax of 13% on chemical fertilizers and another was to increase subsidies for soil fertility testing.

Pollution from livestock farms is another serious problem that China is trying to resolve. Progress has been made in cleaning up hog farms in areas vulnerable to pollution and farmers are being urged to adopt manure treatment systems and install biogas facilities on their farms. They also receive a subsidy for the safe disposal of diseased animal carcasses. Other instruments applied are financial awards to farmers, based on volume of pork sold outside the county,

16 Of the maximum budget available for each Member State, 30% goes to greening and the remaining 70% goes to other direct payments. Payment for young farmers is also mandatory (maximum 2%), while other payments are voluntary. This means that the payment for BPS never reaches 70%.

17 Farmers entitled to payments under the BPS (or the SAPS) must observe, on all their eligible hectares, agricultural practices beneficial for the climate and the environment

inventory and slaughter. Funds are also provided for construction or refurbishment of hog farms, purchase of breeding stock, vaccination programs, manure management, subsidized interest on loans, support for companies engaged in purchase, sale, storage, distribution and processing, and for food safety measures. In addition, subsidies are available for the construction of village gas-generation facilities using animal manure and crop residues, with residues spread on fields as fertilizer. Subsidies per household amount to USD 156 in eastern provinces, USD 188 in central provinces and USD 234 in western provinces (Gale 2013).

A subsidy of 300 yuan per hectare has been established to encourage farmers to plough straw and stalks into the soil or to purchase seed for green manure crops. The program also promotes commercialization of organic fertilizer with a subsidy of 200 yuan per metric ton, based on use of 1500 kg per ha. Soil fertility testing results are being used to promote the use of organic fertilizer.

Concluding remarks on moving forward with sustainable management of natural resources

A number of questions remain to be answered in order to make progress on the agenda for sustainable management of resources in agriculture, in the face of weather variability and climate change. One question is: how we can develop synergies or reduce conflicts between the countries' Ministries of Agriculture and Environment to improve natural resource use in the agricultural sector? A second question is: how can conservation and the sustainable use of natural resources serve as a basis for resilience to climate change? And a third question is: can climate change serve as an articulating element to increase the synergies between different sectors and also between the many different goals identified for the agricultural

sector, in terms of competitiveness, low carbon agriculture, sustainability and reduction of negative environmental externalities? Some of the challenges, opportunities and approaches used in different countries are discussed below.

Facing climate change and weather variability

Most countries foresee greater weather variability in the future. Consequently, agricultural policymakers, environmentalists and representatives of the insurance business now spend a lot of time discussing the different aspects and impacts of weather volatility, trying to determine how to meet the challenges involved in building resilience into agriculture and coping with such variability.

By examining flooding patterns, it is clear that some regions are experiencing droughts and floods in the same season. In Canada, for example, the 2014 growing season was especially challenging for producers, faced with excessive moisture, a cold spring, a very difficult summer and then a cold early fall. Despite this situation, the harvest was higher than average, particularly in the West of the country, showing that the sector is already fairly resilient. However, even greater resilience needs to be built into agriculture, and that will require changes in agronomic and economic practices, including a wider introduction of precision agriculture techniques, greater use of sensing and data, more feedback from the field so that farmers know what is happening to their crops in real time, better inputs such as fertilizers, herbicides and pesticides, genetics and seed technologies.

Smaller countries that contribute very little to climate change mitigation approach the issue of climate change from the perspective, and under the umbrella, of integrated-risk-management programs that involve a process to incorporate climate change in the programming strategy of the Ministries of Agriculture.

Profitability, subsidies and environmental sustainability

Agricultural production must be sustainable from an environmental standpoint, but also it must be sustainable from a financial point of view. Producers have to make money, otherwise production is not feasible. Subsidies may be necessary but they should not be massive or permanent to the point of creating problems with the allocation of scarce public resources. As discussed in the first chapter, public-sector support to farmers varies greatly from country to country. Brazil, for example, subsidizes commercial farmers to the tune of 3.1% of total agricultural gross income (average for the period 2013-2015), while the average percentage for the European Union is 17.6% (OECD 2016). As noted in the first chapter, the type of support provided also matters. In Brazil, 70% of the support provided to farmers is used to subsidize interest rates, given that these are controlled by the Central Bank and are set very high compared with competing countries in Europe or the United States. About 25% is allocated to price support programs, which are not used at this time because prices are higher than the guarantee price. On the other hand, crop insurance subsidies only cover 10% of total planted area in Brazil. Given the limited resources in LAC countries, the challenge is to make agriculture sustainable and profitable and expand the use of market instruments (such as contract farming, call options and put options) to manage production and financial risks more efficiently.

Regulations versus incentives

In some countries the conflict between environmental protection and agriculture is associated with the tensions between regulation and voluntary incentives. In the United States, for the most part, there has been resistance to regulation in agriculture, especially regarding the use of pesticides, rules for endangered species and nutrient management in certain regions. However, further regulation may be needed to control continuous and excessive use of certain chemicals. For example, over the course of the last two decades, US corn and

soybean farmers have increased their use of glyphosate (the active ingredient in herbicide products such as Roundup) and have decreased their use of herbicide products containing other active ingredients. This shift has contributed to the development of at least 14 glyphosate-resistant weed species in US crop producing areas (Seth J. Wechsler and Fernandez-Cornejo 2016).

Monitoring and evaluation

A number of lessons can be learned from the different policy tools used in the countries, always bearing in mind that the menu of instruments available will depend on each country's conditions, natural resource base and most pressing issues. However, one lesson that applies to all countries is that instruments should be continuously evaluated. Not only is it essential to conduct monitoring and impact evaluations of the policy instruments themselves, but at some point it is also necessary to conduct a more rigorous and critical evaluation to determine whether these have any unintended outcomes or indirect impacts. The three examples of policy instruments for water, soils and forestry in Chile are a good illustration of this. The academic community can also play an important role in evaluating and suggesting possible adaptations for policy instruments applied in different circumstances. A review of methodologies, institutional innovations, experiences and lessons learned can be found in (Chavarría et al. 2016).

Big data

In terms of the design, monitoring and evaluation of policies, as well as support for private decision-making, agriculture is expected to benefit enormously from various emerging technologies for managing and analyzing huge amounts of data in ways that can be used for decision-making. Some countries such as Canada, the United States and Brazil are adopting these technologies at a rapid rate. The challenge is to transform agriculture into a large information industry, because unless the real situation of each farmer is known, it will not be possible to implement appropriate

policies. This effort involves the production of large, very specific, interrelated sets of data and information, which can be continuously analyzed in a timely manner, and accessed and used by all. For example, EMBRAPA and other public and private research institutions in Brazil are developing an agricultural zoning system by gradually constructing a large database with indications of the best farm uses and best planting seasons for each region, territory, agricultural activity and seed variety, etc. If a farmer does not follow the technical recommendations established by the agricultural zoning system, then he/she is not eligible for a loan from the financial system. Therefore, the system works as a technology tutor but also as a mitigator of production and financial risks.

Research and technology transfer

Research and technology transfer systems are a crucial complement to the big data system. This issue is a major problem in Brazil and in other Latin American countries, because government technical agencies have limited human and financial resources to keep up with the technical progress achieved in the research institutions.

Responding to new demand attributes

Markets are evolving toward the regulation of production processes to promote a more rational use of natural resources. Examples include the carbon and water footprints which will be mandated by EU importing countries in the short term. In addition, the environmental footprint is expected to be mandatory for any type of food or beverage entering the European market. This will require countries in the Americas to adopt policies to comply with attributes demanded by the market. In Chile, for example, the Ministry of Agriculture, in partnership with the private sector, is establishing protocols and regulations to deal with free riders¹⁸ and is supporting private certification processes that allow the sector to

respond quickly to demand for new market attributes. Although there is limited experience of environmental cross-compliance in LAC, this principle could gain importance in the future, mainly through successful experiences with organic production standards, international fairs and similar processes driven by the private sector. Payments for environmental services (PES) are also incipient in LAC (Costa Rica has the most emblematic experience in the region), but have great potential to promote positive environmental externalities by transferring financial resources from those who benefit from certain ecological services to the suppliers of such services or the administrators of natural resources. The general principle is that the agricultural and natural resource sectors can be compensated for services such as mitigation of greenhouse gas emissions (carbon reduction, absorption, fixation and storage), the protection of water for urban, rural or hydroelectric use, protection of biodiversity (for conservation and for sustainable scientific and pharmaceutical use, research and genetic improvement), the protection of ecosystems and life forms, natural scenic beauty (for tourism and scientific purposes, and for the maintenance of agroforestry).

Public and private partnerships

Finally, the relationship between private and public interests, and between markets and what takes place on the farm, in the food chain or even at the territorial level, should be a topic for much debate. Because these issues are often sensitive, organizations like IICA can play a key role moderating the debate. More participation and organized pressure by the private sector is needed to try to reconcile conflicts between agriculture, politicians and the ministries responsible for environmental issues. Public-private partnerships have the potential to guide agriculture in the right direction with alternative solutions that are market-oriented and socially and environmentally responsible.

18 The free rider problem is a market failure that occurs when people take advantage of being able to use a public good or resource without paying for it.

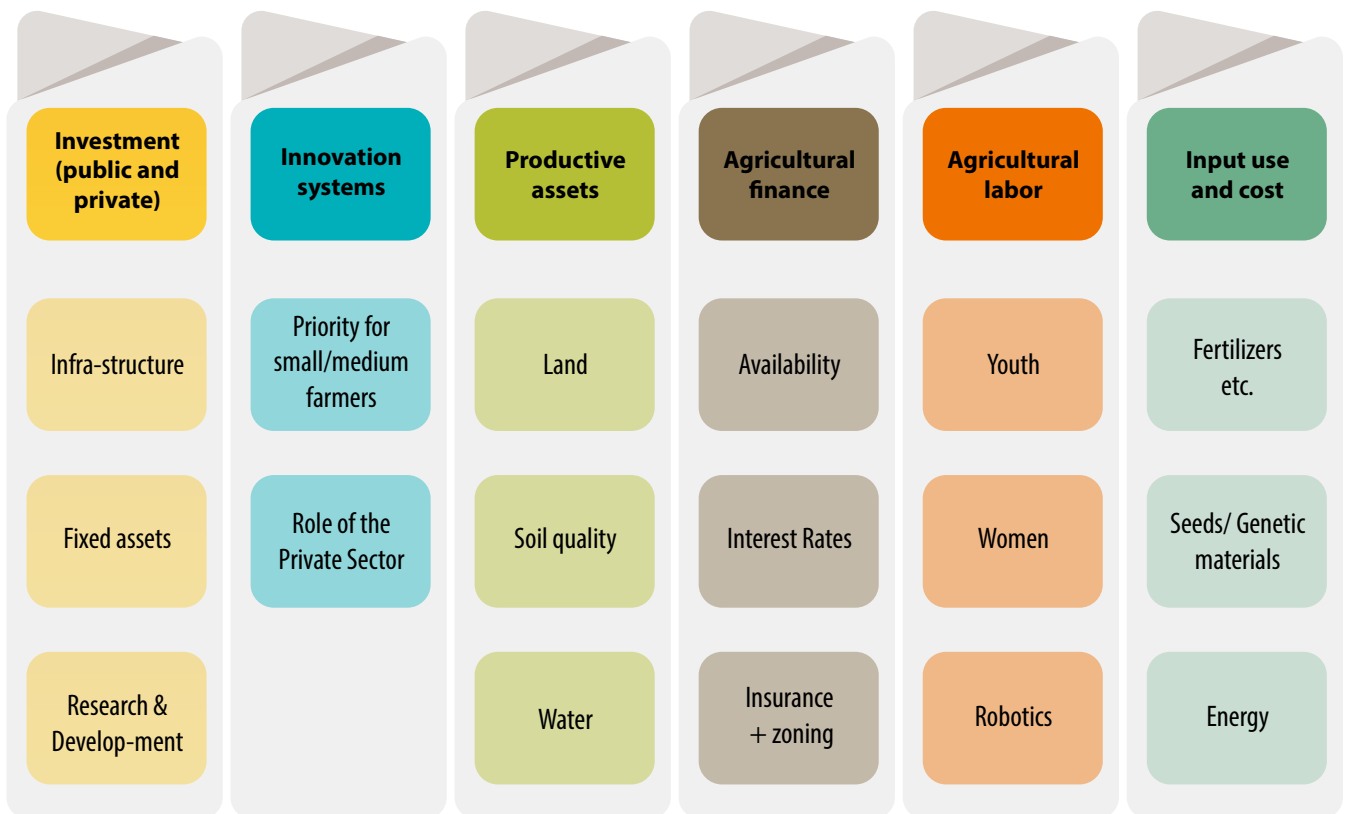


IV. Efficient Use of Inputs and Factors of Production

Introduction

The following diagram summarizes the range of topics for analysis when considering policy instruments for the efficient use of inputs

and factors of production. This section does not cover all these topics in detail, since they have already been discussed in some depth in previous chapters.



Source: Author

The context for achieving efficiency in input use

Before discussing the specifics of policy instruments for the efficient use of inputs and factors of production, it is important to consider the context in which agriculture operates. The environment worldwide is currently undergoing major changes. On the one hand, demand for agricultural products is growing and, because the population with higher incomes is also growing, demand for agricultural products is different from what was required before. On the other hand, there is greater pressure on limited resources. The previous chapter mentioned various aspects of this subject, noting that urbanization is competing with agriculture for water and land and there is increased general competition for scarce natural resources. In response, the agricultural sector is witnessing a technological revolution that is truly amazing. The possibility of producing or directing production using sensors is closer to becoming a common practice, allowing for precise dosing of agricultural inputs on specific areas from satellite images and, coupled with robotics, will certainly change the context for agriculture. This implies a technological leap towards a far more efficient use of inputs and production factors.

This new agricultural environment will entail major changes in production, requiring high levels of capital investment and much lower demand for labor. Labor force requirements will shift toward demand for more technical workers with high qualifications, something that will translate into opportunities in the future. These developments in agriculture offer great potential but also generate conflict and tensions, as they coexist with traditional agriculture, dominated by small producers who employ very little technology. It is a context of change with great potential benefits, contrasting with many tensions; what will happen moving forward is an important open question to think about.

Another major challenge to take into consideration is climate change, discussed in the previous chapter. Climate change carries a

significant risk for agricultural production and has strong effects on its adaptability. Agriculture now has to adapt continuously and rapidly, which means implementing changes in the areas of production and in the intensity of production, something that the sector is not accustomed to doing. This in turn, has important effects on the use of inputs and factors of production.

Another element to be considered is the inherited structure of land tenure dominated by small farms. Although this is changing in many countries, as people migrate to the cities, small-scale farms are still important in many LAC countries. However, this might not be the main problem. In fact, several realities persist in Latin America's farm structure. On the one hand, extensive large-scale holdings that use precision agriculture and advanced technologies are growing in importance, achieving greater efficiency and profitability based on scale, though there are still many large farms that are not geared to intensive high-tech production. On the other hand, small-scale agriculture is not always synonymous with inefficiency because, depending on the type of crop (vegetables, for example), productivity can be very high. However, small producers tend to incorporate less technology and seldom engage in appropriate production planning, etc., due not only to the scale of production, but to other much more important issues, such as lack of access to finance, technology, information, etc. A good example is Europe, where small-scale agricultural production is seldom associated with inefficiency in the use of inputs.

Agricultural financing also remains relatively low in most countries, though it varies widely from country to country. One indicator of low financial penetration in agriculture is that agricultural funding as a share of total funding is often significantly lower than the share of agricultural value added on gross domestic product. On one side of the equation are the challenges arising from a demand that is not well articulated, affected by the age-old problem of land tenure and persistent weak risk management. On the other side of the equation, the credit supply faces adverse conditions to the point that few players are willing to participate.

In this context, it is important to identify opportunities for improving efficiency in the use of inputs and factors of production and managing risks. The challenge is to differentiate between social efficiency and private efficiency and recognize when input use is too low or too high, so as to ensure that policy instruments are adequate to address the problem. But the greatest challenge is finding ways to increase the adoption and adaptation of technologies by small farmers.

Integrated approaches, the case of Brazil

Brazilian agriculture and the agro-processing sector have shown remarkable improvement over the past two decades for three main reasons. First, there has been a rapid increase in productivity and yields in the crops and livestock sector. Secondly, the structural adjustments that have resulted from economic policies and macroeconomic stability have increased or facilitated the opening up of the economy and the inflow of foreign investment in the country. Thirdly, investment in research and development has generated technology gains, due in part to the important contribution of EMBRAPA since the 1960s. Agricultural production in Brazil is expected to continue its growth pattern, given the factors that have worked effectively over three decades and the country's land availability. Brazil currently has 67 million hectares in production out of 160 million hectares available (excluding protected areas) (Deininger and Byerlee 2011). Other studies (FAO n.d.), using different methodologies, estimate a potential of more than 400 million hectares, though this includes moderately and marginally suitable land. In any case, the potential for expansion is overwhelming.

The combination of a very large domestic market and the significant role that Brazil plays in global export markets indicates that it is essential for the country to continue with the policies that have ensured sustained growth. The set of policies implemented in Brazil may be summarized in three main instruments: a

price support system, concessional credit and insurance support. These three instruments operate within the framework of a land use policy, an agricultural zoning system and regulations on biofuels. In addition, Brazil provides support for land reform and the development of general services for agriculture, not only for commercial agriculture but also for small producers, and for innovation in the agro-industrial system that benefits all producers.

Agricultural zoning

It is important to make a distinction between short-term versus long-term policies for increasing productivity and competitiveness. In the case of Brazil, it is worth highlighting a system that the country considers as an innovation from the point of view of natural resources: agricultural zoning. It is an innovation because it includes not only operational credit for small producers (one-year credit as part of the annual plan to support agriculture) but also climate change. Agricultural zoning takes into account the latitude, geographic location and yields that producers are expected to obtain. To ensure that producers follow agricultural zoning regulations, all credit is tied to risk mitigation. Thus, if producers wish to obtain credit they must provide evidence that they comply with agricultural zoning. Over a seven-year period Brazil has included 27 commodities in agricultural zoning regulations, and it is within this framework that producers are obtaining short-term operational credit and also investment credit.

Input use

“Poor but efficient”

From the previous discussion, the impression is that input use and nutrient levels are too high, and that there is excess runoff that explains why policies are set up to constrain input use. Privately, farmers are applying what they consider to be profit maximizing levels, which should be the right levels when there is no market distortion. However, negative

externalities motivate governments to step in to try to control input use. In other cases, particularly in developing countries, the question is the opposite: why is input use so low?

“Poor but efficient” was the famous expression used by the first and only agricultural economist ever to win the Nobel Prize, Theodore Schultz (see *Transforming Traditional Agriculture* by Schultz 1964). Poor farmers are doing as well as they can, given the constraints that they face. They are choosing the right level of private inputs that are freely available to them, such as seed and fertilizer, but there are other issues that are holding them back. Of the whole range of inputs mentioned above - from institutional property rights, transportation, credit, quantity and quality of labor, to information about prices and demands - the key questions to be answered are: why is the factor market either nonexistent or, if it does exist, why is it distorted? Based on this question, a number of policy issues can be properly examined to try to improve those factor markets.

Overuse of fertilizers

Canadian and US farmers (and probably others elsewhere) tend to apply more than the recommended rates of nitrogen. So, are they being irrational? The answer is no. Schultz (1964) discovered a long time ago that farmers apply more than the recommended rate because the response rate in any given year is very even. In other words, if the optimum amount of fertilizer application is 200 kg/acre, a farmer can apply 50kg less or 50kg more with little effect on yields. Yields will be lower than at the 200 kg rate, but not significantly lower, so it does not matter much, as long as the application rate is within a certain range. However, the difference in yields is much greater between years, because if weather conditions are good, a farmer can obtain a really large boost in yields if the amount of fertilizer applied is more than the recommended rate. Farmers also know that, on average, the extra benefit obtained in the good years more than offsets the over costs

paid in the poor years. The negative side effect of this behavior is the environmental impact. For this reason, the first measure recommended to reduce greenhouse gas emissions is that farmers apply less fertilizer. The argument is that applying less fertilizer is a win-win situation for farmers, because less fertilizer means lower cost and, at the same time, there is an environmental improvement.

The implication of this discussion is that to properly design a policy instrument, it is crucial to first understand a farmer’s reasoning and motivation regarding input decisions. If the objective is to reduce nitrogen use, it is not sufficient to simply inform farmers that they are over-applying, something they are already aware of. The task is to assess the efficiency and effectiveness of the abovementioned policies, including regulation, taxation, incentives and a variety of different instruments. On the other hand, for developing countries, the challenge might be different when designing a policy instrument because the problem usually is that farmers are not applying sufficient fertilizers. Again, it is important to understand the explanation for this. One likely reason is that farmers do not have the working capital at the right time for fertilization, or that the production and market risks involved are too high.

Access to quality seeds

Small and medium-scale farmers often lack the cash reserves or credit access to be able to buy quality seeds. Given their importance in increasing productivity, several of the countries studied have implemented policies to facilitate access to and use of quality seeds. China provides a subsidy for the purchase of improved seeds, which is distributed either by giving a cash payment to farmers to buy seeds or by transferring funds to a company that sells seeds to farmers at a discounted price (Gale 2013). Canadians benefit from the Seeds Act and its Regulations to help ensure that the seeds sold domestically are registered, labeled and properly represented in the marketplace; the CFIA (Canadian Food Inspection Agency)

is responsible for its administration. Brazil offers farmers subsidized credit for operational expenditures, including the purchase of seeds. The importance of maintaining the genetic diversity of seeds is recognized under the SDGs (Sustainable Development Goals) as a means to end hunger, achieve food security, improve nutrition and promote sustainable agriculture (Goal 2). Without a doubt, the rate of change in agricultural performance (productivity) depends largely on the innovations introduced by seed suppliers to the sector, and definitely depends on conditions for farmers' adoption of high quality seeds (creditworthiness being one of them).

Financial services

The challenge for LAC countries is to develop creative mechanisms for financing micro, small and medium-sized enterprises, which are critical for agricultural and value chain development, and to open up opportunities for regional integration. More than 60% of Caribbean economic operators do not have access to financing. In agriculture, this figure increases to about 80%. But the situation is even worse, because with the global recession of 2008-2009, many commercial banks, particularly in the Caribbean, closed due to massive debts. Even large producers now find it difficult to obtain financing. CARICOM is sponsoring a proposal with the Philippines to address the issue of micro, small and medium enterprise financing, motivated by the urgent need to "unlock" more than 80% of the people involved in this development process through financing. Associated with this situation is the fact that while some countries in Latin America have well-developed R&D capabilities, the majority of those capabilities are not reaching the people who are the focus of the 2030 Sustainable Development Agenda. Networks should be created so that people who are resource poor

can have access to those capabilities, and also to ensure that large segments of the population are not left behind.

Agricultural and rural credit in Brazil

With respect to policies for long-term productivity gains, Brazil has 12 different major credit programs for agriculture. These are: 1) the Low-Carbon Agriculture ABC Program, a groundbreaking initiative that targets sustainable agricultural practices and is one of the first in the world to finance low-carbon emission practices; 2) the Innovagro program, which finances technological innovation, market competitiveness and technical assistance, giving support to a wide range of commodities - from organic agriculture, poultry and pork processors, to dairy farming; the investment program for storage facilities, to support medium agricultural producers; 3) the ModerAgro program for the modernization of agriculture and conservation of natural resources, which finances soil fertility enhancement, soil recuperation and environmental compliance, among other activities; 4) the ProdeCoop, which provides funding for the capitalization of cooperatives formed by small-scale and family producers; 5) the ProRenova program, which is being implemented for the renewal of sugarcane production; 6) ModeInfra; 7) ModerFrota, for the purchase of equipment for the preparation, drying and processing of coffee; 8) ProdeAgro, for agribusiness development; 9) ProdeFruta, a program to support the development of the fruit sector; 10) PropFlora, for the planting and restoration of forests; 11) ProCapAgro; and 12) PRONAF, a program that provides credit to small-scale and family farmers at low annual interest rates ranging from 0.5% to 3.5%, depending on the amount borrowed, and the activities financed (see Table 1 below for further details and Lopes et al. 2015). These policies and programs are in place to promote long-term growth in agriculture.

Table 1

Brazil: Programs for the Promotion of Agriculture (Adjusted Annually)

PROGRAM	LIMIT (USD)	MAX TERM (YEARS)	GRACE PERIOD	% per year	2013/14 USD millions
PRONAF	Costing 1596 to 11979 Investment: 3990 to 119703	3		0,5 to 4,0	7181,2
"Low Carbon" agriculture - ABC (EMBRAPA)	798 or 1197	15 (variable)	8	5 or 4,5	1109
MODERAGRO	319 (individual) & 958 (collective). For PNCEBT: 80 & 1,8 (per animal)	10	3	6.5	207
MODERINFRA	798 (individual) & 2394 (collective)	12	3	4,0 or 6,5	90
PROCAP-AGRO	23941 (working capital); 19951 (incorporation)	2 or 6	6 months or 2 years	7,5 or 6,5	1045
Construction and Expansion of Storage (PCA)	Up to 100% of total value	15	3	4	1541
Tractors/harvesters/ Equipment - MODERFROTA	Up to 90% or 100% (when beneficiary in Pronamp)	8 (new items) 4 (secondhand items)	-	4,5 or 6,0	8
Investment support for Equipment- PSI RURAL	Up to 100%	10	2	4,5 or 6,0	5030
Support for medium-sized farmers - PRONAMP (10% of bank enforceability)	154	12	3	5.5	17700
INOVAGRO	399 (individual) & 1197 (collective)	10	3	4	33
PRODECOOP (20% of bank enforceability)	39901	12	3	6.5	302

Source: Deger / SPA / Mapa

Note: Conversion rate: 23/10/2014 – BRL 2,5062/USD

“Equalization” of interest rates and compulsory credit system

As an incentive for financial institutions to provide rural credit on attractive terms to producers, the Brazilian government offers credit at below-market interest rates through a subsidy called “equalization”, or matching of interest rates. The Brazilian Treasury pays for the difference between the subsidized interest rate and market interest rates, as well as for administrative and tax costs incurred by banks. In 2012/2013, for example, USD470 million were allocated to support disbursement of the ABC Program credit, mentioned above.

Since the 1960s, Brazil has implemented a compulsory system for commercial banks that requires them to devote a fixed percentage (about 15%) of checking account deposits to agricultural credit. For example, during the period from 1966 to 1985, 92% of the total credit provided to agriculture was funded using this source (Santana and Nascimento 2012). Table 2, showing data on credits by source, shows that around 80% of the total credit offered in 2013/2014 through the national rural credit system was either subsidized or compulsory. Total credit for agriculture has increased fivefold over a decade, from USD 14 billion in 2003/2004 to USD 62.3 billion in 2014/15. Domestic long-term credit is scarce and is provided mainly by BNDES (for its Portuguese acronym), as the single state development bank that relies on public funding and provides loans at reduced cost. Of the credit allocated to farmers in 2014, about 13% was assigned to small farmers.

Despite the growth in credits to agriculture, domestic credit in Brazil is generally costly and long-term credit is very scarce. Interest rates are very high compared with international trends because of the high risk associated with lending. Despite being limited, subsidized credit is the policy responsible for the huge increase in productivity in Brazilian agriculture.

Table 2

Total Agricultural Credit by Source (billion USD)

Function	2014/15
Working capital	44.7
1. “Controlled” Interest Rates - compulsory credit	35.5
a. “Equalization” of rates	13.6
2. Not “controlled”	9.2
Investments	17.6
1. “Controlled” Interest Rates	17.4
a. “Equalization”	12.0
2. Not “controlled”	0.2
Total	62.3

Source: PAP/SPA 2014/2015

Land issues

Some countries, such as China, are finally recognizing that farm size is a major problem (a situation shared by many LAC countries). China, with an average of about an acre (0.405 has) per family, is trying to liberalize

arrangements to rent out land and is gradually exploring how to extend this approach without giving up on collective land ownership. There is a major push to introduce, not only measures to improve the transfer of land, but also to support the so-called “new-style” farmers, consolidating plots of land into larger commercial operations, and providing them with financial support for their operating expenses, technical services, soil testing and also addressing some of the environmental issues related to farming.

Owned versus rented land has implications for what farmers do with the land, in terms of short-term inputs and long-term investments and how that affects rental rates. Normally, input use is significantly higher for rental farms with the corresponding environmental consequences. There is a conflict between the operator who manages the land and is interested in short-term profits, and the owner of the land who is more forward-looking, which raises the following question: to whom should the regulation policy apply? This is particularly important for countries with high rental rates, such as Argentina, where an estimated 40 to 50% of land under crop or livestock production is rented. One challenge for LAC countries is to ensure that leasing laws consider sustainability objectives, for which incentive schemes are fundamental, rather than imposing long-term leases.

Another question related to land ownership rights is: who should be the beneficiary of government programs, such as direct payments or subsidies - the producers or the land owner? When beneficiaries are not the actual producers, government programs begin to look more like welfare payments, having little or nothing to do with agriculture.

The modernization of extension services: the experience of Canada

With respect to lessons for adopting new technologies and adapting to climate change, certain policies implemented in the past were effective in improving the competitiveness of Canadian farmers. In the 1950s and 1960s when

farmers were relatively poor, and were not as financially well off as their urban counterparts, the government implemented a number of policies such as income support, extension services and insurance markets, and also established a bank as an arm's length agency of the federal government that lent money only to farmers. Although at one time extension services were very effective in helping farmers to adopt new technologies, this is no longer the case. Whereas in the 1950s and 1960s, when farmers were poor and relatively uneducated, extension work served to increase their knowledge and enhance their productivity, now that the sector is so heterogeneous, with very large-scale and technically sophisticated farmers who are often better informed of what is going on than the extension workers, extension services have shifted their focus to smaller part-time farmers.

Policies have moved on to respond to the sector's financial priorities, while insurance markets have become well developed and offer a variety of risk management techniques. Regarding adaptation to climate change, for many years farmers and companies have been working to create new varieties that are more adaptable or stress-tolerant, and have implemented diversification strategies. The real issue is the sector's vulnerability and volatility. In terms of mitigation, precision agriculture and big data are evolving technologies, and again, farmers have now moved beyond the extension efforts that played such a crucial role in enhancing the competitiveness of Canadian farmers a generation ago.

Given that agriculture is becoming a highly specialized field of knowledge, extension agents cannot be expected to know about all the aspects required by farmers; rather, they can facilitate access to specialized knowledge or change the way in which extension services are provided.

Youth in Agriculture

In most countries, the age structure of farmers has become a matter of concern. The household division of labor that reflects different

opportunity costs among household members is evident, because young adults are most likely to work off-farm, whereas elderly family members are most likely to remain in the community and engage in farming. One issue affected by the increasing average age of farmers is how this influences decision-making, because older farmers tend to have a shorter planning horizon than younger producers. Another trend observed in the United States is that younger operators are more likely to lease the land while older producers own the land but are less involved in farming. While farmers older than 65 make up a third of all farm operators, they account for only a 20 percent share of production (USDA/ERS 2016). In 2014, the average age of principal landlords in the United States was 66.5 years and more than half (57%) of principal landlords were 65 years or older (USDA 2015). In Chile, 50% of the men who are owners of the 9.9 million hectares dedicated to agriculture and livestock activities are older than 60. Similarly, 3.1 million hectares are owned by women, of whom 56% are aged 60 years or older (ODEPA 2009). In Canada, just over 20,000 out of approximately 200,000 farms are owned and operated by men and women under the age of 40 (ODEPA 2009). Although agriculture still attracts young people, aging in the sector is also a concern in Canada because the number of farms where the oldest operator was under 40 years old declined by almost 75.0% between 1991 and 2011, from 74,159 to 20,299 farms. A decline in percentage terms to 9.9% of the total in 2011 from 26.5% in 1991 (Statistics Canada 2011).

Given the fact that many young people do not regard farming as an attractive activity, efforts to involve them and ensure a generational transition in agriculture have become essential for both developing and developed countries. But it does not have to be this way. Picture, for example, the story a farming family in Alberta, Canada, during a typical year from seeding, to harvest and sales. There is a father, two boys, a young man and a young woman, with their drones flying over their GPS-driven harvesters. It is a modern example of how canola is planted in Canada using zero till technologies, with air seeders that deliver fertilizer and chemicals at

the same time as they seed. It is basically an inspiring story about young people participating in farming and bringing what they always bring: innovation, energy and enthusiasm. We see farmers adopting leading-edge technologies such as unmanned aerial vehicles, new strategies for processing and collecting the crop, and of course, using the media to show how farmers pursue environmental sustainability with a great deal of energy, without being recognized for the benefits they provide in terms of a good crop but also a sustainable crop.

Ensuring generational transition in agriculture also requires reforms in the agricultural education system, and in the education system in general. The message to be delivered is that agriculture (including natural resource and water management) is very demanding in terms of skills and technical qualifications, and is therefore very appealing to young people interested in professional careers in technical or business-related areas. Agriculture is full of job opportunities for young professionals, offering them work as marketing agents, quality control agents, accountants, managers, irrigation experts, crop variety experts, mechanization experts or soil scientists. Even in developed countries, such as the United States, the demand outstrips the supply of human talent in agriculture. Agriculture is expected to provide around 57,900 highly-skilled job openings annually in the United States, yet only 35,400 graduates are available to fill them (USDA n.d.).

In coordination with the private sector, it is important to reinforce the message about the types of occupations or professions available in agriculture, in the broader sense of the word. Numerous examples should be provided to show how agriculture is becoming a field of highly specialized knowledge, and therefore more attractive to young people. For example, a family in Panama that has produced pineapples for decades still does not know everything there is to know about growing the crop, so they regularly have experts visit their fields to give advice on what they are doing wrong and what they need to improve. A wine producer in Chile receives frequent visits from technical experts to discuss the management of his vineyards and

the processing of the wine. The same is true of producers in California, in other wine producing areas and, in fact, in all fields of agriculture around the world.

Given the opportunities and challenges facing generational change in agriculture, the policies to target young farmers must be more inclusive, with better agricultural training, improved land rights and enhanced access to financial and non-financial services.

Despite the fact that this situation is common to many countries, few are doing anything about it. The European Union and the United States, for example, help young people to get started in farming with funds to buy land, machinery and equipment or to set up irrigation and drainage facilities. They also provide grants to train both new entrants and established farmers in the latest technical production methods.

Under the EU CAP 2014-2020, a new compulsory top-up (complementary) payment provides income support to new young farmers (under 40 years of age) during a maximum two-year training period and for a maximum of five years during the initial operation period. Total support is set to be no higher than 2% of the national envelope assigned to direct payments (OECD 2014).

In Canada, the Stream B-Fostering Business Development Program provides support for sector-based activities that allow agricultural businesses to adapt to change and improve their profitability and resilience. It is targeted at not-for-profit organizations that operate at national level in Canada and deliver services and/or products to farmers and producers so that they can develop their agri-businesses' entrepreneurial capacity in several areas, one of which is the development of young and established farmers. A series of programs (such as the Advance Payments Program, AgriInsurance, AgriStability, AgriInvest and the Canadian Agricultural Loans Act Program) provide funding and support to help young farmers innovate and remain competitive. Young and beginning farmers also benefit from the Career Focus Program that offers employers

a subsidy of up to CAD 20,000 for providing an agricultural internship to a recent graduate in agriculture, agrifood, agrifood science and veterinary medicine (AAFC 2014).

Change in demographics and the scale of farming: the case of China

When China joined the WTO, one of its major concerns was rural employment. At that time, the country had a massive surplus of rural workers (150-200 million) engaged mostly in farming, the default activity in the Chinese rural economy. Since there were not enough jobs in the cities, people stayed in the countryside and therefore the population increased while land bases remained fixed. For this reason, the country ended up with a small average farm size. However, migration from farms to the cities has picked up considerably in the last 10 or so years, probably becoming the largest migration in history. Large numbers of people, especially the young, have abandoned the countryside, leaving few behind in the villages to do the farming, a task undertaken mainly by older people and unskilled laborers who cannot move to the cities to do other types of work. This situation has become a major concern for the Chinese government because productivity is low and there is little impetus to increase it, since farming has largely become a part-time activity and does not provide people with most of their income. Consequently, there has been a push to increase the scale of farming and, more broadly, to extend this approach to other activities throughout the agricultural food supply chain, including marketing and processing. A parallel effort is under way in the retail sector to consolidate it in the chain as well.

Food safety concerns are also behind the huge effort to increase the scale of operations, since so many small, individual operators are difficult to control, a fact that is at the root of many food safety problems. The idea is to shut down small processing plants, to drive small vendors and small traders out of business and to consolidate them into big companies. The employment ramifications of this major change in the Chinese economy have not really been

considered. China is probably undergoing the most rapid demographic change ever seen, as the population ages and the proportion of working-age people shrinks, thereby easing certain employment concerns.

Concluding remarks

It is often overlooked that the challenge of making policies more market-oriented on the output side also applies on the input side. This is especially true after learning from the 2007-2008 crisis that input subsidies can also be fairly distorting. The Smart Subsidies Program in Malawi (using vouchers) is a valuable experience from which lessons can be drawn. One lesson is that promoting more input use or price subsidies is not the solution because these measures are not environmentally sustainable, are not cost effective and create fiscal pressure over time. Instead, the solution might be to promote greater competition, both domestically and internationally. An example of how this can be done is through the construction of fertilizer blending facilities, and by matching blending fertilizers with soil needs, as the government of Ethiopia is doing in a joint initiative with the World Bank and USAID. International cooperation agencies can help with education programs designed to demonstrate the consequences of output/input subsidies, and promote available alternatives for long-term, sustainable and cost effective solutions. The future calls for agricultural intensification; therefore one key action would be to prepare high-resolution soil maps to understand which input is needed and where, so that the right combination of inputs is applied. The cost/benefit ratio of doing this is very positive. Some countries have high-resolution soil maps that are not being used, while a number of advanced industries are using these maps to increase profits significantly by improving yields in a cost effective manner.

However, it is important not to quickly judge farmers' input decisions as irrational. As mentioned previously, there are good reasons

for overuse or underuse of inputs, which must be fully understood prior to designing a policy instrument in order to properly address any environmental side effects of input use in agriculture.

As discussed earlier in this chapter, the issue of land or property rights has important policy implications. For one thing, it is important to decide who should benefit from government programs, such as direct payments or subsidies, or be the targets of government regulations - the producers or the land owners? When the actual producers are not the beneficiaries, government programs begin to look more like welfare payments, having little or nothing to do with agriculture. Also, the question of owned versus rented land has policy implications because a conflict often exists between the operator who manages the land and tends to be more interested in short-term profits, and the owner of the land who is more concerned with the long term.

With regard to the issue of labor markets, the major changes under way in production will require high levels of capital investment and will imply much lower demand for labor. A research priority should be to investigate which specific capabilities and skills will be required in 10 or 15 years' time for workers to properly respond to the needs of the agricultural sector; and by implication, the changes that will be required in the educational system to respond to those needs. Furthermore, effective policies will be needed to help absorb those workers who will no longer be needed in the agricultural sector. Finally, a distinction must be made between short-term versus long-term, and between isolated versus integrated policy approaches for increasing productivity, sustainability and agricultural competitiveness. For example, it is worth emphasizing the experience of agricultural zoning as an innovation for efficiently managing natural resources and channeling operational and investment credit to small farmers, taking into consideration the latitude, geographic location, risks and the yields that these producers could expect to obtain.



V. Conclusions and Recommendations

Based on the analysis of changes in agricultural policies in the United States, the European Union, Canada, China, Brazil, Chile and Central America, we can identify four major trends in policy design that could enable agriculture to play a major role in responding to the urgent need to strengthen food security, eradicate poverty and hunger, and ensure inclusive economic and social development, and environmental sustainability, in line with the 2030 Sustainable Development Agenda. The major trends identified are:

- Market-oriented agricultural policies
- Market development and regional integration
- Sustainable management of natural resources in agriculture
- Efficient use of inputs and factors of production

It is around these trends that multiple and diverse issues were discussed in this document and from which important lessons and recommendations, of benefit for policy design in LAC countries, can be derived and applied. It is worth noting that some recommendations were the outcome of the closing panel moderated by Miguel García (Trends and Challenges in designing policies in light of the post-2015 Development Agenda), during the workshop held in Washington DC on September 24, 2015, in which the contributions of Maximo Torero, Eugenio Díaz-Bonilla, Cesar Falconi and Juan Buchenau are greatly appreciated.

On the contribution of agriculture to the 2030 Sustainable Development Agenda:

There should be no doubt that all issues discussed throughout this document, and the recommendations made, can be useful in determining how agriculture can contribute to the 2030 Sustainable Development Agenda:

- A critical task at hand is to design and implement policies that will enable the agricultural sector to respond to the SDGs. This calls for innovations on how food is produced, distributed, and consumed. The 2007/2008 crisis taught us how vulnerable this sector is, and also underscored the need to manage risk and increase the sector's resilience to specific and systemic shocks.
- Only a systemic approach that recognizes agriculture's central role in poverty and hunger eradication will allow us to make progress in the SDGs. The SDGs cover a wide range of topics, from poverty, hunger, education, water and sanitation, to infrastructure, energy and urbanization. Together with agriculture, these constitute the building blocks for achieving food and nutrition security, and sustainable and inclusive development.
- On the eradication of poverty (Goal 1) and hunger (Goal 2) of the SDGs, the challenge is how to address the issues of small farmers and very small-scale agriculture, while recognizing its coexistence with a dynamic agricultural system that includes some large players.

As is argued in this document, an important challenge ahead is to eliminate market and policy distortions in order to maximize agriculture's great potential to offer solutions to the goals of the 2030 Sustainable Development Agenda, by providing nutritious food, generating income, protecting the environment and being the pillar for rural development.

General considerations on policy design

- It is important to recognize that we need a basic understanding of the structure of the economy, the global cycle, the multiple objectives and different levels of intervention (Díaz-Bonilla 2015). This means that we require not one, but a set of coherent policy instruments, to address multiple issues at different levels of intervention.
- Policymakers need to understand the structure of the economy and how agriculture is inserted in it. Every economy is different, with different problems in terms of size, stage of development etc. and the structural linkages between agriculture and the rest of the economy are also different.
- Policy design should also adjust quickly to global cycles. For example, the market is now moving from a cycle of high prices to a cycle of low prices, similar to past cycles that lasted for a period of 10 years.
- Objectives must be clearly defined and policies must address several objectives at once, some of which may be conflicting while others may be complementary. The challenge is to increase productivity and make agriculture more competitive while effectively addressing the issues of poverty, employment, income distribution, food security, food safety, nutrition and environmental sustainability. The high interplay among these objectives calls for coherent policies to ensure their efficiency and effectiveness.
- When dealing with policy design and implementation, it is crucial to recognize the four levels of policy interventions: the farm (supply side), the consumer (demand side), the rural territory (which connects agriculture with the non-farm economy) and the agricultural supply chains (covering the flow of products, inputs, equipment, investments and services related to the activities of primary production, processing, transportation and marketing of agricultural products). All these levels of intervention are encompassed by the general economy and country-wide governance and institutions, policies, investments and regulations.
- One difficulty is that Ministers of Agriculture do not control the demand side, which mostly responds to the actions taken by central banks to maintain economic growth at a certain level, or to those taken by other ministries to improve income distribution, eradicate poverty or expand external demand by promoting trade that strongly depends on the exchange rate policy. Thus, the demand side is mostly dominated by macro-economic factors, which are not under the influence of Ministers of Agriculture. The implication is that it may not matter much what actions are taken by the agricultural sector to stabilize agricultural prices, for example, if the exchange rate is jumping up and down, injecting a lot of market uncertainty. This means that agricultural policymakers must find ways to engage in or influence policies at the macro level.
- The fact that most ministries of agriculture do not have jurisdiction beyond the farm gate, or have little influence on value added activities that take place along the supply chain, is also a challenge for policy design. This does not excuse agricultural policies for their lack of a value chain focus. Experiences such as the value chain roundtables in Canada are good examples of how to help industries collectively and strategically build capacity and leadership.

The round tables provide a forum for government and industry to undertake joint actions and promote the adoption of shared value propositions that meet the needs of rapidly changing domestic and world markets. They also promote industry-led initiatives, in partnership with government, which are innovative, efficient and accountable, and facilitate industry and government collaboration in a broad range of regulatory, science and innovation areas. They focus on anticipating and keeping pace with changing consumer preferences, changing conditions in the marketplace and evolving international standards in an increasingly competitive global marketplace.

- The process of policy design for agriculture should factor in the high level of heterogeneity of the stakeholders engaged in agricultural production and value added activities. Several LAC countries have many small family farms and as well as very large farms, and in some cases have two Ministries (i.e. Brazil) for the sector, recognizing the fact that policies cannot be the same for both types of farms.
- It is also worth reiterating Bhagwati's targeting principle: the optimal policy instrument is that which targets the problem directly, rather than indirectly. So, if the concern is food security, the policy instrument must target the person suffering from food insecurity, not the crop or food that the person consumes. A subsidy for corn, wheat or rice will be very inefficient, and will have negative second round type effects on food security. Therefore, for the purposes of food security or poverty eradication, it is the person who should receive the subsidy, not the crop.
- A general consideration is that the political economy implications of an instrument or set of instruments should be paramount. In the end, knowing the effectiveness and distributional effects of the policy will determine the political support obtained by a Minister or a policymaker.

- To encourage more robust growth and the associated improvements in living standards, governments should ensure that the private sector receives sufficient incentives for innovation, entrepreneurship and investment in physical and human capital. For example, officials could cut red tape, rein in deficits and debt, enact tax policies conducive to capital formation, reform the education system and invest in research and development.

On market-oriented policies

Moving on to specifics, below are some recommendations to help countries move quickly from ideas to proposals and actions on topics such as innovation, inclusion, input/output subsidies and agricultural labor markets:

- Policies that make agriculture more market-oriented help farmers respond to market signals and make better decisions about what, when and how much to produce, thereby satisfying food quantity and quality requirements, and providing the attributes demanded by final consumers. More open, transparent and efficient markets will level the playing field between developing and developed countries.
- The future calls for agricultural intensification; therefore the preparation of high-resolution soil maps is required to understand what is needed and where, so that the right combination of inputs is applied. The cost/benefit ratio of this action is very favorable. Some countries have high-resolution soil maps that are not being used, and some advanced industries are increasing profits significantly by improving yields in a cost-effective manner.
- On the input side, there is also the issue of labor markets in agriculture. Much is known about urban labor markets, whereas little knowledge is available on rural labor markets. Academic and international

organizations can contribute to efforts to improve our understanding of existing wage gaps, wage differentials and regulations in rural labor markets.

- A new environment for agriculture entails important changes in the way we produce, requiring high levels of capital investment and much lower demand for labor. Research is needed to determine which capabilities and skills will be required in 10 or 15 years' time so that workers can effectively meet the needs of the agricultural sector and, by implication, identify the changes that would be required in the educational system to respond to those needs. It will also be necessary to estimate - at least approximately - the number/demographics of the workers who will be left out of the process, and determine what policies should be put in place to help absorb the labor that will no longer be needed in the agricultural sector.
- On the subject of innovation, more testing and pilot projects are needed to make sure that the scaling- up structure is in place. This means implementing a pilot project in an area with similar conditions to many other locations, so that once a solution is found, it can be quickly scaled up. Unfortunately, countries are not doing sufficient testing, and therefore large technology adoption programs are being implemented without first evaluating their effectiveness.
- With respect to land titling, there are plenty of good programs in LAC countries that can be escalated throughout the region. Titling is a simple and effective solution to the land problem because it is a necessary condition for the creation of a rental market, similar to the United States, where a large share of the land is rented (about 40%). This promotes a more efficient use of available land, increases the scale of production and generates incentives for increased investment and financing in agriculture.

- Regarding the issue of size, the problem is that policies and government interventions in general fail to take into account that size barriers differ, depending on the country. A small farmer in Brazil is very different from a small farmer in Peru, India or a country in Africa. The problem is aggravated when small farmers are not treated as business people. This is a conceptual issue because it constrains policy makers and researchers from analyzing failures along the value chain in order to solve problems faced by small farmers. In a value chain approach, the goal is to make business successful as a product moves from the producer to the consumer. This requires us to look not only at the production side, but also at the intermediary, industrial and services sectors, and to think of agriculture as a business.

On inclusion and equity in agriculture

- To promote inclusion and equity in agriculture, one quick action would be to carry out titling programs to ensure that both husbands and wives, and minorities, have land rights that give them access to credit and enable them to make decisions that are more sustainable.
- As regards the inclusion of small farmers, it is important to recognize that this also implies the possibility of moving out of agriculture. This is a structural change that requires government support for them to migrate, face risks and take on other activities where they can be more productive. It means providing them with the tools to learn about other opportunities, obtain proper funding to engage in other activities and help them mobilize their assets.
- Financial inclusion is of course very important. This not only means access to credit, but also access to a variety of financial services. When people migrate, for example, financial services for remittances become vital for inclusion, allowing them to have access to safe deposits, transfers,

insurance products and viable alternatives for low income, rural people who usually are unbanked. The achievement of financial inclusion also requires a comprehensive and integrated set of policies related to the provision of financial products, the strengthening of demand for financial instruments and the promotion of financial literacy. People must learn how to manage their money better, and that includes knowing how to make profitable investments in agriculture. To promote financial inclusion it is important to look at institutions so that financial services and the whole financial ecosystem (regulatory framework, technology, partnerships, digital infrastructure, mobile services, non-bank providers, etc.) works in a transparent, efficient and competitive manner.

- Another relevant point for inclusion is to define the policy subject or target: the farm or the farmer. When the farmer and the farm owner were one and the same, policies could address equity and efficiency simultaneously; but if the farmer is not the owner of the land, policies may create a distortion by benefiting the owner of the farm and not the farmer. Thus, if farmers were the subject of educational and extension programs, and if income support programs with instruments such as conditional cash transfer programs, were targeted toward poor or disadvantaged farmers, efficiency and inclusion could be achieved at the same time.
- Expanding conditional cash transfers to cover small farmers and rural populations is also key to achieving greater inclusion in agriculture. This is because Latin America has mostly applied this policy instrument to the urban poor. Scaling up conditional cash transfers to rural people and poor farmers (especially for food and inputs) will stimulate aggregate demand in rural areas, especially demand for food, and at the same time help to achieve both efficiency and equity in agriculture, while significantly reducing public expenditure.

On market development and regional integration

- Much debate is needed in LAC about regionalism, which is normally considered the same when referring to the Pacific Alliance as when discussing ACS, ALBA, UNASUR, NAFTA or SICA. In fact, each case is very different, and therefore requires different approaches and instruments.
- Regionalism is morphing in Latin America as a result of the exhaustion of the predominant model of open regionalism, associated with the debate on the limits of globalization, the crisis in multilateral negotiations, the emergence (now at a standstill) of mega-trade agreements such as the TPP and the TTIP, and declining opportunities in North-South trade. Regionalism is becoming more strategic and pragmatic in the LAC region, moving away from the dilemma of intergovernmental versus supra-national approaches, to initiatives centered around a development agenda, beyond trade, and more focused on thematic and relevant social, economic or environmental issues. However, it remains to be seen how the US' emerging preference for bilateralism, the possible renegotiation of NAFTA, and Brexit will play out in Latin America's regionalism process.
- Future integration processes must be redefined to respond to the specific needs of agricultural producers with respect to deficiencies in infrastructure, transport and services. This implies real physical integration beyond just economic-trade integration. This will make Ministers of Agriculture feel more comfortable in promoting regional integration rather than opposing it.
- For integration processes to be positive and serve as allies of domestic agricultural policies, they must improve the incomes of producers and businessmen throughout the agricultural value chains. Without this

direct relationship, agricultural policies will move in a direction contrary to the integration process.

- Infrastructure, in all its dimensions, is an urgent matter. Countries in the region have tremendous potential but the infrastructure for delivering services, including transportation, still remains very deficient. The difficulties involved in moving goods from one country to another are due to lack of infrastructure, but are also related to the issue of information. On any given day, tremendous opportunities arise in one market while in another within 200 miles, there is over-supply.
- Promoting investment funds and financing for infrastructure, transportation and services might be a way for politicians to feel more comfortable about redefining agricultural policies in favor of real integration.
- Regarding international trade negotiations, regulations are becoming the focus of attention, taking over from commodity issues (such as price supports). The discussions center on issues such as the use of hormones for animal production, antimicrobial washes (for sanitizing poultry against microbial contamination), genetically modified organisms (labelling and production), and the issue of geographical indications. Convergence or progress on these regulatory issues is important to LAC countries because these matters have become essential to global agribusiness and even to small producers, as they try to access specialized markets.
- Consumers are becoming increasingly selective and demanding in terms of the products they wish to consume. Therefore, priority should be given to understanding and responding to changes in consumer habits, along with efforts to satisfy consumer demand for quality, standards, processes, nutritional value, social values and ethics associated with the product.

- To avoid high volatility in exports to a particular country, in terms of value and volume, an efficient monitoring system is needed to keep track of market changes (structural and cyclical changes), as well changes in domestic production. This would indicate whether or not a country of interest (such as China or any other export market) is going to meet domestic demand for food, in order to then develop long-term export strategies.
- With regard to international cooperation, the LAC region (especially sub-regions comprised of smaller countries, such as Central America and the Caribbean) faces the challenge of addressing the lack of efficiency in the use of financial resources rather than contributing to the dispersion and disconnection of initiatives in the region.

On the sustainable management of natural resources

- The agricultural sector in LAC plays - and will continue to play - a critical role in providing food for a world population that is expected grow by 2.3 billion by 2050. The challenge is to do this in a sustainable way, producing more with less and conserving the quality of natural resources.
- A territorial approach is essential. While it may be true that the allocation of resources appears more efficient when the state subsidizes and supports decisions that are exclusive to the private sector, it is obvious that a territorial approach is better when dealing with natural resources in agriculture. Ministry of Agriculture resources should not be allocated on the basis of farms or agricultural activities, but rather should be allocated at the territorial level, i.e. to a larger space where governance becomes more relevant and objectives and outcomes go beyond private interests to properly address the common objectives of the community, and to better account for negative externalities.

- The challenge is to prevent and respond to emergencies (e.g. droughts, floods, etc.) and at the same time pay more attention to broader issues such as the impact of agriculture on urban areas and downstream communities, and concerns that go beyond agricultural fertility. These issues include water quality, wildlife habitat, and air quality and land preservation, essential issues that are external to agriculture but that require agriculture to respond to the needs of those not engaged in farming. This is a major transformation from the way agricultural conservation is traditionally viewed.
- One area of focus is the provision of secure land ownership rights to promote a more productive and sustainable use of natural resources and help fight rural poverty. Property rights are essential to ensure the effectiveness of irrigation systems, the efficient management and governance of natural resources and, in general, the sustainability of agriculture.
- An interesting policy innovation is compulsory cross-compliance, which is partially voluntary, and requires producers to adhere to certain environmental quality standards in order to receive payments through commodity programs and premium subsidies in crop insurance programs.
- A growing trend in developed countries is the implementation of voluntary programs. Producers have the option of enrolling in land retirement programs or in programs that apply environmentally-friendly practices to working land. Budgetary limitations generate a competitive enrollment pressure to benefit from these programs. Enrollment in these types of programs relies on striking a balance between profitability/benefits to the producer and environmental outcomes, so incentives should be significant enough to attract producers from the most sensitive production areas.
- In terms of policy design, a balance must be reached between compliance, regulation and voluntary targeted benefits. Sometimes tensions arise between regulations and voluntary programs. While voluntary programs based on incentives (such as tax exemptions, subsidized credits and insurance premium subsidies) are effective, regulations are also needed to control continuous and overuse of chemicals, for example. Further research is needed to demonstrate, through comparative case studies, that incentives schemes are more effective and efficient in achieving the objectives of sustainable production than costly regulations.
- One key lesson from the implementation of input subsidy programs in many countries (even China is changing its policy) is that promoting more input use or input price subsidies is not the solution because these programs are neither environmentally sustainable, nor cost effective and create fiscal pressure over time.
- Although the menu of instruments for addressing the natural resource base and the most pressing issues depends on each country's conditions, one lesson that applies to all countries is that these instruments should be continuously evaluated. As part of that evaluation, it is crucial to determine whether there are any unintended outcomes of the policy and what the indirect impacts are.

On the role of international organizations

Finally, some recommendations on how international institutions can cooperate at any stage of the policy cycle for agriculture in the countries of the Americas:

- One way to foster viable collaboration among institutions is to find critical issues that are of common interest, or on which several institutions have the competence or

the mandate to work. An example of this type of initiative is the joint institutional effort implemented during the avian flu crisis in 2006. The IDB received a request for help and assembled a group of health and agricultural experts from different institutions (PAHO, FAO, OIE and IICA) to design an action plan for Latin America. The fact that the outbreak could have had terrible consequences for the region's poultry sector, that the request for help came from the countries and that the solution required a multidisciplinary effort, facilitated the collaboration of several institutions.

- However, we must recognize the complexity involved in multilateral institutions working together, given that multiple instruments are needed. In groups such as the G20, the process for all parties to reach a consensus can be so complex and prolonged that it takes a long time to address important issues. Cooperation among multilateral institutions normally works if countries demand it and if they have the proper cooperation instruments. If the process were more demand-driven (bottom-up approach), countries would be more likely to provide or implement incentives for multilateral institutions to coordinate or work collaboratively. In a supply-driven system it is easier for international institutions to work alone. From a country's perspective, it is not workable to receive 20 different recommendations from many different institutions that may not be in agreement. However, a good recommendation in consensus with different institutions such as IFPRI, FAO and IICA would be very welcome and helpful to countries.
- It may also be true that countries sometimes prefer less coordination because in that way they obtain more funding or more diverse technical views. The key message is that institutional coordination is good, but it does not have to occur on everything. It is already difficult enough to coordinate efforts within one institution, so the difficulties increase if everything has to be coordinated with other institutions. Therefore, having different approaches, even competing approaches, may be desirable in some circumstances. Some coordination among financial institutions such as CAF, IDB and the World Bank is good because a country can obtain the best support from each one but, at the same time, maintaining some diversity is good for testing different possibilities.
- International organizations, such as IICA, need to become more relevant to the integration processes by creating a forum for the exchange of technical ideas, at the appropriate level, among technicians who can contribute to the work of the integration secretariats. The forum could serve as a mechanism for high-level technical discussion aimed at activating agriculture within those integration processes.
- Institutions can play a multilateral role by influencing the adoption of best innovation practices in the countries. The problem is not the lack of innovation - the academic community, research centers and the private sector all have good ideas of what works or what does not work - but rather how to convince and convey these messages to politicians in the countries.



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