

Agricultural Insurance in Latin America

Developing the Market



THE WORLD BANK

Agricultural Insurance in Latin America

Developing the Market

December 2010



THE WORLD BANK



TABLE OF CONTENTS

Acknowledgments	ix
Executive summary	xiii
Institutional challenges	xx
Financial challenges	xx
Technical challenges	xx
Operational challenges	xxi
Conclusions	xx
1. Introduction	1
2. Overview of the agricultural sector	5
Agribusiness segmentation	8
Risks affecting agricultural production	12
Agricultural risk management in LAC	21
Rural finance in Latin America	23
3. Status of agricultural insurance	27
Size of agricultural insurance markets and premium volumes in LAC	29
Availability of agricultural insurance products	32
Crop insurance products	33
Livestock insurance products	38
Aquaculture insurance products	40
Forestry insurance products	40
Bloodstock insurance products	41
Models and channels of delivery	42
Cost of agricultural insurance provision in LAC	43
Agricultural reinsurance in LAC	44
Public sector support to agricultural insurance in LAC	46
Agricultural insurance penetration in LAC	56
Gaps in the provision of agricultural insurance in LAC	58
Agricultural insurance product gaps	59
Agricultural insurance penetration gaps	63
4. Opportunities and challenges for agricultural insurance	69
Opportunities for the development of agricultural insurance	70
Crop insurance	70
Livestock insurance	74
Forestry insurance	75
Aquaculture insurance	76

Challenges for the development of agricultural insurance in LAC	77
Institutional challenges	77
Financial challenges	79
Technical challenges	80
Operational challenges	82
5. Final remarks	85
Bibliography	91
Annex. Agricultural insurance country fact sheets	94

LIST OF BOXES

Box 3.1	Crop insurance products: Indemnity-based and index-based covers	34
Box 3.2	Types of livestock insurance products	39
Box 3.3	Models of government support to agricultural insurance	48
Box 3.4	Named-peril hail crop insurance program in Mendoza Province, Argentina	53
Box 3.5	SEAF crop-credit insurance guarantee program of the federal government of Brazil	54

LIST OF FIGURES

Figure 2.1	Economic and social importance of the agricultural sector in LAC	7
Figure 2.2	Economic and social importance of agriculture in Mexico, by state	8
Figure 2.3	Agricultural risk layering	22
Figure 2.4	Ratio of agricultural sector GDP to total GDP and agricultural sector loans to total loans	24
Figure 2.5	Development financial institution share of total agricultural credit	25
Figure 2.6	MFI lending to the rural population in select countries of LAC, 2007	26
Figure 3.1	Insurance companies offering agricultural insurance in LAC	29
Figure 3.2	Agricultural insurance direct premiums written, 2005–09	31
Figure 3.3	Distribution of agricultural insurance premiums per business subline in LAC, 2009	32
Figure 3.4	Crop insurance acquisition expenses, A&O expenses, and LAE in LAC countries, 2007	44
Figure 3.5	Premiums and fiscal expenditures on agricultural insurance in LAC, 2004–09	55
Figure 3.6	Agricultural insurance penetration in LAC	57
Figure 3.7	Agricultural insurance gaps in LAC, by type of insurance	63
Figure 4.1	Agribusiness value chain and insurable interest	71

LIST OF MAPS

Map 2.1	Drought hazards in LAC countries	13
Map 2.2	Flood hazards in LAC countries	14
Map 2.3	Anomalies during El Niño events	15
Map 2.4	Anomalies during La Niña events	15
Map 2.5	Hailstorm hazards in LAC countries	16
Map 2.6	Tornado hazards in LAC countries	17
Map 2.7	Winter storm hazards in LAC countries	18
Map 2.8	Earthquake and tropical cyclone hazards in LAC countries	19
Map 3.1	Regional distribution of agricultural insurance direct premiums	30
Map 3.2	Distribution of agricultural insurance direct premiums in LAC	33
Map 3.3	Agricultural insurance products in LAC	42
Map 3.4	Current status of government support for agricultural insurance in LAC	49
Map 3.5	Agricultural insurance penetration in LAC	60
Map 3.6	Degree of development of agricultural insurance in LAC	64

LIST OF TABLES

Table 2.1	Major farming systems in LAC	10
Table 2.2	Risk management strategies and mechanisms	21
Table 3.1	Financial performance of public sector MPCl in select LAC countries	28
Table A.1	Agricultural insurance country fact sheet: Argentina	94
Table A.2	Agricultural insurance country fact sheet: Bolivia	96
Table A.3	Agricultural insurance country fact sheet: Brazil	98
Table A.4	Agricultural insurance country fact sheet: Chile	100
Table A.5	Agricultural insurance country fact sheet: Colombia	103
Table A.6	Agricultural insurance country fact sheet: Costa Rica	105
Table A.7	Agricultural insurance country fact sheet: Dominican Republic	107
Table A.8	Agricultural insurance country fact sheet: Ecuador	109
Table A.9	Agricultural insurance country fact sheet: El Salvador	110
Table A.10	Agricultural insurance country fact sheet: Guatemala	112
Table A.11	Agricultural insurance country fact sheet: Honduras	114
Table A.12	Agricultural insurance country fact sheet: Mexico	116
Table A.13	Agricultural insurance country fact sheet: Nicaragua	118
Table A.14	Agricultural insurance country fact sheet: Panama	120
Table A.15	Agricultural insurance country fact sheet: Paraguay	122
Table A.16	Agricultural insurance country fact sheet: Peru	123
Table A.17	Agricultural insurance country fact sheet: Uruguay	124
Table A.18	Agricultural insurance country fact sheet: República Bolivariana de Venezuela	127
Table A.19	Agricultural insurance country fact sheet: Windward Islands	128



ACKNOWLEDGMENTS

This report was authored by Ramiro Iturrioz (senior agricultural insurance specialist, GCMNB, World Bank) and Diego Arias (senior agricultural economist, LCSAR, World Bank). The authors owe thanks to Antony Randle for his editorial contributions. The work has been partly financed by the Trust Fund for Environmentally and Socially Sustainable Development (TFESSD).

The authors are grateful to the peer reviewers, John D. Nash (lead economist, LCSSD, World Bank), Panayiotis Varangis (lead advisory services, International Finance Corporation [IFC]), Charles Stutley (agricultural risk management international consultant, ARD, World Bank), Martin Buehler (principal insurance officer, IFC), and Carlos Arce (senior agricultural economist, ARD, World Bank),

The authors thank the many respondents who contributed to this study. They are listed below.

- Agroasemex, S.A. (*Mexico*)
- Aon Re (*Argentina*)
- Aon Re (*República Bolivariana de Venezuela*)
- Aseguradora Agropecuaria Dominicana (*Dominican Republic*)
- Aseguradora Magallanes (*Chile*)
- Aseguradora Tajy Propiedad Cooperativa S.A. Seguros (*Paraguay*)
- Asociación Latinoamericana de Empresas de Seguro Agropecuario (ALASA)
- Banco de Seguros del Estado del Uruguay (*Uruguay*)
- Cámara Hondureña de Aseguradores (*Honduras*)
- Colonial Insurance Company (*Ecuador*)
- Comité de Seguro Agrícola (COMSA, *Chile*)
- Compañía Cooperativa de Seguros Surco (*Uruguay*)
- Hannover Re (*Germany*)
- Instituto Nacional de Seguros (*Costa Rica*)
- Instituto Nicaragüense de Seguros y Reaseguros (*Nicaragua*)
- La Segunda Cooperativa Limitada de Seguros Generales (*Argentina*)
- Mapfre Colombia (*Colombia*)

- Mapfre Re (*Spain*)
- Mclarens Toplis Peru Ajustadores y Peritos de Seguros, S.A. (*Peru*)
- Ministerio da Agricultura, Pecuária e Abastecimento do Brasil (*Brazil*)
- Ministerio de Agricultura (MAGPyA, *Uruguay*)
- Ministerio do Desenvolvimento Agrario do Brasil (*Brazil*)
- Munich Re (*Argentina*)
- Novae Re (*Switzerland*)
- Oficina de Riesgo Agropecuario (*Argentina*)
- Partner Re (*Chile*)
- Protección Agropecuaria, Compañía de Seguros S.A. (*Mexico*)
- Scor Re (*Switzerland*)
- Seguradora Brasileira Rural (*Brazil*)
- Swiss Re (*Brazil*)
- UIB Colombia S.A. Corredores de Reaseguros (*Colombia*)
- Willis Argentina S.A. (*Argentina*)
- Windward Islands Crop Insurance (1988) Ltd. (*Dominica*)

ABBREVIATIONS

ADACA	Aseguradora Dominicana Agropecuaria, Dominican Republic
AGDP	agricultural gross domestic product
AGRODOSA	Aseguradora Agropecuaria Dominicana, Dominican Republic
ANAGSA	Aseguradora Nacional Agrícola y Ganadera, Mexico
A&O	administrative and operating
APH	actual production history
BANADESA	Banco Nacional de Desarrollo Agrícola, Honduras
BGA	Banana Growers Associations
COMSA	Comité de Seguro Agrícola, Chile
CONASA	Consejo Nacional de Salud (National Health Council), Ecuador
CSF	classical swine fever
DFI	development finance institution
ENSO	El Niño-La Niña-Southern Oscillation
FCR	Fundo de Catastrofe Rural, Brazil
FOGASA	Guarantee Fund for Crop Insurance, Peru
GDP	gross domestic product
GNP	gross national product
INDAP	Instituto de Desarrollo Agropecuario (Small Farmer Lending Bank), Chile
INISER	Instituto Nicaraguense de Seguros y Reaseguros, Nicaragua
INS	Instituto Nacional de Seguros, Costa Rica
IRB	Instituto Nacional de Resseguro do Brasil (Brazilian Reinsurance Institute)
ISA	Instituto de Seguro Agropecuario, Panama
LAC	Latin American and Caribbean countries
LAE	loss adjustment expenses
MFI	microfinance institution
MPCI	multiple-peril crop insurance
NDVI	normalized dry vegetative index
PACC	Program to Assist Climatologic Contingencies, Mexico
PML	probable maximum loss
PPP	public-private partnership
PROAGRO	Programa de Garantia da Actividade Agropequária (Brazilian Guarantee Program)
PRONAF	Programa Nacional de Fortalecimento da Agricultura Familiar (Brazilian Program to Strengthen Family Agriculture)

REDD	reducing emissions from deforestation and degradation
SAGARPA	Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (Ministry of Agriculture), Mexico
SEAF	Seguro da Agricultura Familiar (Insurance for Family Agriculture)
SENASA	Servicio Nacional de Sanidad Animal (National Service of Animal Health), Argentina
SICAF	Integrated Agricultural Insurance System, Argentina
TSU	technical support unit
WINCROP	Windward Islands Crop Insurance Limited



EXECUTIVE SUMMARY

The agricultural sector plays a pivotal role in the economy and in the lives of people in the Latin American and Caribbean (LAC) countries. Agricultural producers in LAC face a myriad of risks that can threaten their output, their income, and, sometimes, their consumption. However, they have devised various strategies to deal with the risks affecting their production, using both active risk management and risk-coping strategies. While risk management strategies attempt to address the risk ex ante, risk-coping strategies address it ex post. The management of agricultural production risks relies on an optimal combination of technical and, when they are available, financial tools. Agricultural producers can retain small but recurrent risks through the use of appropriate on-farm risk mitigation techniques (such as irrigation, crop management, and pest prevention) and self-insurance tools such as savings and contingent credit. However, agricultural producers are not able to manage the less frequent but more severe losses affecting their agricultural activities; thus some farmers transfer them to other parties through financial mechanisms like insurance, when available and accessible.

Agricultural insurance is typically one of many tools that farmers can use as part of their comprehensive strategy for managing agricultural production risks. The level of development of agricultural insurance is heterogeneous among the different countries and geographic areas in the LAC region. The study focuses on how agricultural insurance can complement and enhance agricultural risk management in LAC. The overall objective of this study is to provide the key elements for a strategy to increase the penetration of agricultural insurance in the region. The specific objectives are to (a) diagnose the current situation, (b) identify gaps in the provision of agricultural insurance, and (c) identify impediments to increasing penetration and recommend a series of actions to remove those impediments.

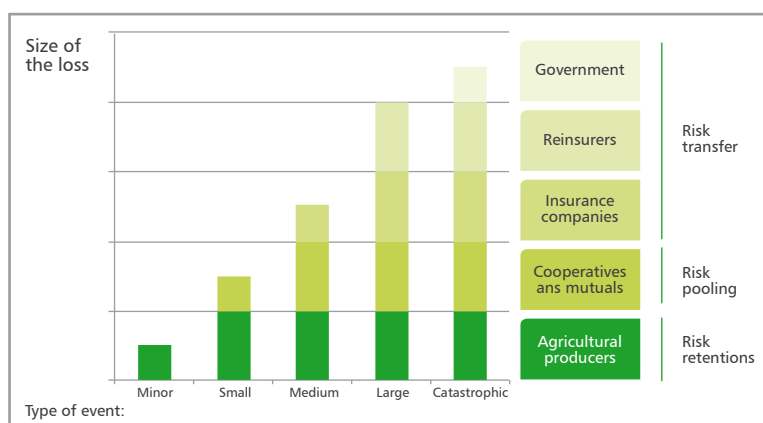
There are some key aspects to consider when designing an adequate agricultural insurance strategy for LAC. These include (a) an understanding of the economic and social relevance of the agricultural sector, (b) the deconstruction of agricultural producers into agribusiness segments, (c) the assessment of the risks affecting agricultural production, (d) the identification of the risk management strategies implemented by agricultural producers and governments, and (e) the assessment of the rural finance sector. The LAC region has a wealth of natural resources, the world's greatest agro-biodiversity, and immense economic, social, and environmental diversity. The region also benefits from a stock of natural resources suitable for agricultural production. Agricultural production can be classified into three sectors: traditional farming sector, semi-commercial farming sector, and commercial farming sector, but the predominance of each type of sector varies among geographic areas, so

the analysis of agricultural farming systems provides a good proxy for the segmentation of agricultural producers in the region.

Agricultural production in LAC faces a myriad of production risks. Drought and floods are devastating perils that affect agricultural production in almost all LAC countries. Hailstorms are frequent in the Southern Cone countries and along the Andes Mountains, in Central America, and in western Mexico. Tornadoes affecting agricultural production are common in the Southern Cone countries, eastern Mexico, and Baja California peninsula. Winter storms are common in Uruguay and the southern coasts of Argentina and Chile. Tropical storms have devastating effects on agricultural production in Mexico, Central America, and the Caribbean. Earthquakes, although frequent in the region, do not cause severe direct losses to agriculture production. Agricultural production in the coastal areas of the Pacific and the Caribbean region face the risk of tidal waves caused by tsunamis. Volcanic activity is also a source of risk for agricultural production in LAC.

Agricultural producers and governments in LAC have devised risk management strategies to deal with the production shocks faced by the agricultural sector. The types of agricultural risk management mechanisms implemented by agricultural producers and farmers vary by country. The management of agricultural production risks relies on an optimal combination of technical and financial tools. The risk-layering concept is useful for analyzing the optimal combination of technical and financial risk management tools in agriculture (see figure 1). Farmers and herders can retain small but recurrent losses through the use of appropriate on-farm risk mitigation techniques (for example, irrigation and pest prevention) and self-insurance tools (for example, savings and contingent credit). More severe but less frequent nonsystemic losses can be pooled into cooperative or mutual insurance schemes. However, the relatively severe and frequent systemic losses, which cannot be managed through either on-farm risk management mechanisms or a cooperative or mutual insurance scheme, need to be transferred to commercial insurers and reinsurers. Governments have a large role to play in major disasters, acting as reinsurers of last resort or providing post-disaster aid.

Figure 1 Agricultural risk layering



Source: Mahul and Stutley 2010.

Assessing the access of the agricultural sector to rural finance is important in the design of an agricultural insurance strategy. Agricultural producers in LAC use different sources to finance investments in agricultural production, but the penetration of rural credit is very low. Development financial institutions¹ are the main source of financing for the agricultural sector, and commercial credit is an important source of rural finance in the agriculture net-exporting countries in the region. However, microfinance institutions are still not an important source of finance for agriculture in LAC. Access to agricultural finance depends on the farmers' characteristics. Commercial farmers are mostly financed through formal financial institutions and commercial credit. Semi-commercial or emerging commercial farmers integrated in supply chains satisfy their financial needs mainly through commercial credit provided by supermarkets, agro-industry, exporters, input suppliers, or other supply chain agents. The main source of financing for traditional smallholder farmers is informal credit. The traditional smallholder farmers who are living in extreme poverty have, for the most part, no access to formal credit and are reliant almost completely on public sector support and nonfarm sources of income.

Agricultural insurance has a long history in some countries in the region. Agricultural insurance was provided in many LAC countries by public sector insurance companies from the 1950s up to the end of the 1980s. In this period, there was major growth in public sector multiple-peril crop insurance (MPCI) in Latin America, often linked to small farmer seasonal production credit programs offered by the public sector. Most of these public sector agricultural insurance programs performed very poorly, with high operating costs and very

¹ Development financial institutions are institutions that carry on any activity, whether for profit or otherwise, with or without government funding, with the purpose of promoting development in the industrial, agricultural, commercial, or other economic sector, including the provision of capital or other credit facility.

high loss ratios, which were exacerbated by very low premium rates and poor management. Most public sector programs were terminated by 1990 on account of their poor results. The provision of agricultural insurance through the private sector and public-private partnerships is a new trend in the region. Agricultural insurance is currently available in most LAC countries.

Agricultural insurance in LAC is relatively well developed in comparison with other regions such as Africa and many Asian countries. Agricultural insurance premiums in LAC have been growing exponentially in recent years; however, they are not distributed evenly among the different agricultural insurance business sublines or among countries. The supply of agricultural insurance products in the region is relatively evolved in comparison with other regions in terms of diversification and number of companies offering insurance.

Crop insurance is the most developed business subline of agricultural insurance in LAC. Yield-based MPCl is the most common type of crop insurance marketed in the region. Individual-grower named-peril crop insurance (mainly hail) is the second most popular type of crop insurance after MPCl. Index-based crop insurance has been one of the most promising new products.

Livestock insurance is a relatively small segment of the agricultural insurance market in LAC. Livestock insurance is offered by the private insurance industry in several countries. Aquaculture insurance, including off-shore marine and on-shore freshwater aquaculture insurance for fish stock, crustaceans, and shellfish, is an important agricultural insurance business subline in some countries. Finally, forestry insurance provides traditional named-peril indemnity insurance against fire and allied perils affecting standing timber production.

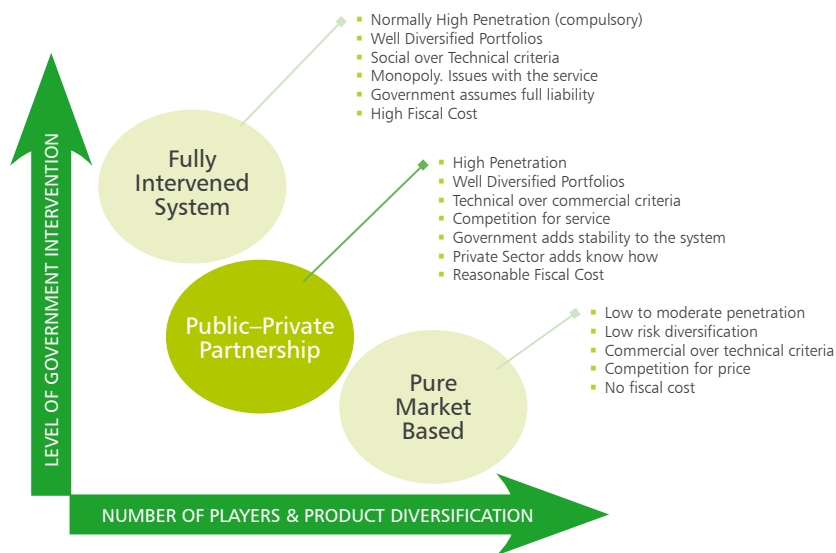
The provision of agricultural insurance in LAC countries is expensive in comparison with other regions. According to a sample of 11 LAC countries extracted from the survey performed by Mahul and Stutley (2010), estimated average total expenses incurred by the insurance sector in the provision of agricultural insurance in 2007 were equal to 29 percent of total original gross agricultural insurance premiums. The estimated total expenses for the provision of agricultural insurance in LAC are 11 percent higher than average expenses of other regions in the same year—26 percent of original gross agricultural insurance premiums.

Agricultural reinsurers have an active role in the LAC agricultural insurance market. Agricultural risks in the region are ceded to reinsurers using different types of reinsurance agreements and different forms of reinsurance cession. The magnitude of agricultural risk reinsurance cessions varies from country to country. Reinsurance capacity, as long as the insurance proposals are technically sound, is widely available. Agricultural reinsurers in the LAC region do not just provide reinsurance capacity for domestic insurance companies; they also assist domestic insurance companies by providing advisory services in agricultural

risk assessment, risk modeling, pricing, and risk structuring as well as by designing loss adjustment and operational manuals, risk rating and risk accumulation control software, and the wording of insurance contracts.

The public sector has an active role in supporting agricultural insurance in LAC countries. The reasons for public sector involvement in agricultural insurance markets are varied. The public sector often justifies its intervention in agricultural insurance markets by pointing to (a) the absence of insurance infrastructure in rural areas and the absence of private sector agricultural insurance services, (b) the prohibitively high start-up costs in developing agricultural insurance products; (c) constraints on the capacity of reinsurers to underwrite the systemic risks in agricultural production; (d) high administrative costs of underwriting agricultural insurance; and (e) affordability issues, which arise from the often high costs of agricultural insurance premiums. See figure 2 for the models of government support.

Figure 2 Models of government support to agricultural insurance



Source: Iturrioz 2009.

A wide range of models for the provision of agricultural insurance are available in LAC countries. The public sector mechanisms to support the development of agricultural insurance vary among the LAC countries. Several countries have established public sector agricultural risk units that provide technical support to the public sector and agricultural insurance companies, and many countries subsidize agricultural insurance premiums in an effort to support development of the market. The public sector in many LAC countries has an active role in enabling the legal and regulatory framework to promote agricultural insurance. Direct intervention of the public sector in the provision of agricultural insurance or reinsurance is rare.

The creation of PPPs for financing the catastrophic agricultural risk layers is a recent trend in the region. The public sector (at the national and subnational levels) in several LAC countries has recently begun to purchase private agricultural insurance coverage to transfer catastrophic agricultural risks to international markets and protect small traditional and semi-commercial farmers. Some countries in the region have developed special agricultural insurance programs targeting small and marginal farmers, which has driven the exponential growth of agricultural insurance premiums in LAC. The challenge for LAC countries is to maintain the fiscal capacity to sustain the current levels of government support for these types of agricultural insurance programs and premium subsidies.

Agricultural insurance has reached reasonable penetration rates in parts of the region. However, LAC, on average, still lags behind other regions in terms of agricultural insurance development. The penetration of agricultural insurance is not homogeneous among LAC countries, and it is not homogeneous even across different geographic areas within the same country. The provision of agricultural insurance in LAC countries has several gaps. Gaps are evident in the products offered: (a) only 19 percent of the total cropped area is insured; (b) forestry insurance is only developed in Chile and Uruguay; (c) despite the importance of aquaculture in the region, the development of aquaculture insurance is limited to Chile and Mexico; and (d) the development of livestock insurance is minimal. Geographic gaps are also evident: agricultural insurance is only consolidated in the most dynamic areas in terms of agricultural production.

The level of development of agricultural insurance in the areas where agricultural insurance is consolidated is comparable with the level of agricultural insurance development in high-income countries. Furthermore, the geographic areas where agricultural insurance is in the process of consolidation in the region comprise areas that were turned over to agricultural production in the 1990s, and these are the areas where demand for agricultural insurance products is rising quickly. However, there are many areas where agricultural insurance is still not available but has the potential for development. These areas are characterized by the coexistence of well-developed market-oriented agriculture firms

with traditional or semi-commercial farming. Finally, the geographic areas where agricultural insurance is not yet available and has low potential for development are characterized by a vast population of small and marginal or semi-commercial farmers who produce for self-consumption and, eventually, for the market.

The development of the agricultural insurance market is a long-term PPP effort.

The opportunities for increasing the current levels of crop insurance in geographic areas where crop insurance is already consolidated will come, mainly, from the development of more complex and sophisticated types of products. In the areas where crop insurance is already consolidated, the insurance industry is enhancing its portfolio of crop insurance products to cover more perils and crop activities, and it is also adopting an agribusiness value chain approach in order to deliver products.

The uptake of crop insurance is expected to keep growing in the geographic areas where agricultural insurance is in the process of consolidation.

Large-scale agribusiness enterprises that operate in geographic areas where agricultural insurance is in a process of consolidation will continue to demand customized crop insurance solutions. It is also expected that small- and medium-size farmers and enterprises situated in geographic areas where crop insurance is in the process of consolidation will also increase their demand for crop insurance. Furthermore, the geographic areas where agricultural insurance is available but still not consolidated offer enormous potential for development. There are also many geographic areas in LAC where crop insurance is yet not available, but opportunities exist to provide crop insurance for commercial and semi-commercial farmers. However, in geographic areas where crop insurance is not yet available and the rates of rural poverty are high, the potential to provide crop insurance is very limited.

There are opportunities to develop livestock insurance in the region.

Livestock insurance has not yet reached significant levels of uptake among herders. The provision of better livestock insurance in the region will improve when better livestock insurance products are offered. An increase in the supply of comprehensive livestock insurance in some countries is expected in the short term. The strengthening of the animal health care and prevention systems in LAC countries represents a direct opportunity for livestock insurance. Poultry and swine insurance also offers an interesting opportunity for the development of livestock insurance.

The LAC region offers opportunities to develop forestry insurance. The expected improvement of product design for standing timber forest plantations will enhance the uptake of forestry insurance. Developing suitable forestry insurance products to be used as collateral from reducing emissions from deforestation and degradation (REDD) credits constitutes an opportunity for forestry insurance in the region.

There are several opportunities to develop aquaculture insurance in the region.

Shrimp and tilapia production in LAC offers an opportunity to develop aquaculture insurance. In order to develop aquaculture insurance, efforts will have to be made to build local capacity.

The process of promoting and enhancing agricultural insurance implies overcoming critical challenges. These can be classified into four categories: institutional challenges, financial challenges, technical challenges, and operational challenges. The challenges faced by the governments and the insurance industry, as well as the potential solutions to overcome them, are discussed below.

INSTITUTIONAL CHALLENGES

The development of agricultural insurance requires an appropriate institutional framework. In addition to an adequate legal and regulatory framework, the development of agricultural insurance requires the facilitation of access to technical and financial assistance for the development of products and the integration of agricultural insurance with other financial products and technical services received by the farmers.

FINANCIAL CHALLENGES

Risk-layering schemes should be seriously considered at the time of designing agricultural insurance programs for countries in the region. Also needed are efforts to (a) encourage domestic insurance companies to pool agricultural risks, (b) promote governments' participation in risk financing on the top catastrophic risk layers to complement reinsurance markets, and (c) redefine the role of agricultural insurance premium subsidies.

TECHNICAL CHALLENGES

Proper assessment of agricultural production risks, linked to ongoing product development, is a precondition for the development of sustainable agricultural insurance programs. In addition, better agricultural and weather information services and data infrastructure are needed. Furthermore, support for research and development of innovative agricultural insurance products and services is necessary to reach small farmers and expand the market overall. In other words, agricultural insurance products should be tailored to the targeted clients.

OPERATIONAL CHALLENGES

LAC needs to build local capacity in operational procedures for designing and administering agricultural insurance, especially products based on simple operational models. The bundling of agricultural insurance products with existing services or networks operating in rural areas is important to increase coverage and reduce transaction costs. Complementary support for agricultural insurance operations could include the promotion of (a) cooperatives, producer associations, rural banks, and microfinance institutions as delivery channels for agricultural insurance and (b) technical support units for agricultural insurance in start-up situations.

CONCLUSIONS

Agricultural insurance has reached relatively good levels of development in several regions within LAC. Agricultural insurance is available in most countries in the region, and the industry offers a comprehensive range of products. The level of penetration, except for livestock insurance, is reasonably high in most countries. Total direct agricultural insurance premiums written in LAC during 2009 amounted to US\$780 million, accounting for 3.5 percent of global agricultural insurance premiums.

The degree of development of agricultural insurance, however, is not homogeneous across LAC countries. Several heterogeneities are observed in terms of the penetration of agricultural insurance both between and within countries as well as between different agricultural insurance products. While agricultural insurance in some geographic areas, such as the Southern Cone countries, shows levels of market penetration similar to high-income countries, other geographic areas, such as the English-speaking Caribbean countries, show a complete lack of agricultural insurance markets.

Governments in LAC are already playing an important role in supporting the development of agricultural insurance markets. The main support roles assumed by governments in the region are the provision of subsidies for agricultural insurance premiums and the purchase of catastrophic agricultural insurance products to protect small vulnerable farmers. The total fiscal expenditures on support for agricultural insurance in 2009 amounted to US\$326 million, accounting for 42 percent of total agricultural insurance premiums written that year. Brazil and Mexico account for 90 percent of the total regional government expenditures on support for agricultural insurance.

The region shows several gaps in the provision of agricultural insurance. The reasons for these gaps are diverse and specific to the country and geographic area. Therefore,

the strategies for developing agricultural insurance markets are also diverse and have to be tailored to each specific situation. In other words, no one-size-fits-all strategy for the development of agricultural insurance is suitable for all countries in LAC.

The existence of gaps in the provision of agricultural insurance creates opportunities for development of the market in the region. The private insurance industry has an opportunity to enhance the use of agricultural insurance in geographic areas where commercial farming is the main type of agricultural production. In such geographic areas, the private insurance industry can enhance the use of agricultural insurance in two ways: (a) by making products more affordable and (b) by shifting the insurance industry's approach to clients from a focus on farmers to a broader focus on the agribusiness value chain. The enhancement of agricultural insurance in geographic areas where semi-commercial and traditional subsistence farmers predominate will be more challenging and will likely require government support.

The development of agricultural insurance markets depends on the governments' and the private insurance industry's ability to overcome several challenges. In order to take advantage of the opportunities to develop agricultural insurance markets, the public and private sectors will need to overcome various institutional, operational, technical, and financial challenges. These challenges are different for different countries and geographic areas in the region. The private insurance industry in isolation is unable to overcome these challenges, and public-private partnerships are needed, along with direct government support.

1. INTRODUCTION

The agricultural sector plays a pivotal role in the economy and in the lives of people in the Latin American and Caribbean (LAC) countries. The agricultural sector contributed 5.5 percent of the GDP and 18 percent of total exports from the region in 2006 (FAO 2009). The region is more urbanized than the rest of the world, with 22.4 percent of the population residing in rural communities compared with the world average, 44 percent. As the level of urbanization rises, the need to modernize agriculture and attain higher levels of productivity becomes more acute.

Agricultural producers in LAC face a myriad of risks that can threaten their output, their income, and sometimes their consumption. Throughout history, the LAC region has been among the most disaster-prone areas in the world: volcanoes, earthquakes, droughts, floods, and yearly cycles of major tropical storms all affect agricultural production. It is widely believed that these hazards will intensify through the effects of global warming. A comparison of two five-year periods, 1971–75 and 2002–05, shows that the incidence of droughts has increased 360 percent, hurricanes, 521 percent, and floods, 266 percent. Scarcely a country in the region, which has a population of approximately 550 million, has escaped serious damage from natural disasters within the past two to three years. Disasters affecting the region are relentless, frequent, and highly destructive in the areas affected.

LAC agricultural producers have devised strategies to deal with the multiple risks affecting their production. Agricultural producers in the region use both active risk management and risk-coping strategies. While risk management strategies attempt to address the risk ex ante, risk-coping strategies address it ex post. Managing the risks to agricultural production relies on an optimal combination of management and, when they are available, financial tools. Agricultural producers can retain small but recurrent risks through appropriate on-farm risk mitigation techniques (such as irrigation, crop management, and pest prevention) and self-insurance tools (such as savings and contingent credit). However, agricultural producers often cannot manage the less frequent but more severe losses affecting their agricultural activities; thus some farmers transfer them to other parties through financial mechanisms like insurance, when available and accessible.

Agricultural insurance is typically one of many tools that farmers can use as part of their comprehensive strategy for managing agricultural production risks. Agricultural insurance is used primarily to hedge against the risk of a loss of production. It

is defined as the equitable transfer of the risk of a loss, from an agricultural entity² to an insurer, in exchange for a **premium**. Agricultural insurance is a financial tool that provides a mechanism to transfer risks faced by crop, livestock, bloodstock, forestry, or aquaculture production.

The level of development of agricultural insurance is heterogeneous among the different countries and geographic areas in the region. Agricultural insurance in LAC, compared with other regions in the developing world, is quite well developed in most countries. However, this development is concentrated in the most productive areas. Outside these areas, agricultural insurance, if available, is underdeveloped or not developed at all. In addition, agricultural insurance has been targeted at the commercial farming sector. Few initiatives have sought to tailor agricultural insurance to the vast semi-commercial and traditional farming sectors. As a result, although agricultural insurance has reached relatively significant levels of development in LAC, there is still a significant gap in the provision of this risk transfer tool for the semi-commercial and traditional farming sector.

The study focuses on how agricultural insurance can complement and enhance agricultural risk management in LAC. The overall objective of this study is to provide the key elements for a strategy to increase the penetration of agricultural insurance in the region. The specific objectives are (a) to diagnose the current demand and supply of agricultural insurance in LAC; (b) to identify the gaps in the provision of agricultural insurance; (c) to identify impediments to increasing penetration; and (d) to recommend a series of actions for removing them.

The study is based on a comprehensive approach to the development and analysis of agricultural insurance provision in the region. The study presents the operational, institutional, financial, and operational issues associated with the provision of agricultural insurance, and it conducts the first regional assessment of the current status of and opportunities for the provision of other types of agricultural insurance such as forestry and aquaculture insurance. The study assesses (a) the status of the development of traditional products as well as index-based insurance and opportunities for their further development; (b) the roles of governments in the region in supporting the development of agricultural insurance; and (c) the perspectives and attitudes toward risk of the various participants in the agribusiness value chain.

The study follows the agricultural risk management framework developed by the World Bank. The framework is a tool that has been used to assess and develop agricultural insurance markets in several countries. It is based partly on corporate risk management but

² Agricultural entity includes agricultural producers, cooperatives, associations, and agribusiness enterprises, among others.

also considers economic and social factors such as a government's fiscal profile and the living conditions of the farmers in each country. Such a framework should be implemented only after cost-effective risk mitigation techniques (for example, irrigation and pesticides) have been successfully implemented. This framework thus deals only with the residual risk that cannot be mitigated. The framework is based on four pillars: (a) agribusiness segmentation; (b) agricultural risk assessment; (c) agricultural risk financing; and (d) legal and institutional capacity.

The study is organized into five chapters, including this introduction. Chapter 2 provides an overview of the agricultural sector in LAC, including a description of the main farming systems and an assessment of the main perils affecting production. Chapter 3 describes the current provision of agricultural insurance, describing the evolution of agricultural insurance, providing the current market figures, assessing the availability of agricultural insurance products, describing government support to agricultural insurance, and estimating the current levels of penetration. Chapter 4 focuses on the challenges in attempting to increase coverage and penetration. It assesses the current gaps in the provision of agricultural insurance, identifies opportunities for further development, and recommends some future actions that can be taken. Chapter 5 presents the conclusions of the study.

The study is complemented by a detailed description of the agricultural insurance market in LAC countries where this financial product is currently available. This information is presented in the form of fact sheets for 19 countries. Each fact sheet contains information about the history of agricultural insurance in the country, the market structure, the main channels for delivering agricultural insurance, the degree of government support for agricultural insurance, the main agricultural insurance products marketed, the penetration rate of agricultural insurance, and the volume of market premiums. This information is presented in an annex to the main body of the study.



2 OVERVIEW OF THE AGRICULTURAL SECTOR

An understanding of the economic and social relevance of the agricultural sector is a key first step in designing an adequate agricultural insurance strategy in Latin American and Caribbean (LAC) countries. The economic and social importance of the agricultural sector determines whether a national agricultural insurance strategy will have commercial and/or social goals. On the one hand, social insurance—safety net—aims to assure a minimal level of economic security for all farmers, particularly those involved in low-profit activities. These social objectives rely on (contingent) wealth transfer instruments. On the other hand, commercial insurance is oriented toward viable business activities that generate enough profit for farmers to afford the insurance premium. These instruments are based on sound actuarial principles and should apply only to viable farms whose survival may be jeopardized by the occurrence of an insurable event. Country and regional factors should also be considered in the design of a risk-financing strategy.

The LAC region has a wealth of natural resources, the world's greatest agrobiodiversity, and immense economic, social, and environmental diversity. The region covers approximately 205 million hectares and encompasses 32 countries with a total estimated population of 561 million. The size of the region and its wide range of favorable ecologies have led to an extremely high level of biodiversity. Population varies considerably throughout the region, from Brazil—the world's fifth-largest country in both area and population—to numerous Caribbean island nations with fewer than 100,000 people.

The region benefits from a stock of natural resources suitable for agricultural production. The region contains 36 percent of the main cultivated food and industrial species and 28 percent of the world's forest area (UNEP 2000). It also contains some 168 million hectares of cultivated land, including 19 million hectares equipped for irrigation and a further 600 million hectares devoted to grazing and pastureland. It has 40 percent of the developing world's humid areas and almost half of its total renewable water resources, but only 4 percent of its arid and semiarid lands. Some 90 percent of the region's land area is humid and subhumid.

The agricultural sector is an important economic sector in many LAC countries. The agricultural sector accounts for 5.5 percent of regional GDP and 15.6 percent of total exports of the region. However, the degree to which agriculture contributes to the economy varies widely from country to country. Whereas in Trinidad and Tobago agriculture accounts for just 0.1 percent of national GDP and 2 percent of total exports, in Paraguay it accounts

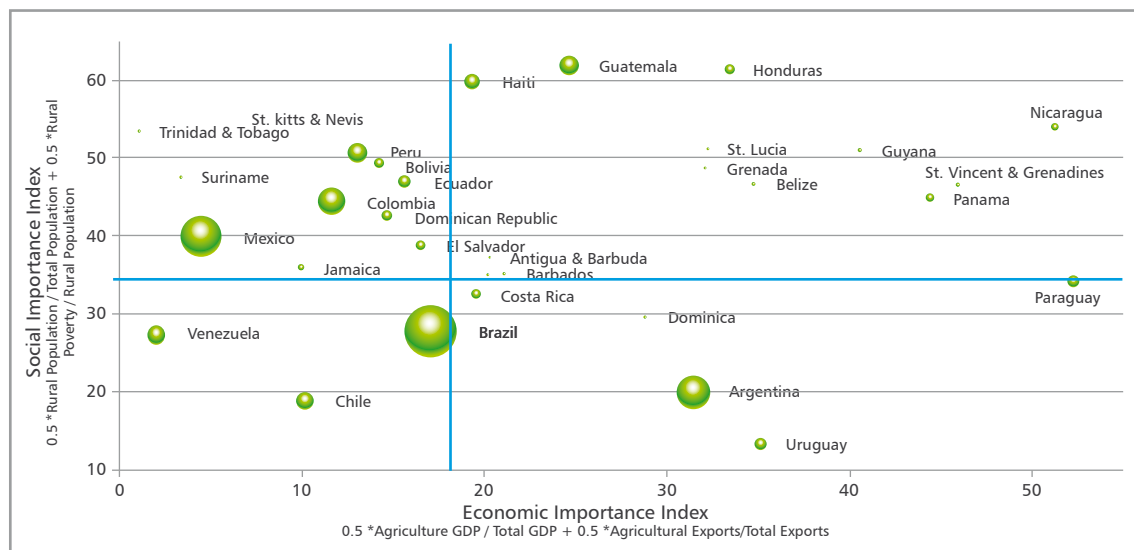
for 20 percent of national GDP and 88 percent of exports (World Bank 2007). Agriculture makes an even larger contribution to the regional economy when linkages with farm-input, food-processing, and distribution industries are taken into account. Although data are limited to certain countries and years, results of studies undertaken by the Inter-American Institute for Cooperation on Agriculture in 2005 indicate that the sector contributes a much higher share of GDP than is reflected in the official data. Data for Costa Rica and Uruguay in 2006, for instance, estimate the contribution of all agricultural industries to be between 30 and 35 percent of these countries' national output compared with official figures of just 9 percent of GDP in each country (ECLAC 2008). Strong forward linkages to the agribusiness and food services sectors exist in all of the region's countries; examples include soybean oil and derivatives in Argentina, Brazil, and Paraguay.

The agricultural sector is also relevant from a social standpoint. With an average GNP per capita of US\$6,544 in 2009, LAC is the wealthiest of the developing regions. However, it is characterized by striking inequality in the distribution of wealth: the poorest 20 percent of the population receives only 3 percent of all income, whereas the wealthiest 20 percent receives 60 percent. Although urban poverty rates in some countries are high, poverty is more widespread in rural areas. More than 50 percent of rural people live below the poverty line. Poverty data vary extensively, from fewer than 2 percent of the population with an income of under US\$1 a day in Uruguay (1989 data) to 40 percent in Guatemala (FAO 2004).

LAC countries can be classified into four groups according to the economic and social importance of their agricultural sector. The first group comprises those countries in which the agricultural sector has neither relevant economic nor social importance. The agricultural sector in these countries makes a small contribution to national GDP, total exports, or both; at the same time, a small portion of the population lives in rural areas, so the incidence of rural poverty is very low. The República Bolivariana de Venezuela is an example of countries in this group. In the second group of countries, the agricultural sector does not have economic relevance, but it does have social relevance, either because agriculture is the source of livelihood of a major part of its population or because rural poverty is a serious issue. Andean countries and Mexico are examples of countries in which the agricultural sector has low economic but high social relevance. The third group comprises countries in which the agricultural sector is economically as well as socially relevant. The agricultural sector in these countries makes a major contribution to national GDP, to total exports, or both; at the same time, a major part of the population has agricultural production as its main source of livelihood, and rural poverty is high. Caribbean and Central American countries are examples of countries in which the agricultural sector is highly relevant from the economic as well as the social standpoint. The fourth group comprises countries in which the agricultural sector constitutes an important economic activity and has a large role in total exports, but their

populations are largely urban or there is a low incidence of poverty in rural areas. Argentina and Uruguay are examples of such countries. Figure 2.1 maps the LAC countries according to the economic and social importance of their agricultural sector.

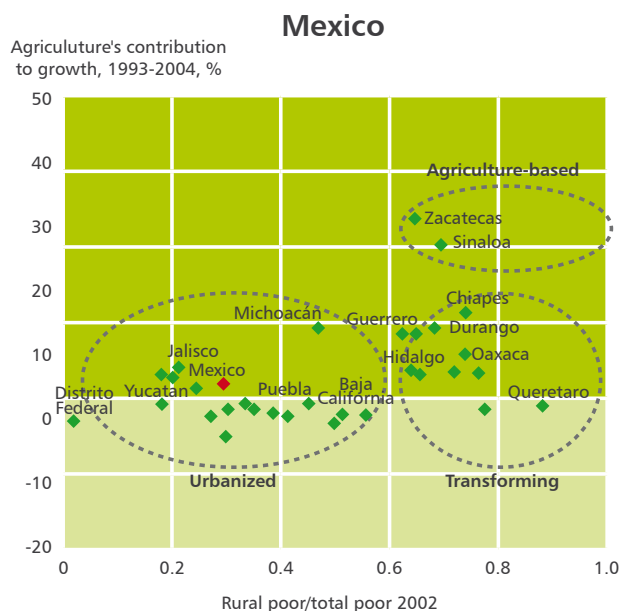
Figure 2.1 Economic and social importance of the agricultural sector in LAC
(size of the balloons represent the level of agriculture GDP)



Source: Authors based on Giordano 2006; World Bank 2010.

Several situations of economic and social relevance can be found within different geographic areas in a particular country. For instance, in Mexico the agricultural sector has low economic importance, but moderate-to-high social importance. The contribution of the agricultural sector to total growth was 6 percent during the period 1993–2004, whereas the share of rural poor in total poor was 25 percent during the same period. While this is true from a national perspective, there are regional differences within Mexico. The sector is economically and socially relevant in the states of Zacatecas and Sinaloa, with the agricultural sector contributing 31 percent to economic growth in Sinaloa and 27 percent in Zacatecas, but with a share of rural poor to total poor of 65 and 70 percent, respectively. Conversely, the economic and social relevance of the agricultural sector in states like Yucatán or Jalisco is very low. Agricultural production contributes only 3 and 9 percent of the total economic value added in Yucatán and Jalisco, respectively. At the same time, the rural poor constitute less than 20 percent of the total poor in these states. Figure 2.2 shows the economic and social importance of agriculture in different states in Mexico.

Figure 2.2 Economic and social importance of agriculture in Mexico, by state



Source: World Bank 2007.

AGRIBUSINESS SEGMENTATION

The deconstruction of agricultural producers into agribusiness segments is key for defining the objectives of an agricultural insurance strategy. Obtaining a correct understanding of the characteristics of agricultural producers present in each of the geographic areas is a fundamental initial step in the design of an agricultural insurance strategy. An agricultural insurance strategy can have either commercial or social objectives. Agricultural insurance programs with social objectives, or safety nets, aim to assure a minimal level of economic security for all agricultural producers, particularly those involved in predominantly subsistence-based agricultural production activities. These social objectives rely on (contingent) wealth transfer instruments. Market-based agricultural insurance is oriented toward commercial agricultural activities that generate enough profit for the producer to afford to pay insurance premiums. Thus market-based agricultural insurance instruments are only meant for commercially viable farms that may be jeopardized by the occurrence of an insurable loss.³

3 An "insurable loss" is a loss that is accidental, unforeseen, definite in time and place, and measurable.

Agricultural production can be classified into three general categories, namely traditional subsistence farming, semi-commercial farming, and commercial farming. The traditional subsistence farming sector is characterized by a large number of agricultural producers operating small holdings using mainly family labor and limited production technology. Farmers in this sector produce primarily for home consumption and in good seasons may sell their surplus in the market. These agricultural producers rarely borrow from the formal banking sector to invest in their agricultural business activity. Usually, nonfarm income represents a large fraction of the household's total income. Since traditional subsistence farmers do not perform business-oriented activities, the basic precondition for developing commercial agricultural insurance is missing in this sector. The semi-commercial farming sector includes medium-size holdings that grow at least one commercial crop and derive a significant proportion of their household income from agriculture. Family labor is still predominant, although producers in this sector invest in production technology. The main challenge associated with the provision of agricultural insurance to the semi-commercial farming sector is the high transaction costs relative to the level of liability involved in the provision of relatively small insurance contracts. Standardized index-based insurance products (for example, area-yield insurance, rainfall insurance), offered through cooperatives or rural finance institutions, may be a potential solution to this problem. The commercial farming sector includes medium-size and large, specialized production units that are run on a purely commercial basis. The individual enterprises are commercially viable and have large asset bases. The enterprises use expensive technology that requires intensive capitalization, which is financed by funds borrowed from the formal financial sector. Traditional named-peril and multiple-peril agricultural insurance products are suited to meet the needs of the commercial farming sector for risk transfer.

The predominance of each type of farming sector varies among geographic areas in the region. Traditional subsistence farming systems, although they are distributed throughout the region, are predominant in the high altitudes along the Andean mountains, in the maize-bean production systems in Mexico and in Central America, in northeastern Brazil, in the step valleys in the Andes region of Peru, and in the Amazon basin. Traditional subsistence agricultural producers, although mixed with commercial agricultural producers, can also be found along the northern coastal areas of South America and in Central America and the Caribbean countries. Semi-commercial farming systems are common in the *llanos* area of Brazil, Colombia, República Bolivariana de Venezuela, and Guyana. They are also present in the southern Andean region of Argentina and Chile, the southern area of Brazil, and the northern area of Uruguay. Other regions with this type of farming include the Chaco region in Argentina, Paraguay, and Bolivia, the coastal areas of Central America, northern South America, and the Caribbean countries. Commercial farming systems are predominant in the irrigated areas of northern and central Mexico, in the irrigated valleys of Peru, Chile, and western Argentina, southeastern and central Brazil, and the coastal zones of central

Chile. Uruguay and the Pampas area of Argentina also have commercial farming systems. Commercial farming is also present in combination with traditional subsistence and semi-commercial farming in the coastal areas of Central America, the northern coastal areas of South America, and in some Caribbean countries.

The analysis of agricultural farming systems provides a good proxy for the segmentation of agricultural producers in the region. An agricultural production system is defined as a population of individual farms that have broadly similar resource bases, enterprise patterns, household livelihoods, and constraints, for which similar development strategies and interventions would be appropriate. Farming systems are strongly linked to particular types of agricultural producers. Within a certain agricultural farming system, it is usual to find similar types of agricultural producers or, at least, a consistent pattern in the mix of agricultural producers in a particular zone.

Agricultural farming systems in LAC are extremely heterogeneous and complex. Owing to its enormous latitudinal range, varied topography, and rich biodiversity, the LAC region has one of the most diverse and complex ranges of farming systems of any region in the world. The sources of livelihood of the farmers, the type of farmers, and the prevalence of rural poverty vary across the different types of farming systems present in the region. According to the Food and Agriculture Organization and the World Bank (2001), it is possible to find 16 major farming systems in the region (see table 2.1).

Table 2.1 Major farming systems in LAC
% of region

Farming system	Land area	Rural population	Location	Principal livelihoods	Prevalence of poverty
Irrigated	10	9	Northern and central Mexico as well as coastal and inland valley areas of Peru, Chile, and Argentina	Horticulture, fruit, cattle	Low to moderate
Forest based	30	9	Amazon basin	Subsistence and cattle ranching	Low to moderate
Coastal plantation and mixed	9	17	Coastal areas of Central America, Colombia, República Bolivariana de Venezuela, Guyana, and northeastern Brazil	Export crops and tree crops, aquaculture, fishing, tubers, tourism	Low to extensive and severe (highly variable)
Intensive mixed	4	8	Eastern and central Brazil	Coffee, horticulture, fruit, off-farm work	Low (except laborers)
Cereal and livestock (campos)	5	6	Southern Brazil and northern Uruguay	Rice, livestock	Low to moderate

Farming system	Land area	Rural population	Location	Principal livelihoods	Prevalence of poverty
Moist temperate mixed forest	1	1	Coastal zone of central Chile	Dairy, beef, cereals, forestry, aquaculture	Low
Maize-beans (Mesoamerican)	3	10	Coastal zone of Mexico to Panama	Maize, beans, coffee, horticulture, aquaculture	Extensive and severe
Intensive highlands mixed (northern Andes)	2	3	Andean region of Colombia, Ecuador, and República Bolivariana de Venezuela	Vegetables, maize, coffee, cattle and pigs, cereals, potatoes, off-farm work	Low to extensive (especially at high altitudes)
Extensive mixed (cerrados and llanos)	11	9	Central-western Brazil, eastern Colombia, República Bolivariana de Venezuela, and Guyana	Livestock, oilseeds, grains, some coffee	Low to moderate (smallholders)
Temperate mixed (Pampas)	5	6	Central and eastern Argentina and Uruguay	Livestock, wheat, soybean	Low
Dry-land mixed	6	9	Coast of northeastern Brazil and Yucatán peninsula of Mexico	Livestock, maize, cassava, wage labor, seasonal migration	Extensive, especially drought induced
Extensive dry-land mixed (Gran Chaco)	3	2	North-central Argentina, through Paraguay and into eastern Bolivia	Livestock, cotton, subsistence crops	Moderate
High-altitude mixed (central Andes)	6	7	Step valleys in Peru, altiplano region of southern Peru, western Bolivia, northern Chile, and Argentina	Tubers, sheep, grains, llamas, vegetables, off-farm work	Extensive and severe
Pastoral	3	1	Patagonia region, Argentina	Sheep, cattle	Low to moderate
Sparse (forest)	1	<1	Southern Andes of Argentina and Chile	Sheep, cattle, forestry extraction, aquaculture	Low
Urban based	<1	3	Periurban and intraurban agricultural systems of major cities throughout the region	Horticulture, dairy, poultry	Low to moderate

Source: FAO and World Bank 2001.

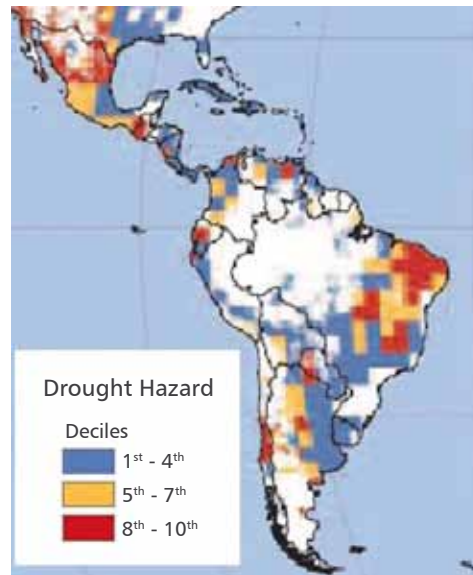
RISKS AFFECTING AGRICULTURAL PRODUCTION

Assessing the risks to agricultural production is a key step in developing an agricultural insurance strategy for the region. The proper identification of the risks affecting agricultural production, the assessment of their frequency and intensity, the accurate mapping of such risks for particular agricultural activities, and the use of proper risk-modeling tools to determine the potential probable maximum loss (PML) that these risks may cause to agricultural production are essential if the private insurance sector and governments in the region are to devise suitable agricultural risk management strategies. This section describes the main risks to agricultural production in the region.

The types of risks faced by agricultural producers as well as their frequency and severity vary widely across countries. Agricultural production is exposed to droughts and floods in almost all LAC countries. Loss from hailstorm is an important risk facing producers in Argentina, Uruguay, and southeastern Brazil. Tropical cyclones are particularly damaging to agricultural production in Central America and the Caribbean countries. Tornadoes are frequent in Southern Cone countries. Winter storms are an important risk facing forestry plantations in Uruguay and Chile.

Drought is a devastating peril that affects agricultural production in almost all LAC countries. Seasonal droughts are fairly common in climates that have well-defined annual rainy and dry seasons. The northeastern states of Brazil, the semiarid areas of the Pampas region in Argentina, the southern areas of Chile, and the northern areas of Mexico are likely to experience episodes of seasonal drought. The main trigger for droughts is the occurrence of El Niño-La Niña-Southern Oscillation (ENSO) events. During El Niño events, drier weather conditions are prevalent in northeastern Brazil, the Caribbean, Central America, Ecuador, Colombia, and the República Bolivariana de Venezuela. During La Niña events, drier weather conditions are prevalent in the Argentine Pampas, Uruguay, and southeastern Brazil. The spatial distribution of drought hazard in LAC countries is presented in map 2.1.

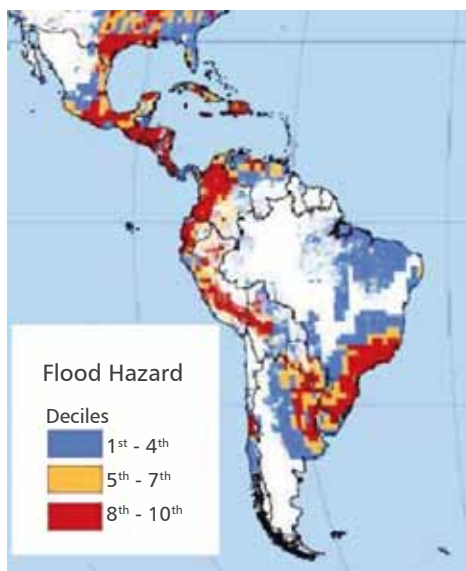
Map 2.1 Drought hazards in LAC countries



Source: World Bank 2005.

Flood is a common peril affecting agricultural production in the region. The causes of floods are varied. Whereas in Central America and the Caribbean countries floods are mostly associated with hurricanes and tropical storms, in South America they are mostly associated with El Niño events, which result in higher rainfall in the southern countries. El Niño events occur every three to seven years. The 1997–98 El Niño events were particularly devastating in Peru and Ecuador. The hydrological system in the region also contributes to the risk of flooding. The major drainage divide is far to the west along the crest of the Andes. West of this divide, in the mountainous regions, the slopes of riverbeds are very steep, which, in the event of storms, increases the risk of flash floods, the most dangerous type of floods. In the lower parts of rivers flowing into the Atlantic Ocean, the risk of flooding is very high, especially when there is sedimentation or when river channels are poorly defined. The spatial distribution of flood hazards in LAC countries is presented in map 2.2.

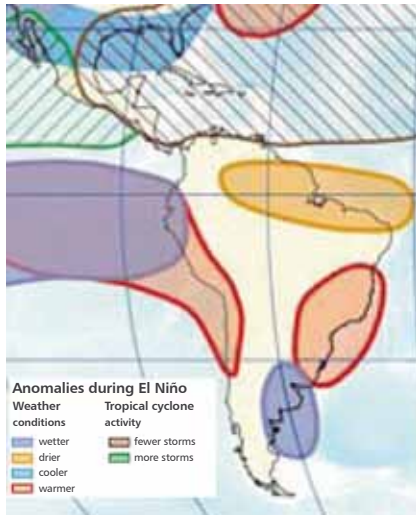
Map 2.2 Flood hazards in LAC countries



Source: World Bank 2005.

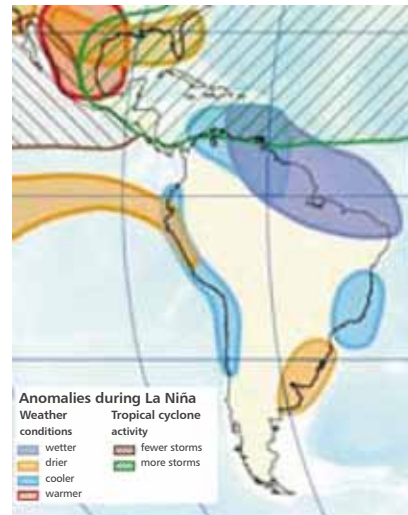
The occurrence of floods, droughts, and tropical storms in the region is influenced by the El Niño-La Niña-Southern Oscillation events. The ENSO refers to periodic (two- to seven-year) anomalies in sea surface temperatures over a large area of the eastern equatorial Pacific Ocean that alter large-scale weather patterns. The warm (El Niño) and cool (La Niña) phases of the ENSO have different effects in different areas of LAC. El Niño events are caused by an anomalous warming of the central equatorial Pacific Ocean. The occurrence of El Niño events results in higher rainfall and above-normal temperatures in Peru, Ecuador, Argentina, Uruguay, the southern regions of Brazil, and the northern regions of Mexico. However, El Niño events also trigger unpredictable droughts in some areas of the region. The occurrence of El Niño events during the northern hemisphere winter causes drier conditions in the northeastern regions of Brazil. The occurrence of El Niño events during the southern hemisphere winter causes drier conditions in Central America, Colombia, and República Bolivariana de Venezuela. El Niño events also cause above-normal storm activity in the Pacific basin and below-normal storm activity in the Atlantic basin during the tropical storm season. La Niña events are caused by an anomalous cooling of the central equatorial Pacific Ocean. During La Niña events, wetter conditions are observed in the northeastern regions of Brazil, Guyana, Suriname, Colombia, and República Bolivariana de Venezuela, while drier and cooler conditions are observed in Argentina, Uruguay, and the southern regions of Brazil, Peru, and Ecuador. La Niña events are also characterized by high tropical storm activity in the Caribbean basin and lower than normal tropical storm activity in the Pacific basin. Maps 2.3 and 2.4 summarize the anomalies observed in the region during El Niño and La Niña events, respectively.

Map 2.3 Anomalies during El Niño events



Source: Munich Re Group 2009.

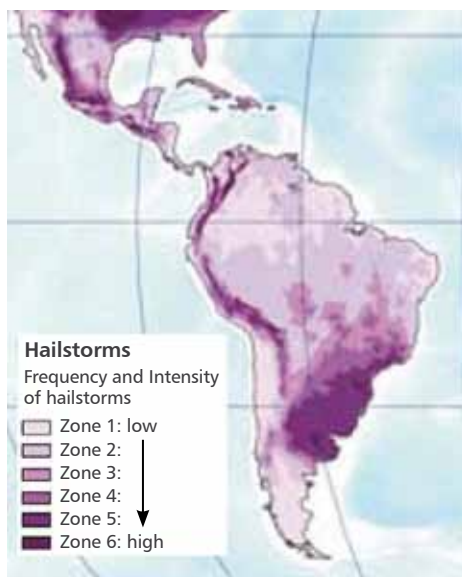
Map 2.4 Anomalies during La Niña events



Source: Munich Re Group 2009.

Hailstorms are frequent in the Southern Cone countries, along the Andes Mountains of South America, Central America, and northwestern Mexico. Hail is particularly damaging for agricultural crop production. Almost all of the area devoted to crop production in Argentina (the main production area for cereals, oilseeds, and fruits), the whole territory of Uruguay, and southeastern Brazil (the production area for fruits and winter crops) are highly exposed to hailstorms. Hail is also a common phenomenon in the step valleys along the Andes Mountains and in Central America and Mexico. Also exposed to hailstorms, but less so, are southern Chile, northeastern Argentina, and southwestern and central Brazil. The distribution of hailstorms in the region is presented in map 2.5.

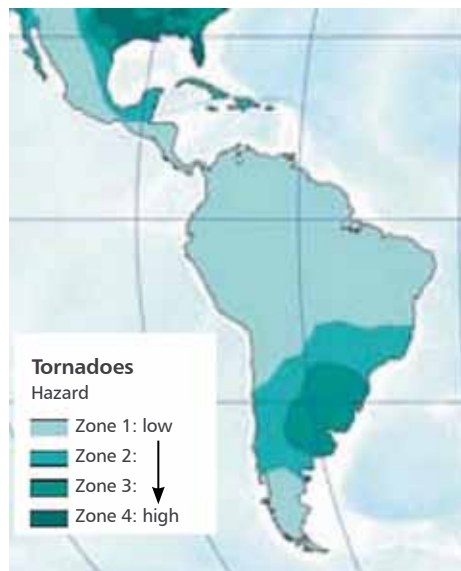
Map 2.5 Hailstorm hazards in LAC countries



Source: Munich Re Group 2009.

Tornadoes affecting agricultural production are common in certain geographic areas in the region (for example, the Southern Cone countries, eastern Mexico, and Baja California peninsula in Mexico). Although the damage caused by tornadoes in agricultural production is localized, it can be significant. Multimillion-dollar losses in forestry production due to tornado damage have been claimed against the insurance industry in Argentina, Brazil, and Chile. In particular, northeastern Argentina, eastern Paraguay, Uruguay, and southern Brazil are heavily exposed to tornadoes. The distribution of tornadoes in LAC countries is shown in map 2.6.

Map 2.6 Tornado hazards in LAC countries



Source: Munich Re Group 2009.

Winter storms are common in Uruguay and in the southern coasts of Argentina and Chile. Winter storms are a frequent cause of losses for aquaculture production in Chile. Winter storms cause the loss of cages and entire off-shore aquaculture farms and cause huge losses due to the escape of biomass (fish stock). Winter storms may also cause severe damage to forestry production. Damage due to winter storms is common in forestry production in Uruguay during the months of July and August. The distribution of winter storms in the LAC region is shown in map 2.7.

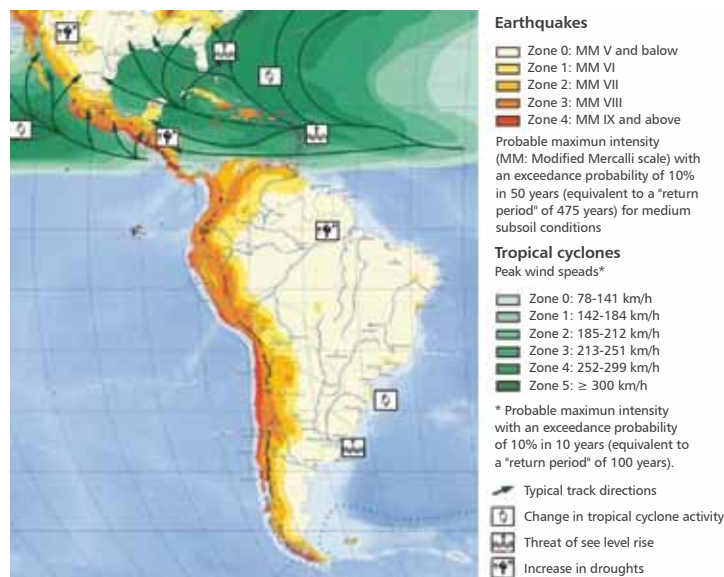
Map 2.7 Winter storm hazards in LAC countries



Source: Munich Re Group 2009.

Tropical cyclones have a devastating effect on agricultural production in Mexico, Central America, and the Caribbean countries. The Caribbean countries are in the pathway of the North Atlantic and Caribbean tropical cyclone system; every year they experience a high number of tropical storms and hurricanes. Mexico and Central America are in the pathway of both West Atlantic and East Pacific tropical cyclones. According to the U.S. National Hurricane Center database, 1,419 tropical storms originating in the Atlantic Ocean were recorded between 1851 and 2009, while 911 tropical storms originating in the Pacific Ocean were recorded between 1949 and 2009. Hurricane activity is influenced by El Niño and La Niña events. During El Niño events, hurricane activity is higher in the East Pacific than in the North Atlantic, and there is evidence that the formation of tropical depressions off the coast of West Africa is lower in El Niño years. Conversely, during La Niña years, hurricane activity tends to be enhanced in the Atlantic region, while tropical cyclone activity tends to be lower in the East Pacific. Hurricane Mitch—a category 5 hurricane according to the Saffir Simpson hurricane wind scale—was one of the most powerful and destructive of all Atlantic hurricanes for agricultural production. This hurricane mostly affected Nicaragua, Guatemala, Honduras, and Yucatán peninsula in Mexico between October and November 1998. The hurricane reached winds of 290 kilometers per hour and a minimum storm pressure of 906 barometric pressure. The longevity of the hurricane (14.5 days) explains why it was so destructive. The hazard map for tropical cyclones in LAC countries is presented in map 2.8.

Map 2.8 Earthquake and tropical cyclone hazards in LAC countries



Source: Munich Re Group 2009.

Earthquakes, although frequent in the region, do not cause severe direct losses to agricultural production. Earthquakes cause damage to infrastructure, rather than direct losses to agricultural production. Nevertheless, damage to infrastructure might cause severe losses in agriculture. For instance, a broken dam as a result of an earthquake can flood an entire valley. The collapse of a drainage and irrigation system can cause losses to crops due to the lack of irrigation water or deficient drainage. The LAC region lies above five tectonic plates and is prone to intense seismic activity. Seismicity is concentrated along the South American Andes, the Caribbean islands, Central America, and western Mexico. According to historical catalogues, about 3,000 earthquakes with a magnitude greater than 5.0 were recorded in South America between 1900 and 1981, and 120 were recorded in Central America, the Caribbean, and Mexico between 1900 and 1979. The largest earthquake ever recorded in the Americas occurred in southern Chile in 1960, measuring 8.5 on the Richter scale. Several earthquakes with magnitudes greater than 8 were recorded during the last 100 years along the coasts of Ecuador (1906), Chile (1906, 1922, 1943, 1960, and 2010), and Peru (1940, 1942, 1966, 1974, and 2007). The January 2010 earthquake in Haiti produced relatively minimal losses in the agricultural sector (approximately 2 percent of total losses), although agriculture represents 30 percent of total GDP of the country. Map 2.8 shows the spatial distribution of earthquake hazards in LAC countries.

Tidal waves caused by tsunamis threaten agricultural production in the coastal areas of the Pacific coast and the Caribbean region. Tsunamis, though infrequent, can cause severe losses to aquaculture, forestry, and crop production. The salmon industry

in Chile has a huge exposure to tsunamis. Chilean salmon production, which is the largest in the world, is located in an area that is highly exposed to tsunamis. The low-lying agricultural areas of the Caribbean region (for example, Guyana and Suriname) also face the risk of saline intrusion after a tsunami. Out of the 405 tsunamis recorded between 1900 and 1983, 61 originated on the Pacific coast of Latin America. Following the 1960 Chilean earthquake, a tsunami caused 200 fatalities in the coastal area. More recent episodes include tsunamis in Nicaragua (1992), Peru (1996), and Chile (2010).

Volcanic activity is also a source of risk for agricultural production in LAC. Latin America has 250 historically active volcanoes and witnessed 1,300 volcanic eruptions in the last 10,000 years. Chile has the largest number of historically active volcanoes in the region, followed by Ecuador. In Central America and Mexico, 36 active volcanoes are produced by the subduction⁴ of the Pacific oceanic crust beneath the North American and Caribbean plates. Although the effect of volcanic eruption on agricultural production is not well studied, volcanic ashes can damage crops, aquaculture, and livestock production. For instance, in 1990, the eruption of the Hudson volcano located on the border of Argentina and Chile had devastating effects on livestock production in the Patagonia area of Argentina. In 1979 following the eruption of Mount Sufriere, banana production on the island of St. Vincent was badly affected by volcanic ash.

AGRICULTURAL RISK MANAGEMENT IN LAC

Identifying the risk management strategies implemented by agricultural producers and governments is a critical step in the design of a cost-effective agricultural insurance strategy. Agricultural insurance deals with the residual risks that cannot be mitigated with cost-effective risk management measures implemented by agricultural producers and governments. Recognizing the type and effectiveness of risk management measures implemented by these parties is a key to designing suitable agricultural insurance programs.

Agricultural production is characterized by highly volatile production outcomes. Unlike most other entrepreneurs, agricultural producers cannot predict with certainty the amount of output that the productive process will yield due to the occurrence of perils such as weather, pests, and diseases. Adverse events occurring during harvesting or collecting the crop may result in lost production.

⁴ Subduction is the process that takes place at convergent boundaries when one tectonic plate moves under another tectonic plate, sinking into the earth's mantle as the plates converge. <http://en.wikipedia.org/wiki/Subduction>.

Table 2.2 Risk management strategies and mechanisms

Strategy	Informal mechanisms	Formal mechanisms	
		Market based	Publicly provided
Ex ante strategies			
On farm	Efforts to avoid exposure to risk, crop diversification, income diversification, buffering of crop stocks, adoption of advanced cropping techniques		Agricultural extension, pest management, infrastructure
Risk sharing	Crop sharing, informal risk pool	Contract farming, insurance, price hedging	
Ex post strategies: risk coping	Sales of assets, relocation of labor, mutual aid	Credit	Social insurance, social funds, cash transfer

Source: Anderson 2001; Townsend 2005.

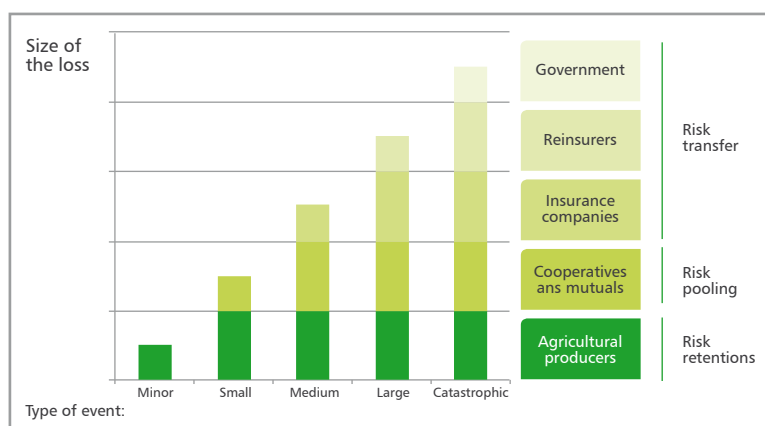
Agricultural producers and governments in LAC have devised risk management strategies to deal with the risks facing agricultural production. These strategies can be divided into two categories: informal and formal strategies. Informal strategies are identified as “arrangements that involve individuals or households or such groups as communities or villages,” while formal arrangements are “market-based activities and publicly provided mechanisms.” The formal and informal risk management strategies can be divided, in turn, into ex ante and ex post strategies. The ex ante or ex post classification focuses on the point in time in which the reaction to risk takes place: prior to the occurrence of the potentially harmful event (ex ante) or after the event has occurred (ex post). Among the ex ante reactions, it is also useful to highlight the differences between on-farm strategies and risk-sharing strategies (Anderson 2001). Table 2.2 summarizes the main types of risk management strategies that are present in the LAC region.

The types of agricultural risk management mechanisms implemented by agricultural producers in LAC vary by country. Countries where financial markets are underdeveloped rely heavily on government post-disaster aid. For instance, in most of the Caribbean countries, Bolivia, and Nicaragua, producers rely almost exclusively on government post-disaster assistance and informal risk management mechanisms. In LAC countries with more sophisticated financial markets (such as Brazil and Mexico), agricultural insurance complements government post-disaster assistance.

The management of agricultural production risks relies on an optimal combination of technical and financial tools. The risk-layering concept is useful for analyzing the optimal combination of technical and financial risk management tools in agriculture. Farmers and herders can retain small but recurrent losses through appropriate on-farm risk mitigation techniques (for example, irrigation and pest prevention) and self-insurance tools

(for example, savings and contingent credit). More severe but less frequent nonsystemic losses can be pooled into cooperative or mutual insurance schemes. Cooperative or mutual insurance schemes are popular in Mexico to insure various perils and in Argentina, Uruguay, and the state of Rio Grande do Sul in Brazil to insure fire and hail risks. However, the relatively severe and frequent systemic losses (drought, flood, windstorm, and freeze) that cannot be managed, either through on-farm risk management mechanisms or through a cooperative or mutual insurance scheme, need to be transferred to commercial insurers and reinsurers (including either local or, which is more common, international commercial reinsurers). Finally, governments may have a major role to play in the event of a major disaster, acting as a reinsurer of last resort or providing post-disaster aid. Figure 2.3 summarizes the agricultural risk-layering concept.

Figure 2.3 Agricultural risk layering



Source: Mahul and Stutley 2010.

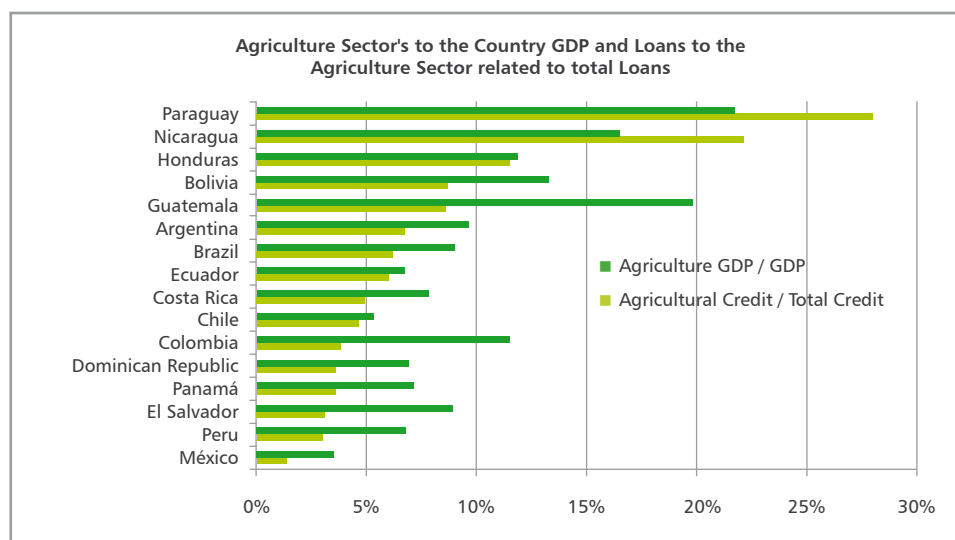
RURAL FINANCE IN LATIN AMERICA

Assessing the access of the agricultural sector to rural finance is important in designing an agricultural insurance strategy. Agricultural insurance and rural finance are intrinsically linked. Experience shows that the demand for agricultural insurance is usually low or even nonexistent where formal credit is not available for agriculture. In contrast, agricultural producers who borrow from formal financial institutions have more incentives to purchase agricultural insurance, either because the banks require their loans to be protected against climatic risks or because these products allow them to access credit at better terms.

Agricultural producers in LAC use different sources of finance for investments in agricultural production. The main source of formal credit for those farmers who can meet lending conditions are the commercial banks or national rural and agricultural development banks. In addition, input suppliers and grain traders provide crop production credit in many LAC countries. If the agricultural producers do not qualify for formal credit, some get finance from microfinance institutions (MFIs) or family remittances. Their decision about which source of financing to use depends on the availability of different sources, their ability to qualify for rural credit, and the terms and conditions of the credit.

The penetration of rural credit in LAC is very low. On average, only 8 percent of the total credit lent by the financial system in the region during 2004–05 was to the agricultural sector (Trivelli and Venero 2007). With the exception of Paraguay and Nicaragua, the ratio of agricultural credit to total credit is always lower than the contribution of the agricultural sector to the economy. Figure 2.4 compares the ratio of agricultural sector GDP to total GDP and the ratio of agricultural sector loans to total loans.

Figure 2.4 Ratio of agricultural sector GDP to total GDP and agricultural sector loans to total loans

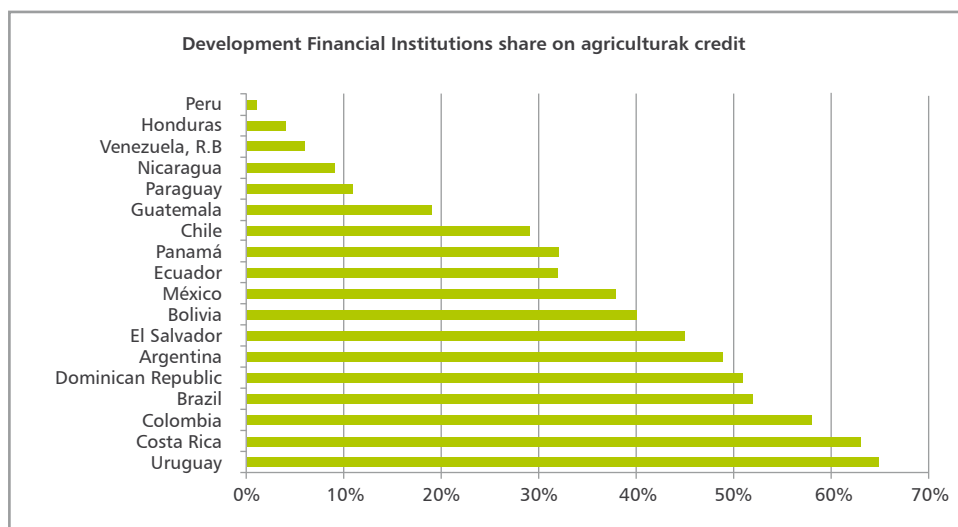


Source: Trivelli and Venero 2007.

Development financial institutions (DFIs) are the main source of financing for the agricultural sector.⁵ Currently, 32 DFIs are managing US\$23 billion of total credits to the agricultural sector in LAC (34 percent of total agricultural lending in the region). Several heterogeneities in the share of DFIs to total agricultural lending are evident, For instance, the DFI share of total agricultural lending is above 60 percent in Uruguay, but below 5 percent in Peru. Figure 2.5 shows the share of DFI lending to total agricultural credit.

⁵ Development financial institutions are institutions that carry on any activity, whether for profit or otherwise, with or without government funding, with the purpose of promoting development in the industrial, agricultural, commercial, or other economic sector, including the provision of capital or other credit facility.

Figure 2.5 Development financial institution share of total agricultural credit

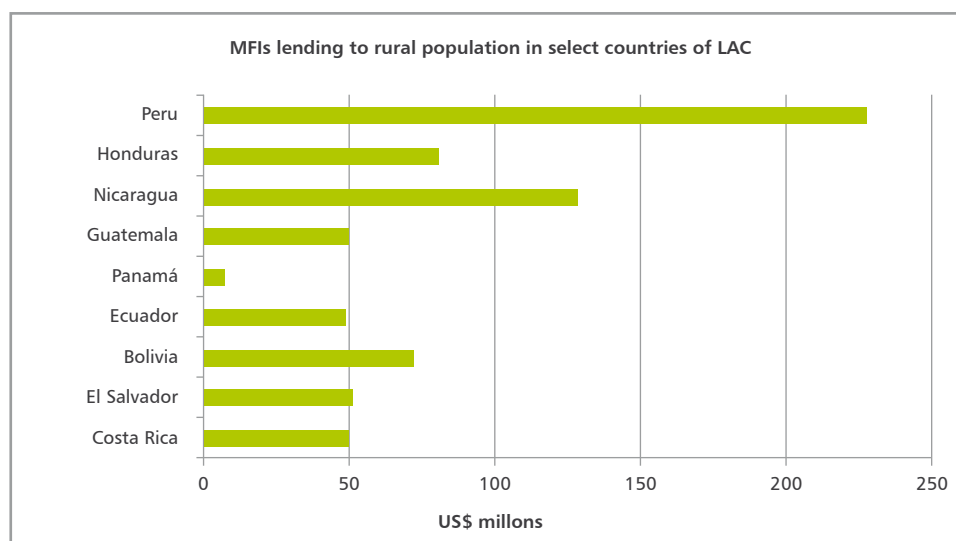


Source: Trivelli and Venero 2007.

Commercial credit is an important source of rural finance in the commodity net-exporting countries in the region. Input suppliers and traders have an active role in financing the rural sector in Brazil, Argentina, Paraguay, and Bolivia. Brazilian farmers obtain up to 40 percent of their agricultural financing needs from the traders who purchase their harvest. Commodity trading companies like Archer Daniels Midland and Cargill are important players, financing commercial soybean farmers in Brazil, Paraguay, and Bolivia. Since the financial crisis in Argentina, bank credit has been substituted by innovative financial solutions such as the use of warrants, fiduciary funds, and equity funds.

Microfinance institutions are still not a major source of finance for agriculture in the region. MFI activities have been growing rapidly in LAC during the last decade. The MFI credit portfolio in LAC grew from US\$4.4 billion in 2006 to US\$6.3 billion in 2007. However, only a few MFIs have been successful in lending to the rural sector. Despite the lower than expected expansion of their rural portfolios in the region, MFIs—in general—have been growing faster than other financial institutions, particularly in countries where the share of the rural population is high. In nine countries where the microfinance sector is highly developed, rural credit accounts for only 37 percent of the total credit portfolio; however, only 20.6 percent of the MFI total credit portfolio is agricultural credit. Figure 2.6 shows the volume in U.S. dollars of MFI lending to the rural population in select LAC countries in 2007.

Figure 2.6 MFI lending to the rural population in select countries of LAC, 2007



Source: Soto Baquero 2009.

Access to agricultural finance depends on the farmers' characteristics. Commercial farmers are financed mostly through financial institutions and commercial credit. Commercial banks satisfy approximately 70 percent of commercial farmers' credit needs. In addition to commercial banks, commercial farmers have arrangements in place to get finance from traders, industry, exporters, and private investors. Semi-commercial or emerging commercial farmers who are integrated into supply chains are financed mainly through commercial credit provided by supermarkets, agro-industry, exporters, input suppliers, or other supply chain agents. Cooperatives and MFIs also have an important role in financing these types of farmers in some countries. The main source of financing for traditional subsistence farmers is informal credit. Several studies document that only 15 to 20 percent of these farmers or households have access to formal credit; thus more than 80 percent of the farmers or households belonging to this group use informal channels in order to get finance (Soto Baquero 2009). Traditional subsistence farmers who are living in extreme poverty have, for the most part, no access to formal credit and rely almost exclusively on public sector support and sources of nonfarm income.

3. Status of agricultural insurance

Agricultural insurance has a long history in some countries in the Latin American and Caribbean (LAC) region. The origins of agricultural insurance in Latin America can be traced back to the late nineteenth century in Argentina, where the first foray into agricultural insurance was undertaken by the Sociedad Cooperativa de Seguros Agrícolas y Anexos Ltda. (called El Progreso Agrícola). This cooperative was founded in 1898 by French settlers with the main objective of creating a mutual fund to protect their crops against hail. Cooperatives and mutuals providing crop insurance for hail spread over Argentina and Uruguay in the late nineteenth century and early twentieth century. Immigration from Europe to countries like Argentina, Uruguay, and southern Brazil helped to develop agricultural insurance in the Southern Cone region. European immigrants brought the cooperative and insurance culture with them from their homelands.

Agricultural insurance was provided in many LAC countries by public sector insurance companies from the 1950s up to the end of the 1980s. In this period, public sector MPCl (multi-peril crop insurance; see box 3.1 for further information) proliferated in Latin America, often linked to small-farmer seasonal production credit programs (for example, Mexico, Costa Rica, República Bolivariana de Venezuela, Ecuador, and Brazil). Most of these public sector programs performed very poorly, with high operating costs and very high loss ratios, which were exacerbated by very low premium rates and poor management.

Most public sector programs were terminated by 1990 on account of their poor results. Table 3.1 presents an analysis of the performance in the 1980s of major public sector MPCl programs in LAC, conducted by Hazell, Pomareda, and Valdes (1992). The results show “producer” combined ratios of between 2.80 for Costa Rica and 4.57 for Brazil. In other words, for every US\$1 in premiums, net of subsidies, collected from the producer, the indemnity payouts and administrative costs in these programs amounted to between US\$2.80 and US\$4.57. A “producer” combined ratio greater than 1.0 indicates that a program, in the absence of any type of government support, would operate at an underwriting loss.

Table 3.1 Financial performance of public sector MPCl in select LAC countries

Country	Period	LP (ratio of losses to gross net premium income)	A/P (ratio of administrative cost to gross net premium income)	(L+A)/P (ratio of losses + administrative cost to gross net premium income)
Brazil (Proagro)	1975–81	4.29	0.28	4.57
Costa Rica	1970–89	2.26	0.54	2.80
Mexico (Anagsa)	1980–89	3.18	0.47	3.65

Source: Hazell, Pomareda, and Valdes 1992.

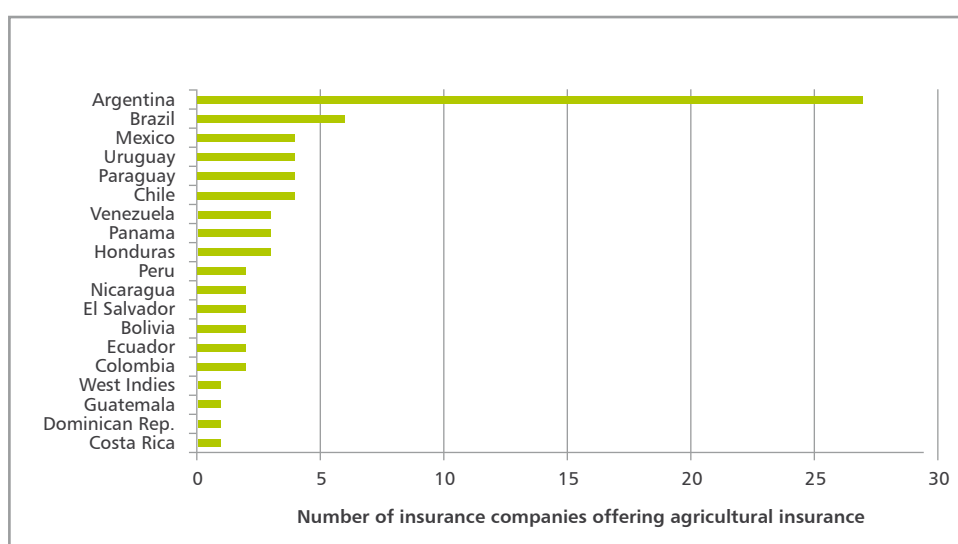
The provision of agricultural insurance through the private sector and public-private partnerships is the current trend in the region. Since the 1990s, governments have promoted agricultural insurance through private commercial insurers, often backed by government financial support, commonly referred to as public-private partnerships (PPPs). In Latin America, new private commercial agricultural insurance was introduced in Ecuador, Brazil, Paraguay, Peru, and Chile during the last decade. Some governments, such as those in Mexico and Peru, are in the process of replacing ad hoc natural disaster compensation programs with ex ante formal crop and livestock insurance programs implemented by the private insurance sector and promoted and supported by government through the provision of premium subsidies or reinsurance protection. Others, however, continue to provide public sector disaster relief (particularly to small and medium enterprises) in addition to subsidized crop insurance (for example, Brazil and Mexico).

Agricultural insurance is available in most LAC countries. Agricultural insurance is offered in 18 (72 percent) of 25 countries with an agricultural base within the region. Four groups of countries can be distinguished according to their experience with agricultural insurance. Argentina, Uruguay, and Mexico are the first group, owing to their extensive experience in agricultural insurance. The second group of countries—Chile, the Windward Islands, Brazil, Colombia, Panama, Ecuador, Cuba, and República Bolivariana de Venezuela—have some experience in agricultural insurance. A third group comprises countries that have started their agricultural insurance programs in recent years. This group includes the Dominican Republic, Peru, Paraguay, and most of the Central American countries. The last group consists of countries where agricultural insurance is not currently available, including Belize, Guyana, Suriname, Haiti, Jamaica, and most of the Caribbean Islands.

The insurance industry is very active in marketing agricultural insurance products in LAC. Agricultural insurance products are being offered by more than 75 companies in the region (see figure 3.1). The number of insurance companies offering agricultural insurance products varies from country to country. Argentina, with more than 27 insurance companies offering agricultural insurance, is the market leader. A second group comprises Brazil and Mexico, with six and five insurance companies offering agricultural insurance, respectively.

A third group comprises Uruguay, Paraguay, and Chile, each with four insurance companies offering agricultural insurance. The fourth group comprises the República Bolivariana de Venezuela, Panama, and Honduras, each with three insurance companies offering agricultural insurance. A fifth group consists of Peru, Nicaragua, El Salvador, Colombia, Ecuador, and Bolivia, each with two insurance companies offering agricultural insurance products. The last group of countries—Costa Rica, the Dominican Republic, Guatemala, and the West Indies—has a single insurance company offering agricultural insurance in each country.

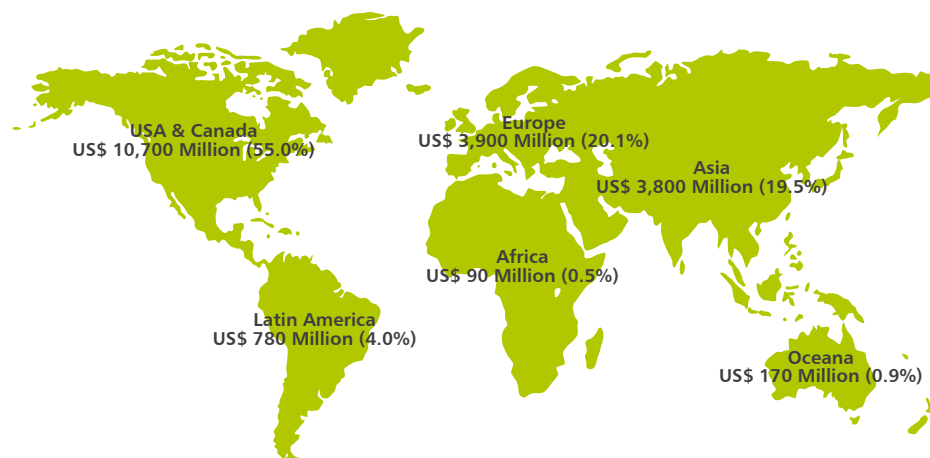
Figure 3.1 Insurance companies offering agricultural insurance in LAC



Source: Authors.

SIZE OF AGRICULTURAL INSURANCE MARKETS AND PREMIUM VOLUMES IN LAC

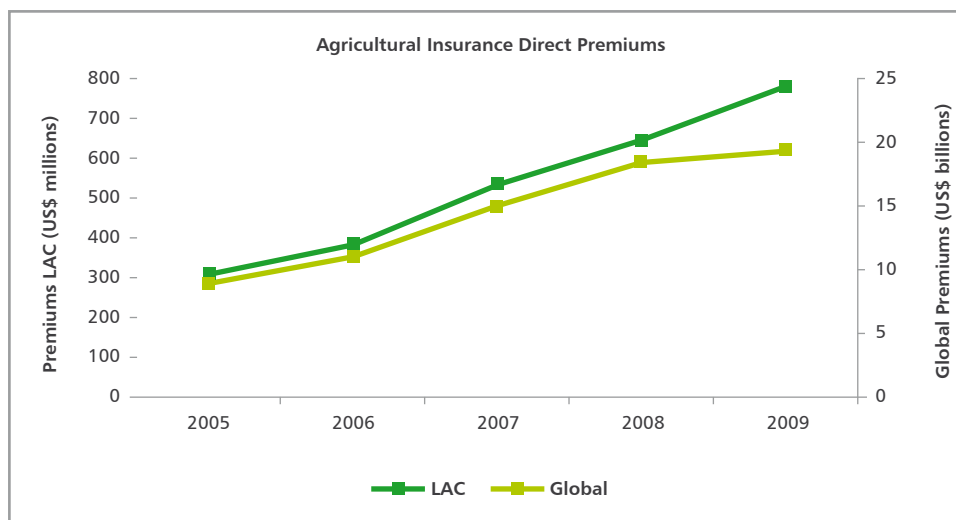
Agricultural insurance in LAC is relatively well developed in comparison with other regions such as Africa and many Asian countries. Total direct agricultural insurance premiums written in LAC during 2009 amounted to US\$780 million. The region accounts for 4.0 percent of the total agricultural insurance premiums written worldwide, behind the United States and Canada (accounting for 55.0 percent), Europe (20.1 percent), and Asia (19.5 percent). Map 3.1 shows the regional distribution of agricultural insurance premiums and the position of LAC countries in the global picture.

Map 3.1 Regional distribution of agricultural insurance direct premiums

Source: Authors' compilation from data provided by Swiss Re, Hannover Re, Novae Re, and Mahul and Stutley 2010.

Agricultural insurance premiums in the region have been growing exponentially in recent years. Direct premiums written for this type of insurance have grown rapidly—from US\$311 million in 2003 to an estimated US\$780 million in 2009—an increase of more than 250 percent. The increase in total direct premiums is consistent with the global trend. Global direct agricultural insurance premiums grew 220 percent, from US\$8.9 billion in 2005 to an estimated US\$19.4 billion in 2009. Three main factors have contributed to this growth. The first is the increase in the underlying value of agricultural production, which has been translated directly into higher sum insured values and larger volume of premiums. The second is the increase in the value of agricultural assets, which has also increased the sensitivity of participants in the agricultural value chain to loss and raised their demand for insurance. The third factor is the development of new markets for agricultural insurance and the increase of public sector support, both of which have contributed to an increase in demand and supply. Figure 3.2 shows the evolution of agricultural insurance direct premiums worldwide and in the LAC region for the period from 2005 up to and including 2009.

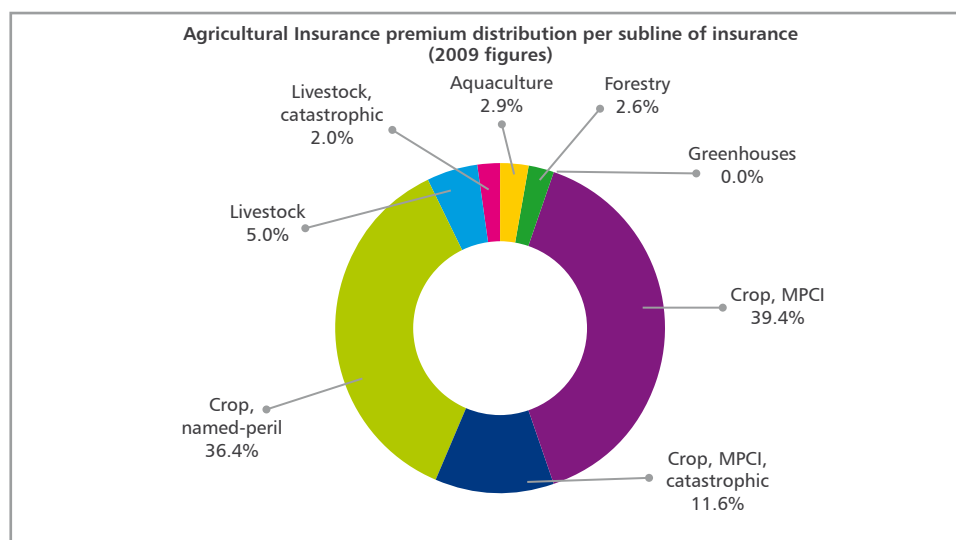
Figure 3.2 Agricultural insurance direct premiums written, 2005–09



Source: Authors' compilation from data provided by Swiss Re, Hannover Re, and Mahul and Stutley 2010.

Agricultural insurance premiums are distributed unevenly among the different agricultural insurance business sublines in the region. Individual-farmer MPCI and named-peril insurance—accounting for almost 76 percent of total premiums written in 2009—are the most developed business sublines of agricultural insurance in the region. Crop and livestock catastrophic insurance—a special business subline of agricultural insurance, which is usually provided by governments—is next, accounting for 13.6 percent of the total agricultural insurance premiums. Livestock insurance accounts for 5 percent of the total volume of premiums; aquaculture and forestry insurance account for 2.9 and 2.6 percent, respectively. Bloodstock and greenhouse insurance are less well-developed business sublines. The distribution of agricultural insurance premiums per business subline is shown in figure 3.3 for 2009.

Figure 3.3 Distribution of agricultural insurance premiums per business subline in LAC, 2009



Source: Authors' compilation from data provided by Swiss Re, Hannover Re, and Mahul and Stutley 2010.

Agricultural insurance premiums are distributed unevenly among countries of the region. The three largest agricultural markets (Brazil, Argentina, and Mexico) are also the largest agricultural insurance markets, accounting for 85 percent of total premiums written in the region in 2009. Chile, Paraguay, and Uruguay together account for 10 percent of total premiums written. The remaining 5 percent is distributed among the Andean countries (3 percent), Central American countries (1.4 percent), and the Caribbean countries (0.6 percent). Map 3.2 shows the distribution of the volume of premiums among the LAC countries. In relative terms, agricultural crop, livestock, forestry, and aquaculture insurance were very poorly developed in the Caribbean Islands in 2009.

AVAILABILITY OF AGRICULTURAL INSURANCE PRODUCTS

The supply of agricultural insurance products in the LAC region is relatively evolved in comparison with other regions. The insurance market is very innovative in developing products to meet the demand. This section describes the main types of agricultural insurance products offered. For a detailed description of the main features of products in each LAC country where agricultural insurance is established, see the annex to this report.

Map 3.2 Distribution of agricultural insurance direct premiums in LAC



Source: Authors' compilation from data provided by Swiss Re, Hannover Re, and Mahul and Stutley 2010.

Crop insurance products

Crop insurance is the most developed agricultural insurance business subline in LAC. Crop insurance accounted for 84 percent of the agricultural insurance premiums written in the region in 2009. Crop insurance products can be classified into three major groups: (a) traditional indemnity-based crop insurance products, (b) index-based crop insurance products, and (c) crop revenue insurance products. Key features of these three product lines are summarized in box 3.1.

Box 3.1 Crop insurance products: Indemnity-based and index-based covers

Traditional indemnity-based crop insurance products

Damage-based indemnity insurance (named-peril crop insurance). Damage-based indemnity insurance is crop insurance where the insurance claim is calculated by measuring the percentage damage in the field, soon after the damage occurs. The percentage damage measured in the field, less a deductible expressed as a percentage, is applied to the agreed sum insured. The sum insured may be based on production costs or on expected crop revenue. Where damage cannot be measured accurately immediately after the loss, the assessment may be deferred until later in the crop season. Damage-based indemnity insurance is best known for hail, but is also used for other named perils (such as frost, excessive rainfall, and wind).

Yield-based crop insurance (MPCI). Yield-based crop insurance is insurance where an insured yield (such as tons per hectare) is established as a percentage of the historical average yield of the insured farmer. The insured yield is typically between 50 and 70 percent of the average yield on the farm. If the realized yield is less than the insured yield, an indemnity is paid equal to the difference between the actual yield and the insured yield, multiplied by an agreed value of sum insured per unit of yield. Yield-based crop insurance typically protects against multiple perils, meaning that it covers many different causes of yield loss.

Index-based crop insurance

Area-yield index insurance. With area-yield index insurance, the indemnity is based on the realized (harvested) average yield of an area such as a county or district. The insured yield is established as a percentage of the average yield for the area and typically ranges from 50 percent to a maximum of 90 percent of the average yield for the area. An indemnity is paid if the realized average yield for the area is less than the insured yield regardless of the actual yield on a policyholder's farm. This type of index insurance requires historical data on area yield as a basis for establishing the normal average yield and the insured yield.

Weather index insurance. Weather index insurance is insurance where the indemnity is based on realizations of a specific weather parameter measured over a specified period of time at a particular weather station. The insurance can be structured to protect against index realizations that are either so high or so low that they are expected to cause crop losses. For example, the insurance can be structured to protect against either too much or too little rainfall. An indemnity is paid whenever the realized value of the index exceeds a specified threshold (for example, when protecting against too much rainfall) or when the index is less than the threshold (for example, when protecting against too little rainfall). The indemnity is calculated based on an agreed sum insured per unit of the index (for example, U.S. dollars per millimeter of rainfall).

Crop revenue insurance

Under crop revenue insurance, the insurer guarantees the policyholder a certain level of revenue to be obtained from the insured crop. This insurance coverage protects the policyholder from eventual shortfalls in the yield of insured crops and also from adverse movements in their price. Under crop revenue insurance, the guaranteed yield can be determined, either as a percentage of the producer's past production or as a percentage of the average yield of the region where the insured farm is located. The guaranteed price can be either the future market price for the crop for the month of harvest or the strike price of a base price option. If the actual revenue received by the producer, which is given by the product of the actual yield and the spot market price at the time of harvest, is less than the guaranteed amount, the insurer will pay the difference.

Source: Authors.

Indemnity-based crop insurance products

The main feature of indemnity-based crop insurance products is that payouts are based on the actual loss incurred by the policyholder. Traditional indemnity-based insurance products include (a) damage-based indemnity policies, which include, in their simplest form, single-peril hail insurance and named-peril crop insurance, and (b) loss-of-yield indemnity policies, including MPCI cover for a yield shortfall.

Yield-based MPCI is the most common type of crop insurance marketed in the LAC region. Yield-based MPCI products accounted for 39.4 percent of total agricultural insurance premiums written in the LAC region in 2009. With the exception of Nicaragua and the Windward Islands, yield-based MPCI products are offered in all countries in the region where agricultural insurance is available. Brazil and Mexico are among the countries where MPCI has reached the most advanced levels of development. The area insured under MPCI is approximately 6.4 million and 1.9 million hectares for Brazil and Mexico, respectively. Other countries with relatively high development of MPCI are Chile, República Bolivariana de Venezuela, Panama, and Paraguay. MPCI has yet to be adopted widely in many Central American countries. In Argentina and Uruguay yield-based MPCI is not popular among farmers, and this insurance product is purchased almost exclusively by big agribusiness firms, usually on an aggregate basis for all the crops and locations in which they have interests.

Aggregate yield-shortfall MPCI is specifically designed to be tailored at the meso level or macro level. An interesting variation of yield-based MPCI policies that is quite popular in some LAC countries is the aggregate yield-shortfall MPCI policy known in Spanish as seguro catastrófico con ajuste de rendimientos. Aggregate yield-shortfall MPCI policies are purchased by state or local governments to get funding to assist farmers, in case one or more events severely affect crop production in the region where they occur. Aggregate yield-shortfall MPCI policies share a feature with area-yield index-based insurance in that the insured unit is a geographic area rather than the individual farm. However, aggregate yield-shortfall MPCI policies are not considered index insurance because they involve in-field loss adjustment (on a sampling basis) in order to determine the eventual yield shortfalls. Aggregate yield-shortfall MPCI policies are popular in Mexico, where approximately 8 million hectares of crops are insured under this modality. In Peru almost 100 percent of the total insured area in the country (approximately 500,000 hectares) is insured under aggregate yield-shortfall MPCI policies. Colombia has recently implemented an aggregate yield-shortfall MPCI scheme to protect banana production in the Department of Quindío.

Global portfolio MPCI is designed specifically for well-diversified large-size agribusiness firms. Global portfolio MPCI has the same principles and operation as the traditional yield-based MPCI coverage. However, global MPCI coverage has several particular

features. First, the insured unit in a global MPCI portfolio, rather than being defined for crop and location, as traditional yield-based MPCI, covers all the crops and locations where the insured has an interest. Second, global portfolio MPCI, rather than insuring individual crop yields, insures a monetary amount usually linked to the investment cost incurred by the insured in the locations and crops in which it has an interest. Third, the indemnity condition is defined as the revenue obtained by the insured (value at agreed prices for each insured crop at the inception of the insurance policy) from all the crops and locations defined in the insured unit falling short of the insured monetary amount. Fourth, if the indemnity condition applies, the insured receives from the insurance company an indemnity equal to the amount by which the actual revenue obtained on the insured unit falls short of the insured monetary amount. The main advantage of the global portfolio MPCI is that it recognizes the risk diversification of agricultural producers. The main drawback is that it is resource intensive for insurers, which have to perform income appraisals in the insured units. The insured units in a global portfolio MPCI usually comprise several locations (in some cases more than 50 locations) distributed throughout a country. The producer's income is determined by the aggregate yields of the insured crops in numerous locations. The insurer indemnifies the insured for the shortfall in aggregate income and must visit, if not all, a representative number of locations to estimate the yields. Owing to the resources that insurance companies have to deploy in order to manage global portfolio MPCI, the transaction costs involved in its operation are high. For this reason, insurance companies tend to offer global portfolio MPCI exclusively to large operations that involve large-scale and well-diversified agribusiness firms. Global portfolio MPCI is very popular among firms in Argentina, Uruguay, Paraguay, and Brazil.

Individual-grower named-peril damage-based crop insurance is the second most popular type of crop insurance in the region. Named-peril crop insurance products accounted for 36.4 percent of total agricultural insurance premiums written in the region in 2009. This type of crop insurance policy adopts a percentage damage basis of insurance and indemnity and is marketed mainly in Argentina, Uruguay, and southern Brazil, where, owing to the temperate climate, agricultural production faces appreciable hail and frost exposures, which are suited to named-peril insurance. In these countries, the insurance industry has a long tradition of offering individual-grower named-peril crop insurance for annual crops (mainly wheat, barley, soybeans, maize, and sunflower) and fruit production. Hail insurance is the main type of agricultural insurance in Argentina and Uruguay, accounting for more than 95 percent of total written premiums; in southern Brazil, it is the main type of insurance for fruit production, where it accounts for approximately one-third of total premiums written in Rio Grande do Sul, Santa Catarina, Paraná, and São Paulo states. The basic and most popular coverage within individual-grower named-peril crop insurance is hail plus fire. In addition to basic coverage, other perils such as freeze, excess rain, and excess wind are also offered on a select basis, depending on the insured crop and the location of the farm.

Index-based crop insurance products

Index-based crop insurance products are promising for LAC. Rather than basing payouts on actual crop losses suffered by the insured as consequence of an event (or events) covered under the insurance contract, index-based crop insurance products base payouts on the measurements of an underlying variable selected as an index during a certain period of time under certain agreed preconditions. Crop index insurance includes three main types of product: area-yield index insurance, crop weather index insurance, and NDVI (normalized dry vegetative index)/satellite index insurance, which has been applied to pasture in a few countries.

Index-based crop insurance is not a new product in LAC. The introduction of index-based crop insurance in Latin America dates back to the late 1990s. Area-yield index-based crop insurance for the main annual crops in the Pampas region and weather index crop insurance to cover frost in the production of apples and pears were introduced in Argentina in the late 1990s. Both programs were discontinued in the early 2000s due to lack of demand. Almost simultaneous with the introduction of index-based insurance in Argentina, area-yield index-based crop insurance was introduced in Brazil to protect maize farmers in the southern state of Rio Grande do Sul. This program was renewed until 2009 and subsequently discontinued.

Since 2000, several attempts have been made to introduce weather index-based crop insurance products in the LAC region.⁶ Unfortunately, most of these attempts never came to fruition, and most of the policies written were discontinued after a few renewals. Currently there are few examples of index-based crop insurance in the region, and most of them have not reached sufficient volumes. The only example of successful implementation of weather index-based insurance is in Mexico, where it has been written to protect a government catastrophic fund to assist farmers affected by natural calamities (Program to Assist Climatologic Contingencies, PACC, formerly known as the Fund for Agricultural Calamities, FAPRAC) since 2003. In addition to the introduction of weather index-based crop insurance, an NDVI crop insurance scheme was introduced in 2006. As of 2009, approximately 2.3 million hectares were insured under the weather index-based crop insurance program, and 3.5 million livestock equivalent units were insured under the NDVI insurance program in Mexico.

⁶ Argentina (2003 and 2005), Chile (2003), Uruguay (2003), Bolivia (2006 and 2007), Peru (2005 and 2008), Nicaragua (2005), and Mexico (2003 and 2006).

Crop revenue insurance products

Crop revenue insurance represents the most recent innovation in agricultural insurance. This insurance coverage protects the policyholder from shortfalls in yield of the insured crop (MPCI) and also from adverse movements in the price of the insured crop. Currently, no crop revenue insurance programs are in place in the region. However, the industry is undertaking several activities in the field of product research and development for this type of coverage in Argentina and Mexico. According to consultations with the insurance and reinsurance industry, the main challenge facing the implementation of crop revenue insurance in LAC is the lack of local commodity futures markets with enough open interest for the forward positions that would have to be taken by the insurance industry to implement this type of product.

Livestock insurance products

Livestock insurance is a very small segment of the market in LAC. Livestock insurance provides products to cover horses, mares, colts, fillies, and foals; bulls, cows, and heifers; swine; sheep; goats; dogs; and occasionally wild animals. The market accounted for 7 percent of total agricultural insurance premiums written in LAC during 2009. There are three basic types of livestock insurance products: (a) traditional animal accident and mortality cover; (b) epidemic disease cover; and (c) livestock index mortality products (see box 3.2).

Box 3.2 Types of livestock insurance products

Traditional livestock insurance

Named-peril accident and mortality insurance for individual animals is the basic traditional product for insuring livestock. The cover includes death against natural perils such as fire, flood, lightning, and electrocution, but normally excludes diseases and specifically epidemic diseases. Premiums are set based on normal mortality rates within the permitted age range, plus risk and administrative margins, and are generally quite expensive. Furthermore, mortality is, to a considerable extent, influenced by management, and the product suffers from adverse selection by the highest-risk farmers. Herd insurance is a variation on individual animal mortality cover for larger herds. A deductible is introduced, where a certain number of animals, or a percentage of the total number of animals, must be lost before an indemnity is paid.

All-risk mortality insurance including diseases is provided in some countries to large commercial farms that can demonstrate high levels of animal husbandry and control over animal diseases. Such covers are normally offered for high-value bloodstock or for herd insurance.

Epidemic disease insurance is offered in only a few countries, notably Germany. Insurance of government-ordered slaughter or quarantine is normally excluded. Epidemic disease insurance carries major and infrequent exposure to catastrophic claims necessitating a high reliance on reinsurance for risk transfer. Due to the difficulties of modeling the spread of epidemic disease and financial exposures, it is difficult to develop this type of insurance and to obtain support from international reinsurers.

Index livestock insurance

Area-yield index insurance for livestock has been applied for mortality risk in Mongolia (under an area-mortality index scheme), where livestock losses are highly correlated with an extreme weather event (*dzud*) for which a weather index could not be built (combination of low temperature, dry conditions, snowfall, and so forth).

NDVI and satellite insurance are constructed using time-series remote-sensing imagery—for example, applications of false color infrared waveband to pasture index insurance—where the payout is based on a normalized dry vegetative index that relates moisture deficit to pasture degradation.

Source: Authors.

Livestock insurance is offered by the private insurance industry in several countries of the region. Named-peril accident and mortality insurance is available in Argentina, Uruguay, Brazil, Peru, Ecuador, Colombia, República Bolivariana de Venezuela, Panama, Costa Rica, Honduras, El Salvador, Guatemala, and Mexico. In some of these countries, basic accident and mortality coverage is complemented with coverage for specific diseases, theft, inland transportation, and acts of terrorism on a very limited basis. The supply of insurance coverage for epidemic diseases is very limited. Epidemic disease insurance provides coverage only in excess of the livestock health prevention plans sold in the country. So far the regional experience with epidemic disease insurance is limited to Mexico and Argentina. Mexico used to have classical swine fever (CSF) livestock insurance coverage, which was purchased for 9.1 million head of swine. The CSF policy indemnified against mortality and compulsory slaughter ordered by the Ministry of Agriculture in the event of a CSF outbreak. The policy

was only offered in states that were declared free of CSF. In Argentina, the National Service of Animal Health (SENASA) used to have an insurance program that covered this institution against the cost it would have to assume as a result of ordering the compulsory slaughter of cattle due to the occurrence of an outbreak of foot and mouth disease.

Aquaculture insurance products

Aquaculture insurance, including off-shore marine and on-shore freshwater aquaculture insurance for fish stock, crustaceans, and shellfish, is an important business subline of agricultural insurance in some countries of the region.

Aquaculture insurance premiums accounted for 2.9 percent of total agricultural insurance premiums written in the region in 2009. Aquaculture insurance is offered in Mexico, Chile, Brazil, Colombia, Peru, Ecuador, Panama, Costa Rica, and Honduras. The main markets for aquaculture insurance are Chile and Mexico. Aquaculture insurance has been offered in Chile since the mid-1990s, accompanying the boom of the salmon industry, which is dominated by medium to extremely large multinational companies with investments in fish farming worth hundreds of millions of U.S. dollars. Aquaculture insurance policies in Chile provide very broad named-peril cover against the loss of installations (fish cages and nets), equipment, and fish stock. Insured perils include storms, tidal waves, strong currents, red tides (algae), diseases, attacks by predators, and theft, among others. For several years Mexico has operated an integrated loss-of-investment-cost policy with final adjustment according to harvested yield for shrimp and tilapia production. The Mexican policy provides comprehensive protection against loss of biomass due to climatic risks, biological risks (diseases), and risks related to environmental contamination and chemical pollution.

Forestry insurance products

Forestry insurance provides traditional named-peril indemnity insurance against fire and allied perils affecting standing timber production.

Forestry insurance products are targeted at commercial forestry plantations. The product is not available in the market for noncommercial forestry, and natural forestry is covered on a very restricted basis. Typical perils covered under forestry and standing timber policies are fire, civil commotion, riot, and allied perils including wind, flood, volcanic eruption, avalanche, frost, snow, and tsunamis. In a few countries, such as Brazil, forestry insurance also covers drought, hail, and heat wave. The valuation of standing timber for insurance purposes is often based on the investment and maintenance costs up to the point where the trees can be harvested for timber, following which the valuation is based on the commercial value of the standing timber. Due to problems arising from moral hazard issues, coverage is subject to the application of insurance deductibles per event, which are normally equivalent to 10 percent of the loss subject to a minimum monetary amount on each and every loss. Owing to issues

arising from risk accumulation, forestry insurance policies typically carry limits on first-loss annual aggregate indemnity.⁷

Forestry insurance is a well-developed agricultural insurance business subline in the Southern Cone countries. Forestry insurance, which accounts for 2.9 percent of the total agricultural insurance premiums in LAC, is available in Chile, Uruguay, Argentina, Brazil, Costa Rica, Mexico, Ecuador, and Colombia. In Chile and Uruguay more than 80 percent of the commercial forest area is insured. Brazil and Argentina have significant potential to develop this business subline.

Bloodstock insurance products

Bloodstock insurance is an agricultural insurance business subline that provides cover for high-value animals, mainly horses. Bloodstock insurance is a minor agricultural insurance business subline in the region, accounting for less than 1 percent of agricultural premiums written. The main markets for bloodstock insurance are Brazil and Mexico, but coverage is also offered in Argentina, Uruguay, Chile, Ecuador, Colombia, and República Bolivariana de Venezuela. Under a bloodstock insurance policy, the animals are insured either on an individual basis or collectively, such as a stable of horses. The insured events include mortality, disability, infertility, medical treatment, and surgery. The sum insured is based on the market value of the animal. The market value is determined by the prizes that the animal has won or the present value of the future prizes that it could potentially win. Any matter that adversely affects the animal's capacity to win prizes will affect its market value and can result in excess insurance. To deal with the potential source of moral hazard, it is common practice among bloodstock insurers to insure high-value animals for only a portion of their market value. The geographic distribution of the availability of agricultural insurance products in each of the LAC countries is represented in the map 3.3.

⁷ Indemnity limit is a contract provision used in insurance to limit the amount that can be paid in the policy period. An aggregate limit is the maximum dollar amount an insurer will pay to settle claims. Often the limit is referred to as an annual aggregate limit, which is the total amount the insurer will pay in a single year.

Map 3.3 Agricultural insurance products in LAC



Source: Authors.

MODELS AND CHANNELS OF DELIVERY

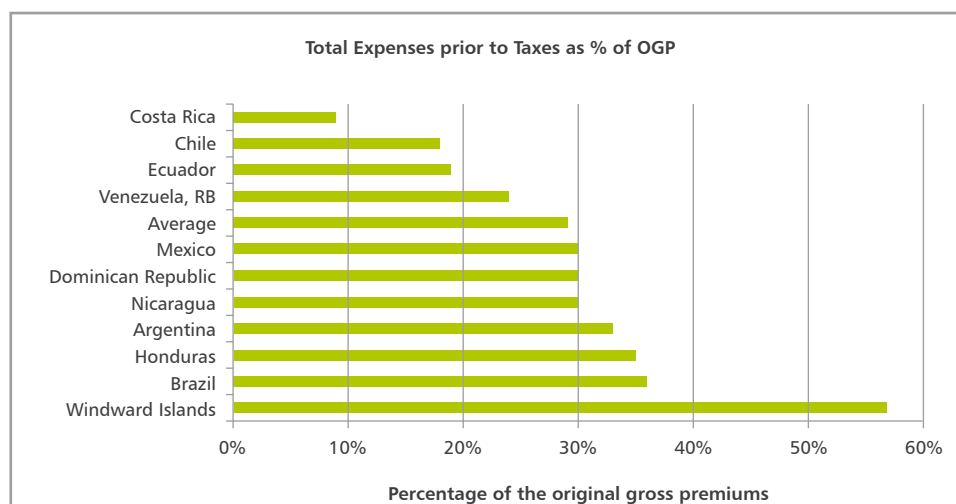
The most traditional channel for delivering agricultural insurance to farmers in the region consists of insurance brokers. Insurance companies rely on insurance brokers because they usually do not have a network in the countryside for marketing agricultural insurance. In some countries such as Argentina, Chile, Mexico, and Brazil insurance brokers have reached a high degree of specialization in delivering agricultural insurance. In countries like Argentina, a single specialized agricultural insurance broker can manage portfolios of up to US\$15 million in premiums. In Chile, insurance brokers have reached high degrees of specialization in forestry and aquaculture insurance. Sales agents are also an important

delivery channel, in particular, when agricultural insurance is provided by cooperatives or state-owned insurance companies, which usually have a well-established branch network of sales agents in the countryside. The delivery of agricultural insurance through financial institutions is also very important in some countries of the region. In Brazil, Aliança do Brasil—an insurance company linked to Banco do Brasil—has the single largest agricultural insurance portfolio in LAC (approximately US\$150 million in premiums), which is linked to rural credit and is delivered to farmers solely through Banco do Brasil branches.

COST OF AGRICULTURAL INSURANCE PROVISION IN LAC

The provision of agricultural insurance in LAC countries is expensive in comparison with other regions. According to a sample of 11 LAC countries extracted from the survey performed by Mahul and Stutley (2010), average total expenses incurred by the insurance sector in the provision of agricultural insurance in LAC in 2007 accounted for approximately 29 percent of the total original gross agricultural insurance premiums. The total expenses for the provision of agricultural insurance in LAC are estimated to be 11 percent higher than average expenses in other regions for the same year: 26 percent of the original gross agricultural insurance premiums. Total expenses for the provision of agricultural insurance can be divided into three categories: marketing and acquisition costs (including commissions paid to agents and brokers); insurers' administrative and operating (A&O) expenses; and, where appropriate, the expense load added to cover loss adjustment expenses (LAE). In LAC countries A&O expenses are divided as follows: 8.4 percent for marketing and acquisition costs; 12.4 percent for administration; and 8 percent for LAE. Average expenses of about 25 percent of the original gross premiums for agricultural insurance are not considered excessive, and these conform to the ceding commission levels that reinsurers are usually prepared to grant on quota share treaty business. Figure 3.4 summarizes the costs of providing agricultural insurance in 11 LAC countries in 2007.

Figure 3.4 Crop insurance acquisition expenses, A&O expenses, and LAE in LAC countries, 2007



Source: Mahul and Stutley 2010.

AGRICULTURAL REINSURANCE IN LAC

Agriculture reinsurers play an active role in LAC agricultural insurance markets.

Approximately 65 percent of the total direct written premiums for agricultural insurance in the region are ceded to the reinsurance market. The agricultural reinsurance market is dominated by a small group of reinsurers, which have units that specialize in agricultural reinsurance. Munich Re, Swiss Re, Hannover Re, SCOR, Aspen Re, Mapfre Re, Partner Re, XL Re, and some Lloyd's syndicates (among others, Catlin Re and Novae Re) participate actively in reinsuring agricultural business. Public sector reinsurers play a very important role in the provision of agricultural reinsurance in some LAC countries, such as in Brazil (Brazilian Reinsurance Institute) and Mexico (Agroasemex).

Agricultural risks in the region are ceded to reinsurers using different types of reinsurance agreements and different forms of reinsurance cession.

The most common agreement for agricultural reinsurance in the region, accounting for 85 percent of the ceded premium, is the automatic reinsurance treaties.⁸ Facultative agreements⁹—accounting for 15 percent of total premiums—are also popular, in particular, for start-

⁸ Automatic reinsurance is an automatic reinsurance treaty specifying that the ceding company is contractually obligated to cede risks to a reinsurer on specified blocks of policies where the risks meet the ceding company's underwriting criteria and provisions of the reinsurance agreement.

⁹ Facultative reinsurance is optional (not a contractual obligation) and allows a reinsurer the opportunity to analyze and separately underwrite a risk before agreeing to accept it.

up operations or in the reinsurance of aquaculture and forestry insurance. Quota share reinsurance cessions¹⁰ and stop-loss reinsurance protections,¹¹ accounting for more than 95 percent of total agricultural reinsurance cessions, are the most common forms of reinsurance. For aquaculture and forestry reinsurance, surplus share cessions and catastrophic excess-of-loss protections are common.

The magnitude of agricultural reinsurance cessions varies from country to country.

The level of agricultural insurance cessions to the reinsurance market in any particular country depends on the type of agricultural risks written and the financial strength of the insurance market. The types of agricultural risks written by the insurance companies have a great influence on their reinsurance strategy. Agricultural insurance portfolios that are exposed to systemic risks show higher cession rates than those that are exposed to non systemic risk. For instance, in countries such as Brazil or Paraguay, where agricultural insurance portfolios are composed mainly of MPCl policies, reinsurance cessions for agricultural insurance can be as high as 80 percent. In other countries, such as Argentina and Uruguay, where the main agricultural peril written by the insurance companies is hail, levels of reinsurance cessions are below 50 percent. The market level of expertise in agricultural insurance also has a huge influence on the reinsurance strategies of insurance companies. The financial strength of the local insurance market has a significant influence on the level of agricultural insurance risk cessions to reinsurance. In countries where the insurance market is relatively weak, the use of insurance fronting is a common practice;¹² however, agricultural reinsurers are reluctant to provide reinsurance capacity to fronting insurance companies and do so only for very particular cases and under facultative agreements where they can control the underwriting and loss adjustment process.

Reinsurance capacity, as long as the insurance proposals are technically sound, is widely available in the LAC region.

Crop hail and named-peril crop insurance programs have adequate reinsurance capacity because this business is not subject to catastrophic losses. On the contrary, since the reinsurers are trying hard to reinsure crop hail named-peril portfolios and insurance companies want to retain more of this type of business, the market enjoys overcapacity, which is reflected in the high commissions that reinsurers have to pay to get named-peril quota share treaties. Accessing reinsurance capacity is not as simple for MPCl business, although it is available, as it is for crop hail named-peril business. Many international reinsurers operating in LAC are averse to underwriting MPCl for individual growers because

10 Quota share reinsurance is an agreement whereby the ceding company is bound to cede and the reinsurer is bound to accept a fixed proportion of every risk accepted by the ceding company. The reinsurer shares proportionally in all losses and receives the same proportion of all premiums as the insurer, less commission.

11 Stop-loss reinsurance protection is a non proportional type of reinsurance, where the reinsurer agrees to pay the reinsured for losses that exceed a specified limit, arising from any risk or any one event.

12 In insurance fronting, a local insurer typically insures the risk in its own name and then reinsures anything up to 100 percent of its liability with a reinsurance company. The contract remains with the local insurer, although, in practice, the settlement of claims is controlled by the reinsurers.

the exposure to systemic risks, such as drought and flood, can accumulate over wide regions, resulting in catastrophic losses. The reinsurers writing MPCI business in the region are deeply involved in defining the terms and conditions of coverage and the conditions for rating, underwriting procedures, loss adjustment, and risk accumulation controls. In order to access reinsurance capacity for MPCI, an insurance company must meet, at least, the following conditions: (a) have a minimum net retention, which is usually not less than 10 percent of total liability; (b) have an in-house agricultural insurance underwriter with a professional background in agriculture sciences and proven experience in agricultural insurance; and (c) have well-defined criteria for MPCI underwriting and loss adjustment, including the corresponding procedural manuals. Accessing basic animal mortality reinsurance capacity in LAC is not a serious issue for the insurance companies. However, if reinsurance capacity is needed for nontraditional livestock coverage such as diseases, theft, terrorism, or epidemic diseases, the lack of reinsurance capacity to cover such perils may be a serious issue. Access to reinsurance capacity for aquaculture and livestock, although available, is very limited and subject to strict terms and conditions.

The role of agricultural reinsurers in the region is not limited to providing reinsurance capacity for insurance companies. In the context of the agricultural insurance market in Latin America, the reinsurance industry requires services that go beyond the provision of financial capacity. Reinsurers involved in agricultural reinsurance in the region usually assist insurance companies by providing advisory services in risk assessment, risk modeling, pricing, and risk structuring as well as in the design of loss adjustment and operational manuals, risk rating and risk accumulation control software, and the wording of insurance contracts.

PUBLIC SECTOR SUPPORT TO AGRICULTURAL INSURANCE IN LAC

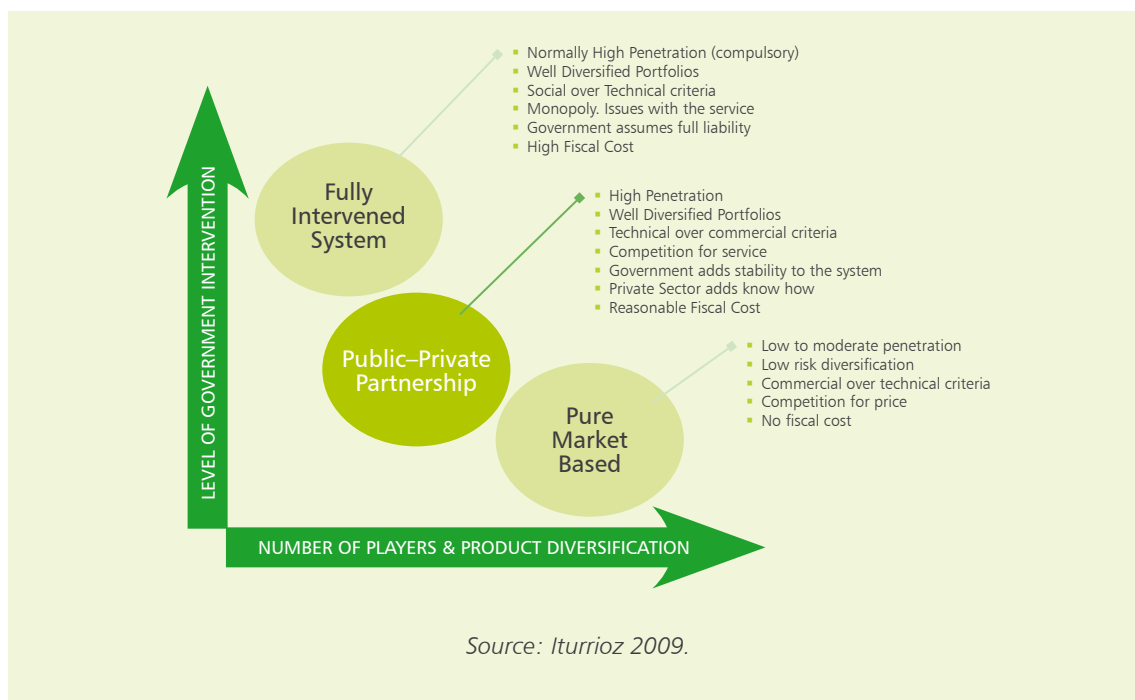
The public sector has an active role in supporting agricultural insurance in the region. In most of the LAC countries in which agricultural insurance products are available, there is some form of public sector support for agricultural insurance. Out of the 18 countries where agricultural insurance is currently available, 16 (89 percent of the total) have some form of public sector support for agricultural insurance, including government-financed premium subsidies. In 2009 the fiscal cost of support—government premium subsidies and government purchase of catastrophic coverage—amounted to US\$326 million, accounting for 42 percent of the total agricultural insurance premiums written that year. Brazil and Mexico have the highest levels of public sector support. Total government expenditures on support for agricultural insurance in these two countries amounted to US\$294 million, accounting

for 90 percent of total central government expenditures on support for agricultural insurance in LAC.

The reasons for public sector involvement in agricultural insurance markets are varied. In this regard, the public sector often justifies its intervention in agricultural insurance by pointing to (a) the absence of insurance infrastructure in rural areas and the absence of private sector agricultural insurance services; (b) the prohibitively high start-up costs in developing agricultural insurance products; (c) the constraints on the capacity of reinsurance to underwrite the systemic risk in agricultural production; (d) the high administrative costs of underwriting agricultural insurance; and (e) farmers' affordability issues, which arise out of the often high costs of agricultural insurance premiums.

The range of institutional models for the provision of agricultural insurance is wide in LAC countries. The pure market-based model, under which private sector commercial insurers, normally backed by private reinsurers, compete for underwriting agricultural insurance with low or no assistance from government, is observed in Argentina, Uruguay, Paraguay, and República Bolivariana de Venezuela. Different forms of public-private partnership arrangements for the provision of agricultural insurance are observed in the LAC region. A comprehensive PPP model for agricultural insurance is an arrangement under which the private sector commercial insurers have to comply with strict criteria in the design of insurance policies and rating in order to qualify for public sector support. In most of the agricultural insurance PPPs implemented in the LAC region, the public sector supports agricultural insurance policies based on nonstandardized rating and loss adjustment criteria. In Chile a national entity, the Comité de Seguro Agrícola (COMSA), is in charge of approving the insurance policies and the rates eligible for government-subsidized agricultural insurance premiums. Fully intervened models, under which a national or parastatal insurance company has the monopoly or a special regulatory framework exists for the provision of agricultural insurance, have almost disappeared from the region. Notwithstanding, national or parastatal insurance companies provide agricultural insurance in several countries (Nicaragua, Uruguay, Costa Rica, Panama, and the Dominican Republic); these insurance companies are providing agricultural insurance under the same conditions as private insurance companies. The only fully intervened models in the region, although they are pseudo-insurance programs, are PROAGRO (Brazilian Guarantee Program) and SEAF (Insurance for Family Agriculture) in Brazil. Box 3.3 presents a simplified representation of the various models for the provision of agricultural insurance.

Box 3.3 Models of government support to agricultural insurance



The public sector mechanisms to support the development of agricultural insurance vary among the LAC countries. The type of public sector support for agricultural insurance adopted across the region depends on the objectives for the agricultural sector, the type of risks faced in agricultural production, the type of farmers, the degree of development of the local insurance industry, and the fiscal constraints of the country. Basically, five main mechanisms of public sector support for agricultural insurance are present in LAC countries: (a) funding of premium subsidies, enabling the policy and regulatory framework for the development of agricultural insurance, (b) research and development of agricultural insurance products, (c) provision of agricultural insurance and reinsurance, (d) direct purchase of agricultural insurance by governments, and (e) the setup of specific agricultural insurance programs targeted to small and marginal farmers. These mechanisms are not mutually exclusive, and several countries have introduced a combination of them. Map 3.4 shows a synoptic representation of the current status of government support.

Map 3.4 Current status of government support for agricultural insurance in LAC



Source: Authors.

Public sector agricultural insurance technical support units are present in several LAC countries. Technical support units promote and assist the development of agricultural insurance markets. They perform diverse activities, such as gathering the basic information needed to develop agricultural insurance, assessing the risks for different agricultural activities in different areas of the country, developing products to assist farmers and the industry in risk management, and developing agricultural insurance products (such as crop and/or weather risk maps). They are also involved in gathering and processing information, conducting agricultural risk assessments, developing agricultural insurance products, and creating farmer awareness education and training. Public sector technical support units are

established in Uruguay, Argentina, Chile, Brazil, Paraguay, Peru, Ecuador, Panama, Nicaragua, Honduras, Mexico, and the Dominican Republic.

Premium subsidies are a common mechanism used by the public sector in the LAC region to support the development of agricultural insurance. Brazil, Mexico, Chile, Peru, Colombia, Costa Rica, Ecuador, and the Dominican Republic have agricultural insurance premium subsidies in place, albeit with different levels of support. Argentina and Uruguay provide premium subsidies for specific crop insurance programs. Several countries, including Brazil and Chile, cap the amount of premium subsidies that any one farmer can receive. This measure is designed to prevent large farmers from capturing a disproportionate share of the budget for premium subsidies available each year. Other countries, such as Costa Rica, offer higher premium subsidies to small and marginal farmers than to larger farmers. The total amount of agricultural insurance premium subsidies in LAC, including subsidies provided by local state governments, amounted to US\$228 million in 2009, accounting for 29.4 percent of total direct premiums written. The premium subsidies are not distributed evenly across the various types of products. While crop insurance receives more than 92 percent of total premium subsidies in LAC, livestock insurance receives only 7 percent. The participation of other business sublines of agricultural insurance in total subsidies is minimal. Only a few countries (Brazil, Mexico, and Peru) subsidize livestock insurance, while only Brazil subsidizes forestry insurance.

The public sector in many LAC countries has an active role in enabling the legal and regulatory framework to promote agricultural insurance. With the exception of Bolivia and the Windward Islands, none of the LAC countries has enacted a specific law for agricultural insurance. However, many LAC countries have enacted specific laws directed toward creating mechanisms and supporting agricultural insurance. These countries include Chile, Colombia, Panama, Mexico, Costa Rica, Nicaragua, and the Dominican Republic.

Direct intervention of the public sector in the provision of agricultural insurance is rare in LAC. The provision of agricultural insurance through state-owned insurance companies is observed only in Uruguay, Panama, Costa Rica, Nicaragua, and the Dominican Republic (the latter is a joint venture with the private sector). With the exception of AGRODOS (Aseguradora Agropecuaria Dominicana) in the Dominican Republic, an institution that was created exclusively for the provision of agricultural insurance, most of the public sector insurance companies in LAC do not exclusively provide agricultural insurance. The trend is that public sector direct interventions in agricultural insurance markets are disappearing. Currently, the state-owned insurance and reinsurance companies in the region compete on equal terms and are subject to the same legal framework as the privately owned insurance and reinsurance companies.

Public sector participation in the reinsurance of agricultural insurance portfolios is rare in the region.

Public sector participation in reinsuring agricultural insurance portfolios is observed in Mexico, Costa Rica, and Brazil. In Mexico the public sector provides agricultural reinsurance through Agroasemex, the state-owned insurance and reinsurance company. The role of Agroasemex has changed over time. Originally active in the provision of agricultural insurance, Agroasemex now provides reinsurance for private insurance companies, the small farmer mutual crop and livestock insurance schemes (*fondos de aseguramiento rural*), and the state governments under the PACC program, which involves a series of macro- or state-level parametric and nonparametric insurance schemes as well as the development of new agricultural insurance products. In Brazil, until 2007, the Brazilian Reinsurance Institute (IRB) had monopoly control over all reinsurance in Brazil; it provided quota share protection to local insurers and retroceded the greater share to specialist international reinsurers. Finally, in Costa Rica, INS (Instituto Nacional de Seguros, the public insurance company) used to have private reinsurance, but is currently not being reinsured, and thus the public sector acts as reinsurer of last resort.

The creation of PPPs for the provision of risk financing for catastrophic agricultural risk is a new trend in the region.

The Brazilian government has just enacted a law creating the Fundo de Catastrofe Rural (FCR). The FCR is a public-private partnership that includes the government of Brazil, the private insurance sector, local and international reinsurers, agro-industries, and cooperatives. Its objective is to create mechanisms to cap the potential losses faced by insurers due to their agricultural insurance portfolio. This measure aims to increase the confidence of the insurance and reinsurance industries and encourage them to write agricultural business in risky geographic areas and for risky crops not included in their agricultural insurance portfolios. The FCR's budget is estimated initially at US\$2.3 billion.

The public sector has an important role in purchasing agricultural insurance to transfer catastrophic agricultural risks from traditional subsistence and semi-commercial agricultural producers to external markets.

Several state governments in the region used to purchase macro- or state-level insurance coverage—catastrophic agricultural insurance (*seguro agropecuario catastrófico*)—in order to use the insurance payouts to assist small and marginal farmers affected by catastrophic events. Catastrophic agricultural insurance is offered as both a traditional and an indexed agricultural insurance product. Currently, more than 8.5 million hectares and 4.5 million animal units¹³ in the region are insured under catastrophic insurance policies purchased by governments. Total direct agricultural insurance premiums due to catastrophic insurance amount to US\$111 million (14.2 percent of total direct agricultural insurance premiums in the region).

¹³ Animal units are as follows: 1 cattle unit = 1 equine unit, 5 ovine units, 6 goat units, 4 swine units, 100 poultry units, or 5 hive units.

Subnational governments have an active role in purchasing agricultural insurance in Mexico, Peru, Argentina, and Colombia. Mexico is leading the way in implementing macro-level market-based insurance in the region. Catastrophic insurance coverage has been offered to state governments since 2003. The federal and state governments assume the cost of catastrophic agricultural insurance. In risk-prone areas, the federal government bears 90 percent of the cost of the premium, while the state government bears 10 percent. In medium- or low-risk areas, the federal government bears 70 percent of the cost of the premium, while the state government bears the remaining 30 percent. In 2009 the government of Mexico, through the Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA), spent US\$96.9 million on purchasing catastrophic agricultural insurance to assist small and marginal farmers in the country. In Peru, macro-level catastrophic crop insurance products are implemented in five departments. The government of Peru is spending approximately S/.40 million (Peruvian nuevo soles, US\$13.6 million) annually on catastrophic crop insurance products to assist small and semi-commercial farmers. Colombia is in the initial stages of developing catastrophic crop insurance products for banana producers in Quindío Department. The government of Mendoza Province in Argentina, which is situated in a hail risk-prone area, has been purchasing named-peril hail crop insurance since 2004 in an effort to substitute ex post ad hoc disaster relief assistance to fruit and vineyard farmers with an ex ante and objective financial mechanism to transfer hail risk. The main features of this program are summarized in box 3.4.

Box 3.4 Named-peril hail crop insurance program in Mendoza Province, Argentina

Type: Catastrophic named-peril crop insurance with nondeductible franchise of 50 percent of the loss

Insured perils: Hail and late seasonal frost

Insured crops: (a) hail: vineyards, olive, fruits, and vegetables; (b) frost: only vegetables in crop areas smaller than 10 hectares

Sum insured: US\$480 per hectare for farms up to 5 hectares and a decreasing sum insured per hectare after that, according to an area stratification scale

Premiums: US\$4.5 million paid in full by the provincial government

Loss ratio: 70 percent

Insurers: Coinsurance pool comprising six insurance companies

Beneficiaries: 16,205 farmers

Insured area: 240,000 hectares

Other features of the program: Private insurers offer optional additional coverage to individual farmers on a voluntary basis. This additional coverage tops up the basic protection provided by the government.

The insurance program complements risk management measures implemented by the government of Mendoza, such as the Active Hail Defense Program (hailstorm monitoring systems and hailstorm combat systems) and credit lines to finance the purchase of hail nets.

Source: Authors' compilation from Ochiuzzi 2010.

Some countries in the region have developed special agricultural insurance programs targeting small and marginal farmers. Such is the case of Chile, Argentina, Brazil, and Mexico. In Chile, the Small Farmer Lending Bank (INDAP) has developed an online crop insurance system in conjunction with the insurance sector that permits any recipient of credit for seasonal crop production to be covered automatically under the small farmer insurance facility. In Peru, the government is supporting a program called Agro Protégé, which is targeted at small and marginal farmers. In Argentina, several agricultural insurance schemes, such as the hail insurance program implemented in Mendoza Province and the MPCl program for cotton farmers implemented by Chaco Province, were developed by state governments with assistance from the federal government in order to help small farmers to manage risk. In Mexico, Agroasemex has for nearly two decades been associated with the *fondos* (crop and livestock mutual insurance funds). In Brazil the federal government has two special pseudo-crop insurance programs for small and marginal farmers: PROAGRO and SEAF (see box 3.5).

Box 3.5 SEAF crop-credit insurance guarantee program of the federal government of Brazil

SEAF is a compulsory crop-credit insurance program of the federal government for smallholder farmers who access seasonal production credit from PRONAF (the National Program for the Strengthening of Family Agriculture, Programa Nacional de Fortalecimento da Agricultura Familiar).

Nature of cover: Automatic cover for beneficiaries of PRONAF seasonal credit

Type of policy: Multi-peril yield-shortfall policy, which indemnifies growers by the amount that actual crop revenue falls short of the sum insured (see below for definition of sum insured)

Insured crops: A wide range of crops identified under the agricultural zoning program (*zoneamento agrícola*), including rain-fed and irrigated cereals, legumes, oilseeds, fiber crops, root crops (cassava), grapes, and tree fruits (40 crops)

Insured perils: Drought, excess rain, frost, hail, excess variation in temperatures, strong winds, cold winds, crop pests, and diseases that cannot be controlled either technically or economically

Basis of sum insured: The sum insured is based on the amount of seasonal production credit loaned to the farmer, plus the interest due on the principal, plus up to 65 percent of the estimated net revenue of the crop, subject to a maximum of US\$3,000 per farmer per year. The estimated gross and net revenue is determined by the bank and the crop inspector at the time of policy issuance.

Beneficiaries: 2.8 million farmers

Premium rate: 2 percent fixed rate paid by the insured for each insured crop

Premium subsidy: Government pays a 75 percent premium subsidy on the SEAF program.

Basis of indemnity: Losses must exceed 30 percent of the expected gross revenue for the crop in order to qualify for indemnity.

Estimated premiums: US\$427 million (US\$95 million paid by the farmers; US\$332 million paid by SEAF)

Reinsurance: The program is not reinsured. All the liabilities arising out of the program are retained by the government of Brazil.

Source: Authors' compilation from information provided by the Ministerio de Desenvolvimento Agrário do Brasil 2010; Mahul and Stutley 2010.

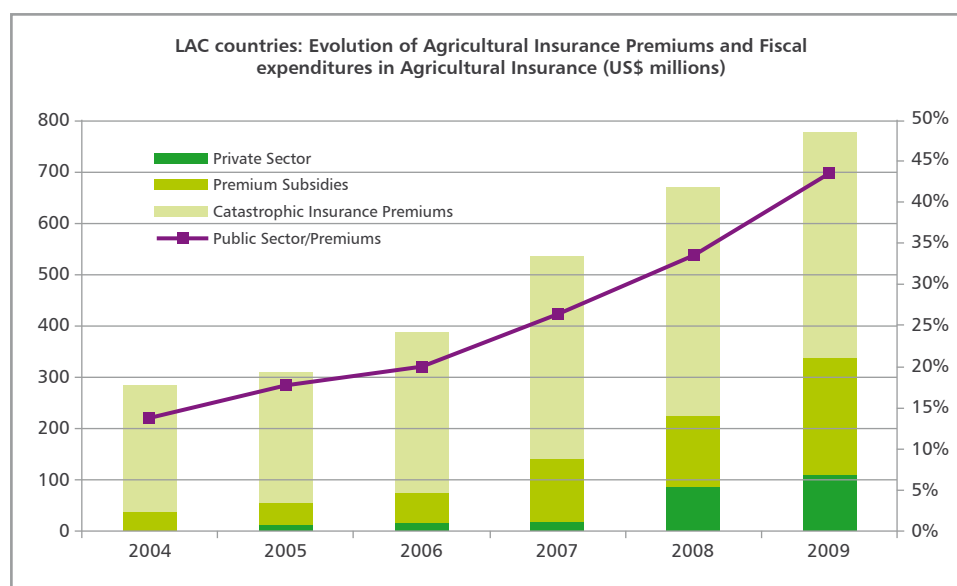
The public sector has increased its support for agricultural insurance in the region during recent years. Total government expenditures toward supporting agricultural insurance in the region have increased from US\$33 million in 2003 to US\$326 million in 2009. Several governments have assumed an active role in supporting agricultural insurance. While in 2003, public sector expenditures in supporting agricultural insurance accounted for 12 percent of total agricultural insurance premiums, in 2009 they accounted for 44 percent. Brazil and Mexico have been leading this process. For instance, agricultural insurance premium subsidies were introduced in Brazil in 2005 and increased from US\$1.7 million in 2005 to approximately US\$163 million in 2009.¹⁴ The situation is similar in Mexico, where the government has increased its budget for the purchase of catastrophic agricultural insurance coverage from US\$18.1 million in 2007 to US\$96.9 million in 2009.

¹⁴ Including state agricultural insurance premium subsidies.

The exponential growth of agricultural insurance premiums in the region is explained largely by the increase in public sector expenditures to support this type of risk transfer product. The coefficient of regression (R^2) between total public sector expenditures in agricultural insurance and direct agricultural insurance at the regional level is 0.97, which is extremely high. While direct agricultural insurance premiums in the region grew 285 percent, from US\$272 million in 2004 to US\$780 million in 2009, during the same period public sector expenditures in agricultural insurance grew 991 percent, from US\$33 million in 2004 to US\$339 million in 2009. Private sector expenditures in agricultural insurance grew only 185 percent during the same period, from US\$239.5 million in 2004 to US\$438 million in 2009.

The challenge for LAC countries is sustaining the current levels of government support for agricultural insurance. As noted, LAC agricultural insurance markets have been growing in recent years, fueled mainly by public sector support, both through agricultural insurance premium subsidies and also through the direct purchase of catastrophic agricultural insurance for small farmers. Governments in the region have been able, so far, to afford the current levels of financial support for agricultural insurance. However, the question is whether they will be able to sustain that level of support if the agricultural insurance market continues to grow at the current rate. Figure 3.5 shows the evolution of total agricultural insurance premiums and total government expenditures to support agricultural insurance in the region.

Figure 3.5 Premiums and fiscal expenditures on agricultural insurance in LAC, 2004–09



Source: Authors.

AGRICULTURAL INSURANCE PENETRATION IN LAC

Agricultural insurance has reached reasonable penetration rates in the region.

Currently, approximately 29 million hectares of crops (17 percent of the total crop area) are insured under crop insurance policies, 2.3 million hectares of commercial forest (19 percent of the total commercially forested area) are insured under forestry insurance policies, and 350,000 tons of aquaculture biomass (28 percent of the total aquaculture biomass) are insured under aquaculture insurance. Livestock insurance lags behind, with only 4.5 million head of cattle insured out of a population of almost 400 million.

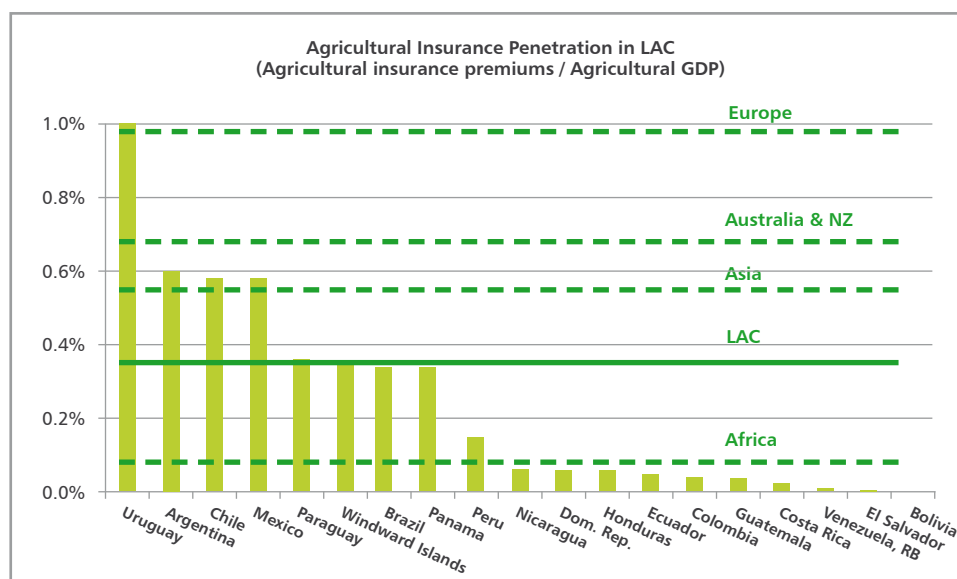
The LAC region, however, still lags, on average, behind other regions in the development of agricultural insurance.

In 2009 agricultural insurance premiums accounted for only 0.37 percent of agricultural GDP in LAC, which is considerably lower than in many other regions of the world. For instance, in the United States and Canada, agricultural insurance premiums account for almost 6 percent of total agricultural GDP. In European countries, they account for almost 1 percent of total agricultural GDP. In Asia, agricultural insurance premiums account for 0.47 percent of agricultural GDP. Africa, with 0.079 percent of agricultural GDP, is the only region where the penetration of agricultural insurance is lower than in the LAC region.

The penetration of agricultural insurance is not homogeneous among LAC countries.

Uruguay, where named-peril crop insurance is highly developed, has the highest agricultural insurance rate in the region. Agricultural insurance premiums account for 1.05 percent of agricultural GDP in Uruguay, followed by Chile and Mexico, with 0.60 percent. In Brazil, Panama, the Windward Islands, and Paraguay, penetration rates are around 0.35 percent. The remaining countries, mainly the Andean and Central American countries, have agricultural insurance penetration rates lower than 0.1 percent of agricultural GDP. Figure 3.6 compares penetration rates across LAC countries as well as between LAC and other regions in the world.

Figure 3.6 Agricultural insurance penetration in LAC



Source: Authors' compilation from Mahul and Stutley 2010.

The penetration of agricultural insurance is not homogeneous even across different geographic areas within the same country.

In a given country, the zones with the most dynamic agricultural production also have the most agricultural insurance, while the agricultural production zones that are less dynamic are left behind. For instance, while the Pampas region in Argentina—the main agricultural production area—has agricultural insurance penetration rates of above 50 percent of the cultivated area, other areas have very low penetration rates or no agricultural insurance at all. The same situation is observed in Brazil and Mexico. In Brazil, the southeastern and central-southern areas show much higher levels of agricultural insurance penetration than the northeastern states. In Mexico, the northern states show much more development (50 percent of the cultivated area is insured) than the southern states. A detailed analysis of the reasons for these differences is presented in chapter 4.

Crop insurance, the most popular type of agricultural insurance in the region, shows uneven levels of penetration across countries.

Uruguay and Argentina have high insurance penetration rates of above 60 and 50 percent of the total crop area, respectively. In Mexico and the Windward Islands, between 35 and 40 percent of the cropped areas is currently insured. Paraguay has a moderately high rate of agricultural insurance penetration: 23 percent of the cropped area. Brazil and Peru, with agricultural insurance programs that were implemented only a few years ago, have agricultural insurance penetration rates of 10 percent of the cropped area. In the remaining LAC countries, the penetration of crop insurance is still low. Chile, Colombia, Costa Rica, Honduras, the Dominican Republic, Ecuador,

and Panama have penetration rates between 1 and 5 percent of the total cropped area. In El Salvador, Guatemala, Nicaragua, and República Bolivariana de Venezuela penetration rates are very low, with less than 1 percent of the crop area insured.

Forestry insurance has reached very high levels of penetration in Chile and Uruguay, but not in other countries in the region. Chile and Uruguay have very high rates of forestry insurance penetration, with more than 80 percent of the commercial forest area insured. Argentina has a moderate level of penetration, with approximately 10 percent of the commercial forest area insured. In Brazil, forestry insurance is very new and, in spite of its potential for development and the premium subsidies provided by the government, only covers an estimated 5 percent of the commercial forest area. The remaining countries in the region in which forestry insurance is available (Paraguay, Ecuador, Central American countries, and Mexico) have low penetration rates.

Aquaculture insurance, with the exception of salmon farming insurance in Chile and shrimp farming insurance in Mexico, has not reached high levels of penetration in the region. Approximately 50 percent of the salmon farming centers in Chile are insured under aquaculture insurance policies. However, given the outbreak of infectious salmon anemia in 2008, both biomass and the number of aquaculture centers in production are expected to decline in the near future. In Mexico, approximately 10,000 out of 70,000 hectares under shrimp farming production are currently insured.

Despite the importance of the livestock sector in the region, livestock insurance has minimal penetration levels outside Mexico. Livestock insurance lags behind other covers in terms of insurance penetration in the region, reaching an acceptable penetration rate only in Mexico, where approximately 17 percent of the cattle herd is insured. Colombia is believed to have approximately 250,000 head of cattle insured against terrorism and theft. Penetration rates for livestock insurance are minimal in important cattle-producing countries in the region, such as in Brazil and in Argentina. Map 3.5 shows the penetration rates for crop, livestock, aquaculture, and forestry insurance in LAC region.

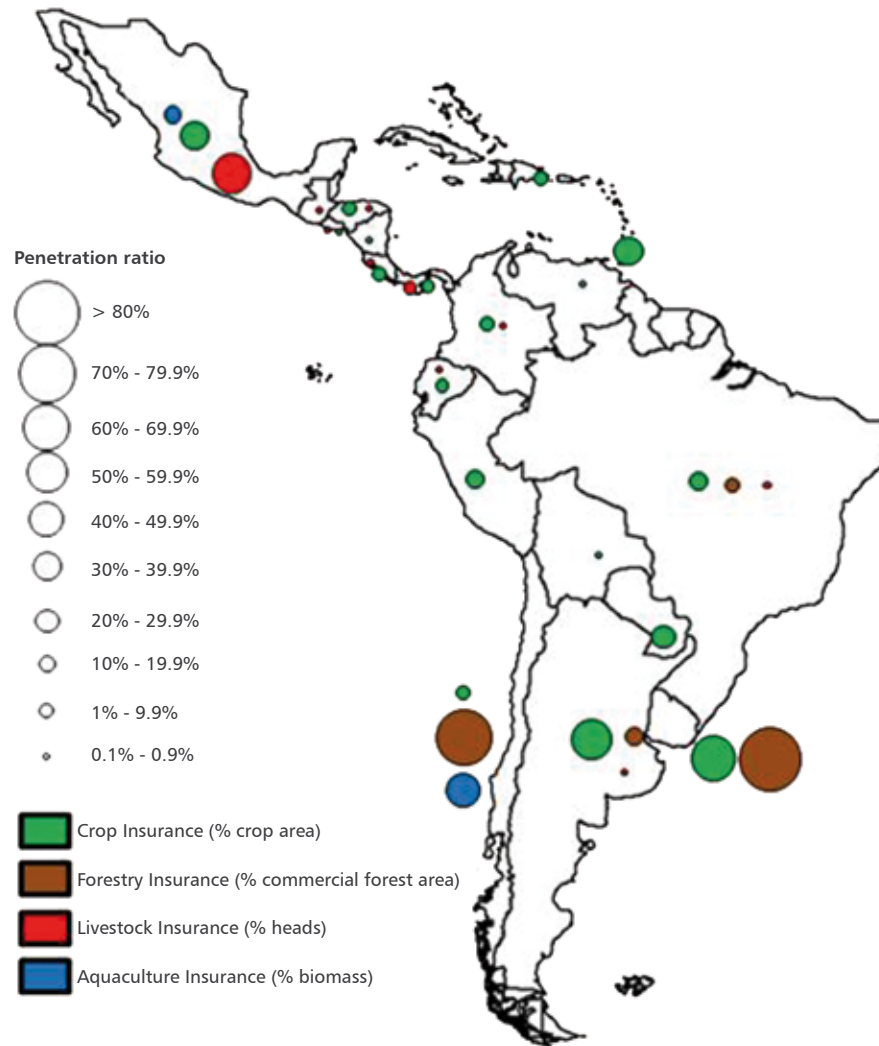
GAPS IN THE PROVISION OF AGRICULTURAL INSURANCE IN LAC

There are several gaps in the provision of agricultural insurance in LAC countries. Although the region has made solid advances in the development of agricultural insurance, it still has a long way to go to develop this market. The development of agricultural insurance in LAC countries is heterogeneous, both spatially and among different business sublines. This section identifies the gaps in the provision of agricultural insurance in the region.

Agricultural insurance product gaps

Crop insurance in LAC still needs further development. Although the provision of crop insurance has reached good levels of development in some geographic areas (such as Argentina, Uruguay, southern Brazil, Paraguay, and Chile), levels are very low in other areas. Crop insurance penetration in the region is only 17 percent of the total cropped area: approximately 138 million hectares out of 167 million cropped hectares are not insured. The reasons for this gap are many and vary from country to country. First, in countries where the majority of agricultural producers are semi-commercial or traditional subsistence farmers, farmers are not familiar with risk management tools and crop insurance is not affordable, which are serious drawbacks to the development of crop insurance. This is observed in the Andean, Caribbean, and Central American countries. Second, in countries where agricultural production is exposed to the risk of catastrophic windstorms and excess rain or flood, as in some Central American and Caribbean countries, the insurance industry does not have the appetite to write agricultural risks and farmers do not demand coverage because they expect governments to intervene in an ex post fashion. Third, in countries producing specialty crops, such as Chile and Peru, the lack of appropriate insurance products to transfer the production and quality risks constrains the development of crop insurance.

Map 3.5 Agricultural insurance penetration in LAC



Source: Authors.

Forestry insurance is only developed in Chile and Uruguay. Currently, only 2.3 million hectares out of 12 million hectares of standing timber forestry plantations are insured in the region. Out of the 2.3 million hectares insured, 2.1 million hectares (90 percent) are situated in Chile and Uruguay. However, in other countries with considerable standing timber stocks, such as Brazil and Argentina, the penetration of forestry insurance is minimal. There are two possible reasons for these gaps in forestry insurance. The first is the existence of different risk perceptions across the countries. For instance, in Chile, one of the countries in the world most prone to forest fires, forestry producers are willing to purchase forestry insurance because they perceive that their plantations are at risk. Conversely, in Brazil, where fire risk is relatively low, the willingness of producers to purchase forestry insurance is low. A second

possible reason for the existence of gaps in forestry insurance outside Chile and Uruguay is the forestry producers' lack of awareness of forestry insurance and the potential advantages of this risk transfer tool. Chile and Uruguay have a long tradition of forestry insurance. Forestry producers in these countries are aware of the existence of forestry insurance and understand the advantages and limitations of this product. In other countries, forestry insurance is a relatively new product, many forestry farmers (particularly small farmers) are not aware of its existence, and, when they are aware, they have no clear understanding of its potential uses. A third possible reason for these gaps is that many forestry farmers do not comply with the minimum risk management practices that are required to be eligible for forestry insurance, such as the existence of resource plans and protocols for fire prevention and fire suppression. In many forestry plantations in the region, mainly small plantations, the minimum risk management preconditions for forestry insurance are not being met.

Despite the importance of aquaculture in the region, the development of aquaculture insurance is limited to Chile and Mexico. Currently, only 350,000 tons out of a total fish stock of 1.75 million tons in the LAC region are insured. From the 350,000 tons of insured fish stock, 100 percent is located in two countries—Chile and Mexico. Aquaculture insurance, including off-shore marine and on-shore freshwater aquaculture insurance for fish stock and equipment, is widely offered to the salmon industry in Chile, where almost 50 percent of the salmon production centers are insured. On-shore aquaculture insurance is offered in Mexico for shrimp production, where 10 percent of the shrimp farming area is insured. However, aquaculture insurance has almost no penetration in most of the shrimp and tilapia production areas of the Central American countries, Peru, Ecuador, Colombia, República Bolivariana de Venezuela, Guyana, and northeastern Brazil. The main reason for the underdevelopment of aquaculture insurance in these important production areas is the lack of expertise and technical capacity of the insurance sector to underwrite this type of complex risk. One of the preconditions for underwriting aquaculture is the existence of qualified risk surveyors and loss adjusters, who are usually designated by the reinsurers. The technical capacity to underwrite and to perform the surveys, follow-up, and loss assessment needed in aquaculture insurance has been developed only in Chile and Mexico. In other LAC countries, insurance companies that want to write aquaculture insurance need to bring in expertise from overseas. This makes the transaction costs of aquaculture insurance too high for small and medium-size businesses and only marginally attractive for large-size farms.

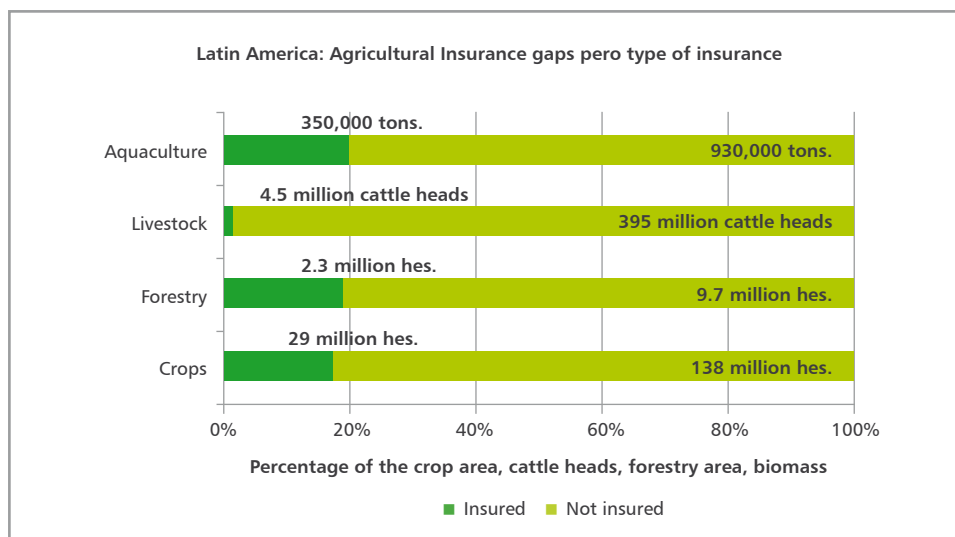
Livestock insurance is very underdeveloped in most of the LAC region. Livestock insurance products are available in most countries. However, the demand for and uptake of this product are extremely low. Currently, in spite of the importance of the livestock sector in LAC, only 4.7 million head of cattle out of an estimated total of 395 million are insured. From the 4.7 million head of cattle insured in the region, 4.4 million are located in Mexico. The main drawback to the expansion of livestock insurance is the existence of market failures in

the provision of this insurance product. Livestock producers are not willing to purchase basic livestock accident and mortality insurance at current market prices because they perceive the product as too expensive given the restricted coverage provided. The insurance industry is not willing to offer comprehensive (all risks including diseases) livestock insurance owing to (a) the potential moral hazard associated with comprehensive policies and (b) animal mortality due to health issues, which has a large management component. Factors under human control are as important as, if not more important than, natural factors in determining mortality rates in livestock production, which depend heavily on herd management, fodder management, and animal husbandry practices. For the insurance sector to follow up and control herd management practices implemented by the insured is key to avoiding moral hazard in livestock insurance programs.

The asymmetries of information in livestock production are the main cause of market failures in livestock insurance. The insurance companies in the region do not have the infrastructure or the human resources to implement the monitoring of insured animals or the loss adjustment procedures needed to provide comprehensive coverage. In addition, other factors also contribute to market failures. The first factor consists of deficient systems for tagging and tracing animals. The existence of proper animal-tagging systems is a precondition for the development of comprehensive livestock insurance, as an efficient system allows the industry to perform close follow-up of the insured herds. The second factor is the existence of gaps in the systems for preventing animal disease in some countries. The provision of comprehensive livestock insurance involves the industry covering animal diseases and, in some cases, epizootic (epidemic) diseases. Given the potential catastrophic exposure that insurance companies would face from epidemic diseases, the industry is not willing to offer cover unless proper policies are in place to prevent disease and control animal health. As livestock insurance coverage becomes more comprehensive, the sophistication of management factors becomes more important. Unless the insurance industry in the region feels confident in its ability to monitor and control the potential sources of moral hazard in livestock insurance, it will continue to provide only basic accidental mortality coverage.

Figure 3.7 summarizes the current level of agricultural insurance penetration as well as the gaps in the provision of agricultural insurance in the region.

Figure 3.7 Agricultural insurance gaps in LAC, by type of insurance



Source: Authors from own agricultural insurance survey and FAO 2009.

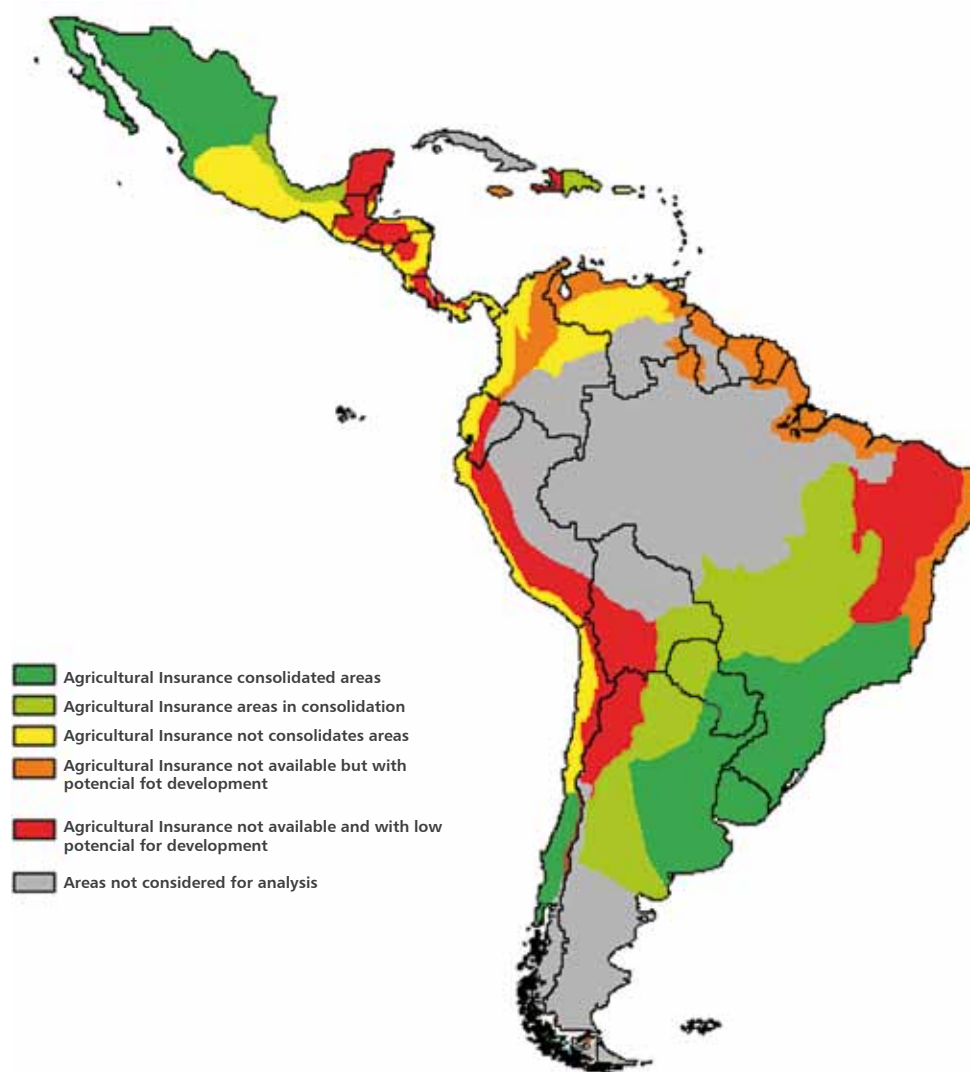
Agricultural insurance penetration gaps

The development of agricultural insurance is uneven among different geographic areas in the region. The development of agricultural insurance follows the boundaries of the agroecological areas with different agricultural production systems, not national boundaries. The general pattern is that agricultural insurance is more developed in geographic areas where agricultural production is more dynamic. In this regard, it is possible to distinguish among five geographic areas in terms of agricultural insurance development: (a) where agricultural insurance is consolidated; (b) where agricultural insurance is in the process of consolidation; (c) where agricultural insurance is not consolidated; (d) where agricultural insurance is not available yet, but has the potential for development; and (e) where agricultural insurance is not available yet and has low potential for development. Map 3.6 presents the geographic distribution of agricultural insurance development in the region.

The geographic areas where agricultural insurance is consolidated are also the most dynamic in terms of agricultural production in the region. These areas comprise the Pampas region and Mesopotamia region in Argentina, the whole territory of Uruguay, eastern departments of Paraguay, southeastern and central-southern states in Brazil, southern regions in Chile, and northern states in Mexico. These geographic areas are among the areas with the most dynamic agricultural production in the LAC region. Agricultural production in these areas is dominated by medium-size and large market-oriented professional agricultural enterprises. The agribusiness value chain in these geographic areas is highly developed, and farmers have full access to agricultural services. Access to finance, which is available from

rural development banks, commercial banks, input suppliers, and trading companies, is not a constraint for most farmers.

Map 3.6 Degree of development of agricultural insurance in LAC



Source: Authors.

The level of development of agricultural insurance in the areas where agricultural insurance is consolidated is comparable to the levels of agricultural insurance development in high-income countries. Total agricultural insurance premiums written in consolidated geographic areas amount to US\$600 million (77 percent of total agricultural insurance premiums written in the region). Approximately 24.5 million hectares of crops are insured across consolidated areas, accounting for 80 percent of total insured area in the

region. The level of crop insurance penetration in these areas is between 40 and 50 percent of the total cropped area. Crop insurance is well developed in Argentina, Uruguay, Brazil, and Paraguay; however, it is not as well developed in Chile. Named-peril hail insurance policies for annual crops and fruits are the main type of crop insurance written in Argentina, Uruguay, and the southern areas of Brazil. MCPI policies are the main type of crop insurance written in Paraguay, Brazil, Chile, and the northern states of Mexico. Forestry insurance, with 36 percent of the forested area insured, shows acceptable levels of penetration in geographic areas where agricultural insurance is consolidated. In Chile and Uruguay, forestry insurance is well developed in geographic areas where agricultural insurance is consolidated, but in Brazil, Argentina, and Paraguay, it is not, as approximately 6 million hectares of forestry are not yet insured. Aquaculture insurance is well developed in areas of Chile and reasonably developed in northern states of Mexico where agricultural insurance is consolidated. Livestock insurance, with the exception of Mexico where approximately 15 percent of the national herd is insured, is not developed either in the areas with consolidated agricultural insurance or at the regional level.

The geographic areas where agricultural insurance is in the process of consolidation in the region comprise areas that were turned over to agricultural production in the 1990s. These areas include Mato Grosso, Minas Gerais, Goiás, Tocantins, Maranhão, and Bahia federative states in Brazil; the western departments in Paraguay; the Department of Santa Cruz de la Sierra in Bolivia; and the geographic area comprising the provinces of Salta (eastern areas), Tucumán, San Luis, Santiago del Estero, Córdoba (western and northern areas), La Pampa (western counties), and Formosa in Argentina. Owing to improvements in crop production technology and the low cost of land, these geographic areas underwent an extraordinary transformation during the 1990s, when investors, attracted by promising returns, purchased large tracts of arable land. Currently, these geographic areas are among the most dynamic for agricultural production in the region. The main feature of agricultural production in these areas is the coexistence of large-scale commercial agricultural enterprises with small- and medium-size semi-commercial and commercial farms. Although the agribusiness value chain in these geographic areas is not well developed, the large agricultural enterprises, with economies of scale associated with their size, have developed their own infrastructure to receive services and commercialize their production. The largest agricultural businesses satisfy their financial needs by negotiating loans directly with local or international bank headquarters and multinational input suppliers or, in some cases, by issuing shares on the stock markets.

The demand from large-scale agriculture for agricultural insurance products in the areas that are consolidating is rising quickly. The total agricultural insurance premiums written in these areas amounts to US\$79 million (12 percent of the total agricultural insurance premiums written in the region). Currently, more than 4 million

hectares are insured (8 percent of the crop area) in these areas. Crop insurance, which was introduced in the early 2000s, has accompanied the development of large-scale agricultural enterprises. The demand for crop insurance is exclusively for MPCI, mainly for soybeans, maize, and oilseed crops. However, the demand for crop insurance from medium- and small-size agricultural enterprises in these areas is minimal. The causes of the low demand include (a) the existence of a large universe of small subsistence agricultural enterprises that cannot afford to pay the high premiums of traditional MPCI and (b) the low profits obtained by the medium- and small-scale farmers due to the high transport costs (these regions are located a significant distance away from markets). Crop insurance products are expensive in these areas for two reasons. First, farmers face high pure risk premiums because these geographic areas are situated in the crop production frontier, and thus data uncertainties and perceptions of catastrophic risks increase loadings on premiums. Second, transaction costs (including acquisition costs, inspections, and loss adjustment costs) are high. Thus crop insurance is only offered to large-scale agricultural enterprises for which the transaction costs involved in the insurance operation can be spread over a large volume of premiums.

The level of development of forestry insurance in the geographic areas where agricultural insurance is in the process of consolidation is still minimal. Forestry insurance penetration is limited to a few forestry insurance policies sold in the states of Bahia and Minas Gerais in Brazil and in the province of Córdoba in Argentina. Insurance companies operating in these areas are reluctant to offer forestry insurance given the climatic characteristics (semiarid zones) and the low implementation of risk management practices in forestry production. The provision of livestock insurance is nonexistent. Owing to the extensive livestock production, the lack of efficient animal-tagging mechanisms, and the lack of livestock veterinary and health services for livestock insurance certification purposes, this type of agricultural insurance product is unlikely to be developed significantly in the short term in these areas.

There are several geographic areas in the region where agricultural insurance, although available for many years, is not yet consolidated. These areas include the coastal areas of Chile, Peru, Ecuador, and Colombia; the *llanos* region in República Bolivariana de Venezuela and Colombia; Central American countries; southwestern departments of Mexico; and the Dominican Republic and Jamaica. Agricultural production in these areas is characterized by the coexistence of large-scale commercial farming export-oriented ventures with small-scale semi-commercial or familial farming.

The level of development of agricultural insurance in the geographic areas where agricultural insurance is not consolidated is low. Currently, approximately 4 million hectares of crops are insured, accounting for less than 4 percent of the total crop area. However, it is important to consider that, of the 4 million hectares insured, 2.7 million are

insured with catastrophic agricultural insurance purchased by the governments. Agricultural insurance direct premiums written in geographic areas where agricultural insurance is not consolidated amount to US\$100 million, from which US\$39 million is paid for catastrophic agricultural insurance cover purchased by governments. In summary, considering only the voluntary uptake of private agricultural insurance in these areas, total agricultural insurance premiums are US\$61 million, and the total insured area of 1.3 million hectares is equivalent to only 2 percent of the cropped area. There are several possible reasons why agricultural insurance has not been consolidated in these areas. The main factor is the existence of a huge population of sparsely distributed traditional subsistence and semi-commercial farmers who have no access to rural services and no financial capacity to afford premiums. The second is the high cost of providing agricultural insurance. These geographic areas are important areas for forestry production; however, the penetration of forestry insurance is minimal. Although more than 2 million hectares of forestry plantations are located in these areas, less than 30,000 hectares are insured. Aquaculture production is an important agricultural activity in the northern areas of Peru, Ecuador, Colombia, and all Central American countries; nevertheless, the provision of aquaculture insurance in these countries is, currently, nonexistent. Livestock insurance has reached some level of development in Colombia and Panama, where 200,000 and 70,000 head of cattle, respectively, are insured, but penetration of this insurance product is still very low.

There are many agricultural production areas in LAC where agricultural insurance is still not available. The total cultivated area in the geographic zone in which crop insurance is not yet available is approximately 50 million hectares (27 percent of total cropped area in the LAC region). While in some of these geographic areas crop insurance can be developed in the relatively short term, in others it will be very difficult to develop crop insurance without government intervention.

The geographic areas where agricultural insurance is not yet available but has the potential for development are characterized by the coexistence of well-developed market-oriented agriculture firms with traditional subsistence or semi-commercial farming. These geographic areas include (a) the high-altitude valleys of the Andean region of Colombia, República Bolivariana de Venezuela, and Ecuador, (b) the coastal areas of northeastern South America, and (c) most of the countries of the Caribbean region. In the intermountain valleys and lower slopes of the northern Andean mountains—the heartland of Andean coffee and horticultural production—farmers are mostly commercial and market oriented; thus there is potential to introduce suitable crop insurance products. However, in the highlands and upper valleys where temperate crops, maize, and pigs predominate, traditional indigenous subsistence farming systems are strongly established, and insurance products would be very difficult to develop. In the coastal areas of northeastern South America and most of the countries of the Caribbean region, large-scale plantations of

tropical fruits, typically export oriented and often internationally owned, coexist with small-scale family farms with mixed agriculture. The insurance industry has been making efforts to develop agricultural insurance products for large-scale agribusiness firms; however, so far, it has not been successful. Large agribusiness producers of specialty crops, most of them multinationals, have very well diversified crop portfolios and are only marginally interested in insuring their crops.

The geographic areas where agricultural insurance is not yet available and that have low potential for development are characterized by the predominance of a vast population of small and marginal or semi-commercial farmers who produce for self-consumption and, eventually, for the market. These farmers are not the subject of commercial agricultural insurance, and their need for agricultural risk transfer should be met by social or safety net programs. These geographic areas include (a) the high-altitude mixed-farming systems of the central Andes (step valleys of the Andean mountains along Peru and the *altiplano* in Peru, Bolivia, Chile, and Argentina); (b) the dry-land mixed-farming systems in northeastern Brazil and the Yucatán peninsula in Mexico; and (c) the staple crop, small-scale farming systems in Central America and the Caribbean. The segment of small-scale farmers has not been targeted to date by the insurance industry.

4. OPPORTUNITIES AND CHALLENGES FOR AGRICULTURAL INSURANCE

Agricultural insurance has enormous room for growth in Latin American and Caribbean (LAC) countries. Not currently insured in the region are 138 million hectares of crops (83 percent of cropped land), 9.7 million of standing timber plantations (79 percent of the total area of standing timber plantations), 395 million head of cattle (98 percent of total head of cattle), and 930,000 metric tons of annual fish stocks (80 percent of annual fish stocks). The gap in penetration of agricultural insurance represents a tremendous opportunity for the insurance industry. Assuming the current terms and conditions of insurance policies, the total agricultural insurance premiums in the region would increase US\$65.3 million for each percentage point increase in insurance penetration across all types of agricultural insurance.

Although agricultural insurance is relatively well developed in the region, it still faces several challenges. As noted in the previous chapter, the level of development of agricultural insurance in the region is uneven, both in terms of product development as well as in terms of penetration between countries and within the same country. The reasons for such discrepancies are diverse; therefore, the strategies to address future development are also diverse.

The development of agricultural insurance requires a long-term public-private partnership (PPP) effort. International experience shows that it takes a long time to develop sustainable agricultural insurance products that are attractive to farmers. The process of promoting and enhancing agricultural insurance in LAC countries will require significant efforts both from the insurance industry and from governments. It is not realistic to expect to reach high levels of penetration in the short term, although the growth rate to date has been promising.

OPPORTUNITIES FOR THE DEVELOPMENT OF AGRICULTURAL INSURANCE

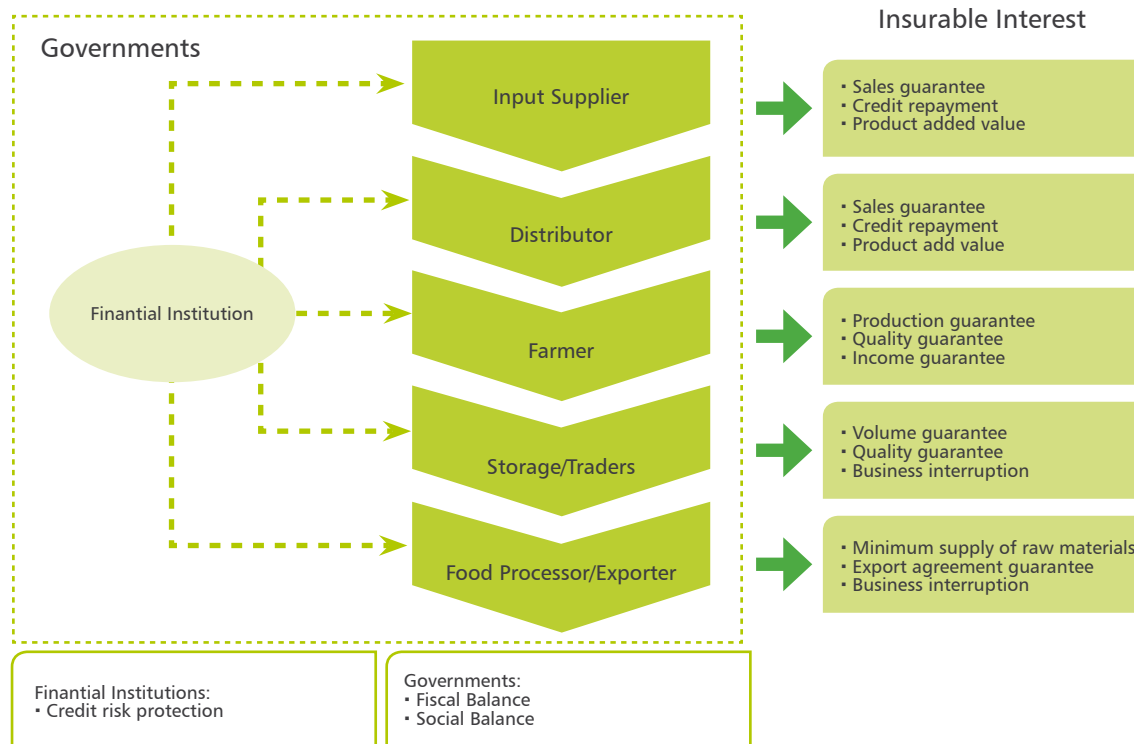
Crop insurance

Crop insurance has a great potential for development in the region. Approximately 138 million hectares of crops (83 percent of cultivated land) are currently not insured. The possible strategies for expanding the use of crop insurance will depend on the social and economic importance of the agricultural sector, the degree of development of crop insurance, the type of risks faced by crop producers, the dominant type of farmer, and the local capacity for offering agricultural insurance. In order to analyze the opportunities for development in LAC, it is relevant to split the region into the same five geographic areas used in chapter 3 to explain the current development of agricultural insurance in LAC based on the level of consolidation and the potential for development in the area.

■ ***Geographic areas where agricultural insurance is consolidated***

Opportunities to increase the current levels of crop insurance in these geographic areas will come, mainly, from the development of more complex and sophisticated types of products. The insurance industry in these geographic areas is enhancing its current portfolio of crop insurance products to cover more perils and activities. For instance, the insurance industry is analyzing the feasibility of introducing revenue crop insurance for soybeans and corn in Brazil, Mexico, and Argentina. In Brazil, the insurance industry is starting to provide coverage for diseases affecting crop production, such as citrus canker and greening in orange production. In Chile, the industry is starting to offer insurance for high-value crops (table grapes, avocado, and berries) that, until now, were not included in the portfolio of insurable crops due to their high values at risk and the insurance industry's inability to manage risk accumulations. The insurance industry is also adopting an agribusiness value chain approach in order to deliver crop insurance products. The insurance industry in these consolidated markets is shifting its focus from providing individual farmers with simple named-peril insurance and multiple-peril crop insurance (MPCI) policies to providing other players in the broader agribusiness value chain with financial transfer solutions. The players in the agribusiness value chain have varied insured interests. For instance, an input supplier or a financial institution may be interested in protecting its sales revenues or the reimbursement of its sales credits due to the occurrence of a weather event affecting crop production. A grain elevator or a fruit exporter may be interested in protecting the procurement of enough grains or fruits in the respective catchment areas to reach the break-even volumes needed to cover fixed operating costs or to comply with a forward contract. Figure 4.1 shows a simplified representation of the insured interests of different players in the agribusiness value chain.

Figure 4.1 Agribusiness value chain and insurable interest



Source: Iturriz 2009.

■ **Geographic areas where agricultural insurance is in process of consolidation**

The uptake of crop insurance is expected to continue growing in these areas.

This expectation is based on two reasons: (a) the increase in the demand for crop insurance by large-scale agribusiness firms and (b) the expected improvement in the profit margins obtained by small- and medium-scale farmers. Large-scale agribusiness firms operating in these areas will continue to demand customized insurance solutions. Production in these areas is usually marginal and faces several production risks. The business model implemented by these firms is characterized by low land prices and technology-intensive production. The firms manage their production risks by diversifying their activities in terms of both product and location and by purchasing crop insurance to transfer the risk that they are unable to manage. These firms include crop insurance as a cost of production in their business model. In order to meet the demand of enterprises for risk transfer, the industry should be ready to tailor solutions to the enterprises' capacity to diversify risks. In that regard, insurance products, such as global MPCl portfolio coverage, probably in combination with crop revenue insurance, could meet the need for risk transfer. In addition to the expected increase in demand from agribusiness firms, it is also expected that the small- and medium-scale farmers will increase their demand for crop insurance as their profitability rises as a

result of improvements in the technical and financial services provided to them. The advent of large-scale agribusiness firms to these geographic areas has been accompanied by the development of services and infrastructure for crop production originally targeted to meet the needs of big farmers.

■ *Geographic areas where agricultural insurance is not consolidated*

The geographic areas where agricultural insurance is available, but still not consolidated, offer an enormous potential for development of crop insurance.

Although crop insurance has been available for many years in most countries in these areas, it has never been consolidated, as evidenced by an average penetration rate of 2 percent. The main opportunity for expansion is through tailoring products to meet the risk transfer needs of export-oriented large-scale agribusiness enterprises. There is a well-developed export-oriented specialty-crop industry along the Pacific coast of South and Central America. Chile has a well-positioned commercial farming sector producing table grapes, avocados, and berries for the Asian and U.S. markets. Peru, which has a booming asparagus production sector, is becoming an important player in this specialty crop. Multinational large-scale agribusiness firms specializing in tropical fruit are found throughout the region from Ecuador to Mexico. The large-scale agribusiness enterprises that produce specialty crops for export operate in a very competitive market characterized by rigorous standards, in terms of both volume and quality, and demand highly sophisticated insurance products. Their risk transfer needs encompass not only production risks, but also the quality of their production and business interruption; in some cases, they also require coverage for inland, marine, cargo, and product recall embedded in a single insurance policy. The provision of such comprehensive insurance coverage is very challenging for the insurance sector, for several reasons: (a) the existence of complex production systems makes the monitoring and the loss adjustment process very difficult and onerous; (b) the accumulation of significant risk in relatively small areas is problematic, as the production of specialty crops is restricted to specific valleys or microclimates; and (c) the insurance industry lacks expertise in underwriting these complex risks and performing the complex loss adjustment involved in insuring specialty crops.

■ *Geographic areas where agricultural insurance is not available yet, but has potential for development*

In many of the geographic areas where crop insurance is not yet available, there are opportunities to develop agricultural insurance for commercial and semi-commercial farmers. Some commercial farms situated in the high-altitude valleys of the Andean region of Colombia, República Bolivariana de Venezuela, and Ecuador, in the coastal areas of northeastern South America, and in the countries of the Caribbean region present opportunities. The common feature of crop production in these geographic areas is the

coexistence of well-developed market-oriented agriculture firms with traditional subsistence or semi-commercial farms. While the risk transfer needs of market-oriented commercial agriculture firms can be met by the private insurance industry, the risk transfer needs of semi-commercial and traditional subsistence farmers should be met by market-based risk transfer mechanisms promoted by the public sector through public-private partnerships. In that regard, government catastrophic coverage is one option for providing crop insurance to these segments of farmers. Additionally, in the case of semi-commercial farmers and certain types of idiosyncratic risks, governments could promote the establishment of insurance mutuals in order to pool risks among a group of farmers.

■ ***Geographic areas where agricultural insurance is not available yet and has low potential for development***

In other geographic areas where crop insurance is not yet available and rural poverty is high, the potential for crop insurance is likely to be very limited.

These geographic areas comprise the high-altitude mixed-farming systems of central Andes (step valleys of the Andean mountains in Peru and the *altiplano* in Peru, Bolivia, Chile, and Argentina), the dry-land mixed-farming systems in northeastern Brazil and Yucatán peninsula in Mexico, and the maize-beans farming system in Central America. These areas share common features that pose serious difficulties for the development of crop insurance. First, the environment for the provision of crop insurance is too complex. Second, these areas are characterized by a large population of traditional subsistence and semi-commercial farmers whose farms are distributed on a scattered basis. Third, there is a lack of information, including crop production statistics, historical weather records, and records of events that have affected production in the past. Under these circumstances, developing a reliable crop insurance program becomes very challenging, and the private insurance industry may not be willing to do so on its own. The government provision of catastrophic insurance products, either index based or traditional, has been shown to provide suitable cover for small farmers in LAC. Catastrophic crop insurance provides macro-level coverage to governments at the state or federal level. Under catastrophic crop coverage, the government is the policyholder. The government pays the insurance premium and receives the payouts from the insurance company in case of a claim. The government sets out the payment rules for farmers who are benefiting from the catastrophic fund. Crop insurance funds have been successfully running for almost a decade in Mexico. In 2008, the government of Peru implemented crop catastrophic insurance in five departments of the country. As of 2010, more than 8.5 million hectares of crops are insured under crop catastrophic insurance in Mexico and Peru.

Livestock insurance

There are opportunities to develop livestock insurance in the region. LAC is an important region for the production of cattle, poultry, pigs, and sheep. Cattle stocks in LAC amount to 392 million head, which is almost one-third of global cattle stocks. Poultry production is also very important, and poultry stocks in the region amount to 2.55 billion head, 15 percent of global stocks. The region also has important pig and sheep stocks. Pig stocks amount to 76 million head, 8.4 percent of global stocks. Sheep stocks amount to 84 million head, 7.6 percent of global stocks.

Growth in the provision of livestock insurance will be accompanied by the design of better products. The supply of comprehensive livestock insurance in some countries is expected to grow in the short term, as the factors responsible for the failure of livestock insurance markets are expected to be resolved. Many governments are introducing policies to enforce compliance with the requirements of their export markets that aim to enhance the development of livestock insurance. In that regard, governments are implementing animal-tracing policies and strengthening their animal health and control systems to maintain their share of and access to beef export markets. It is expected that the adoption of these policies will boost the demand for livestock insurance. The implementation of animal-tracing policies will solve part of the market failures in livestock insurance markets. Microchip technology is expected to overcome many animal identification problems, to detect preexisting problems with animals, and to ease the monitoring of some livestock management practices. The strengthening of animal health care and prevention policies will result in better mandatory control of animal husbandry practices implemented by herders, including vaccination programs. Therefore, the insurance industry should feel more confident of the animal health and husbandry practices implemented by farmers and be willing to offer comprehensive livestock coverage. By implementing such mechanisms, governments are assuming liability in connection with the forced slaughter of animals in case of an outbreak of epizootic disease. In addition to the cost of forced slaughter, governments are facing a huge exposure due to the eventual business interruption caused by the closing of markets (ban on exports) following an outbreak of epizootic disease. In countries where proven animal health care and prevention protocols are in place, both situations represent an opportunity for the insurance sector. Several countries are implementing animal health care and prevention protocols to control epizootic diseases. Chile, Argentina, Mexico, Uruguay, and Brazil are ahead in the implementation of these protocols.

Poultry and swine insurance also offer a promising opportunity in LAC. Insurance products for these classes of animals are not developed. There are a few exceptions, including tailored swine insurance in Mexico to cover classical swine fever. Poultry production is generally not covered, although there is some evidence that some property insurance

policies are covering poultry production as contents of insured buildings. The development of tailored insurance coverage for intensive poultry production is challenging. However, given the potential opportunities, it would be worthwhile for the industry to explore the possibilities of developing an insurance product for poultry production at least.

Forestry insurance

LAC region offers several opportunities to develop forestry insurance. The region has a significant potential for forestry insurance, targeting both standing timber plantations and natural forest. Traditionally, forestry insurance has been offered exclusively for commercial plantations of standing timber. Forestry insurance for commercial plantations of standing timber has reached significant levels of penetration in the region. Almost 19 percent of plantations are currently insured, but, out of the 12 million hectares of commercial forestry in the region, 9.7 million hectares (or 80 percent of total commercial forest area) are not insured.

The expected improvement in product design for plantations of standing timber will enhance the uptake of forestry insurance. Forestry insurance is mostly well developed for covering fire and wind perils in pines and eucalyptus commercial plantations in temperate climate areas. Although the level of coverage is good, these areas provide opportunities for further development. For instance, in Brazil and Argentina more than 5 million hectares of commercial forestry plantations are not currently insured. In contrast to the significant penetration of forestry insurance in temperate climate areas, forestry insurance is almost nonexistent in tropical areas. To date, the insurance industry has been unable to develop suitable forestry insurance products to cover the risks faced in tropical areas, such as tropical storms, floods, and diseases. More than 4 million hectares of commercial plantations in tropical areas are not insured in LAC. The development of suitable forestry insurance coverage for these plantations will certainly expand the uptake.

The development of suitable forestry insurance products to be used as collateral for reducing carbon dioxide emissions from deforestation and degradation (REDD) credits is an opportunity for forestry insurance. REDD credits are being considered as a way for countries, companies, and individuals to offset their emissions by preventing deforestation and the release of stored carbon dioxide. Brazil, Peru, and Mexico are leading the development of REDD projects in the region. In order to offer risk transfer solutions for REDD projects, the insurance industry still has to address the following issues related to product development: (a) how to value the sum insured and (b) how to match the period of insurance with the maturity of the bond.

Aquaculture insurance

There are several opportunities to develop aquaculture insurance in the region.

Many LAC countries have developed professional aquaculture sectors that produce for very demanding markets using international best practices. Aquaculture production is a significant economic activity in Chile (one of the main salmon-exporting markets in the world), northeastern Brazil, northern Peru, Ecuador, Colombia, República Bolivariana de Venezuela, Central American countries, and Mexico. However, so far, aquaculture insurance has been scaled up only in Chile and Mexico. Currently, more than 930,000 tons of fish stocks are not insured in the region.

Shrimp and tilapia production offers an opportunity to develop aquaculture insurance.

Shrimp production amounts to 450,000 tons a year, concentrated in Mexico, Ecuador, and Brazil. Aquaculture insurance, however, has been scaled up only in Mexico, where approximately 10,000 hectares of the 70,000 hectares of shrimp farms are insured. Tilapia production amounts to approximately 170,000 tons a year, concentrated mainly in northeastern Brazil, Honduras, Colombia, and Ecuador. Currently, the provision of aquaculture insurance for tilapia production is limited to isolated facultative insurance policies. The low penetration of aquaculture insurance for shrimp and tilapia production indicates that there is huge potential for the development of insurance products for these species.

There are still opportunities for enhancing aquaculture insurance in Chile.

Aquaculture insurance in Chile focuses mainly on providing risk transfer solutions for medium- and large-scale salmon aquaculture firms. However, some niches in the Chilean aquaculture industry have not yet been fully serviced, including small-scale fish farms. In addition, the development of aquaculture insurance products for mussels and other mollusks offers considerable potential.

The development of aquaculture insurance must be accompanied by capacity building.

Aquaculture insurance is a very specialized and technical agricultural insurance subline. The insurance industry in most of the countries lacks specialized underwriters and loss adjusters. Therefore, surveyors and loss adjusters have to be hired from overseas, increasing the costs of providing aquaculture insurance and limiting uptake to large-scale aquaculture firms. This situation could be reversed if the industry would invest in developing local capacity to write aquaculture risks and to perform loss adjustments.

CHALLENGES FOR THE DEVELOPMENT OF AGRICULTURAL INSURANCE IN LAC

The process of promoting and enhancing agricultural insurance in the region implies overcoming critical challenges, from both the government and the industry perspectives. These challenges, according to the World Bank agricultural risk management framework, can be classified into four categories: institutional challenges, financial challenges, technical challenges, and operational challenges. Each of the challenges facing governments and the insurance industry as well as the potential solutions to overcome them are discussed below.

Institutional challenges

The development of agricultural insurance requires an appropriate institutional framework. An appropriate institutional framework helps to correct market imperfections that could hamper the emergence of a competitive private insurance market. A wide spectrum of institutional frameworks for agricultural insurance exists in the region, from the weakest institutional frameworks in some countries in Central America and the Caribbean to the most evolved ones, such as in Brazil and Mexico. The expansion of agricultural insurance cannot rely exclusively on market mechanisms. Pure market-based agricultural insurance, as expected, focuses on the most profitable segments of agricultural production. The previous section identified a number of opportunities to develop the market. However, in order to take advantage of those opportunities, significant investments will have to be made in information, infrastructure, training, and capacity building. Investment in these activities is not affordable for the private insurance industry alone, and the support of governments will be needed. In such cases, the existence of an appropriate institutional framework in which the government provides stability and financial capacity to the system and the private sector provides know-how is a key for the development of agricultural insurance.

The development of agricultural insurance requires the promotion of an adequate legal and regulatory framework. The general principles governing the regulation and supervision of general insurance and insurance contracts apply, *mutatis mutandis*, to agricultural insurance. In most LAC countries, the framework regulating agricultural insurance contributes to fostering agricultural insurance. However, in a few countries, particularly those where agricultural insurance is not well developed, such as in most of the Caribbean countries, regulatory issues still hamper development. When there is a reasonable correlation between an index and a particular commercial loss, the legal and regulatory framework should allow index-based products to be classified as insurance products. Index-based insurance has been demonstrated to be a suitable tool for transferring risk, in particular, the production risks facing traditional subsistence and semi-commercial farmers, which are the dominant types of farmers in many areas where agricultural insurance is still not developed.

In several countries, such as Argentina, the regulatory authorities do not recognize index-based products as insurance products. Recognizing index-based risk transfer products as insurance products would benefit traditional subsistence and semi-commercial farmers. Delivering agricultural insurance through channels that deliver other services to farmers has been demonstrated to reduce transaction costs. The insurance law could also allow, subject to proper supervision, cooperatives or financial institutions such as microfinance institutions to act as insurance agents.

The role of coinsurance pools in agricultural insurance may offer an opportunity for insurance companies to share the very high start-up costs of new programs.

The development of agricultural insurance is complex and costly; thus access to technical and financial assistance for development is desirable. Although many countries have expanded their technical capacity, others have just started. The experience of countries that have been developing agricultural insurance is that this process is long and costly. A critical minimum mass of potential insured and economies of scale are needed for the private sector to make the necessary investments. In addition, the adaptation of any agricultural insurance scheme is, in most cases, subject to costly financial losses that can jeopardize the continuity of such programs. The insurance sector alone does not have sufficient resources to make all the investments needed for a sustainable agricultural insurance scheme. The establishment of agricultural insurance pools is often justified in such circumstances. Agricultural insurance pools, jointly with government assistance, allow the industry to share the start-up and adaptation costs and to reach the economies of scale needed to implement sustainable agricultural insurance schemes.

Agricultural insurance needs to be integrated with other products and services received by the farmers.

International experience shows that it is very difficult to scale up agricultural insurance in isolation from other services the farmers are receiving. Crop producers first want to ensure that they have timely access to inputs and, often, credit with which to buy these inputs; only then will they consider purchasing crop insurance. For instance, in Brazil, in spite of the existence of premium subsidies, agricultural insurance did not scale up until the Banco do Brasil started to require commercial farmers to purchase crop insurance as a prerequisite for accessing rural credit. In Chile, a major proportion of the crop insurance sold in the country is linked to loans given either by development rural banks (for example, Banco de Chile) or by integrated agribusiness firms (for example, IANSA). Similarly, livestock mortality insurance schemes can be successfully scaled up where insurance is complemented by vaccination programs and intensive support and training in improved livestock husbandry and management, such as coverage for classical swine fever in Mexico. The integration of agricultural insurance with other products and services received by the farmers becomes critical when the objective is to provide insurance to traditional subsistence and semi-commercial farmers.

Financial challenges

The promotion of a cost-effective layering of agricultural production risks is needed. Risk layering should be seriously considered in the design of schemes. In risk layering, small and recurrent risks are often retained by farmers or groups of farmers, less frequent but more severe losses are transferred to the domestic insurance industry, and catastrophic losses are transferred to the international reinsurance market, possibly backed by governments. There are several examples in the region where groups of farmers have organized themselves to pool agricultural risks, for example, the *fondos de aseguramiento* in Mexico and the hail mutual funds in Uruguay, Argentina, and southern Brazil. The insurance industry also has an active role in pooling risk of the sector. In LAC, the liabilities arising out of agricultural business that are retained by the insurance industry average approximately 30 percent of total liabilities. However, these levels of retention vary from 50 percent in Argentina to less than 2 percent in some Caribbean countries. The remaining liabilities (approximately 70 percent of the total) are ceded to the reinsurance industry. Recently, in 2010, the government of Brazil enacted a law creating the Fundo de Catastrofe Rural in which the government is the reinsurer of last resort for liabilities arising out of agricultural insurance. Despite the achievements in this regard, further efforts should be made by governments and the insurance industry to spread the implementation of these practices to all LAC countries.

Domestic insurance companies should be encouraged to pool agricultural risks. Agricultural insurance coinsurance pools have many advantages. The first advantage is that they allow insurance companies to pool their individual agricultural insurance into a more diversified and better structured portfolio and to approach international reinsurance markets in a better negotiating position. A second advantage is that they could play a risk aggregator function, insulating agricultural risks from other lines of business, particularly in low-income countries where the domestic insurance industry may have limited risk capital to sustain catastrophic agricultural losses. A third advantage is that they allow insurance companies to dilute the huge cost of developing new products. In spite of the advantages and the attempts that have been made to create them in several countries of the region, such as in Chile and Colombia, few pools are currently operating in the region (Argentina). If governments and the insurance industry are interested in expanding agricultural insurance in the region, the promotion of coinsurance pools has to be considered seriously when designing agricultural insurance schemes.

Governments' participation in risk financing on the top layers of catastrophic risk is needed to complement reinsurance markets. Governments can act as reinsurers or lenders of last resort through contingent loans. Governments can play an important role in supporting reinsurance programs. As reinsurers of last resort, governments can play a role

in (a) providing reinsurance capacity when this capacity is not available or is too expensive, (b) reducing the cost of reinsurance by putting a ceiling on the liabilities to be assumed by the reinsurer, and (c) lowering the agricultural insurance premium rates to be paid by the farmers. In Brazil, the government recently enacted a law creating the Fundo de Catastrofe Rural, which aims to provide government-funded catastrophic stop-loss protection for local insurers writing agricultural insurance business. The participation of the government as reinsurer of last resort is potentially very important for countries exposed to catastrophic risk in their agricultural sectors, such as the Caribbean, Central American, and Andean countries, if such catastrophic risk is well managed and financed.

The role of agricultural insurance premium subsidies needs to be redefined.

In several countries, these subsidy schemes, as they currently operate, are not financially sustainable either in the short term or in the medium to long term. Most of the agricultural premium subsidy schemes were designed based on “low” uptake ratios in the initial phases of development. In the initial phases of development, the fiscal budgets deployed for agricultural insurance premium subsidies were overestimated and not consumed in full. Because of this fact, several countries relaxed the conditions for accessing premium subsidies by (a) increasing the level of premium subsidies, (b) raising the ceiling on the total amount of subsidy that each individual insured (farmer) is allowed to receive, or (c) incorporating new agricultural activities as eligible for subsidies. Additionally, in some countries the subnational governments have started to complement the federal government’s agricultural insurance premium subsidies. As a result, agricultural insurance has become much more attractive to farmers, and the demand for agricultural insurance has been much higher than anticipated. Governments are realizing that the fiscal resources available for premium subsidies—at the current levels of agricultural insurance—are not sufficient to satisfy the demand and, at the same time, they are unable to cover the market at the current growth rates. Another factor is that, in many countries, the levels of premium subsidies are defined based on a single premium subsidy level. A single premium subsidy level is, however, a very blunt policy instrument if the government is trying to promote agricultural insurance to specific target groups (such as small farmers), specific crops (such as export cash crops, which small farmers can switch into to increase farm incomes), and specific geographic areas (such as disadvantaged or poor regions where farmers are in much greater need of financial support). However, in some countries such as Costa Rica, governments have developed variable premium rates for different types of farmers, crops, and regions, and it is suggested that other countries should consider modifying their premium subsidy programs along similar lines.

Technical challenges

Proper assessment of production risks, linked to ongoing product development, is a precondition for development of a sustainable agricultural insurance market.

Risk assessment that analyzes and quantifies production risks is a critical first step in trying to improve agricultural risk management. Catastrophe modeling offers new tools to assess the economic impact of extreme events affecting agricultural production. Very often, production risks and their financial impacts are underestimated or misdiagnosed, leading to insurance programs that are inappropriate and ineffective for market players. The assessment of risk exposures arising out of the agricultural sector and the development of proper agricultural risk models to determine the probable maximum loss (PML) curves for the main sectors of agricultural production is a key to enabling governments to develop adequate agricultural risk management policies and agricultural insurance. To date, the development of catastrophic risk models for agricultural activities has been somewhat weak. Many of the programs currently in place are based on good rating procedures; however, few of them have a proper way to assess PML. The implementation of proper measures to control the accumulation of risk is still a challenge for the industry and should be addressed if the objective is to expand agricultural insurance coverage.

Better agricultural and weather information services and infrastructure are needed. Proper assessment of agricultural production risks and the design of actuarially sound agricultural insurance products rely on the availability of agricultural production and weather data. In addition, the availability of reliable and timely weather and production data is essential for the development of weather and area-yield index-based products, respectively. National statistics offices have an essential role in collecting agricultural data, not only for policy purposes, but also for insurance purposes. The national weather service also plays a central role in providing weather data to the industry. A relatively dense network of tamper-proof weather stations is essential for the development of weather index insurance products. If the objective is to promote agricultural insurance in the region, governments should play an active role in providing proper agro-meteorological information to the insurance industry.

Additional support for research and development of innovative agricultural insurance products and services is needed. In most countries, there is still a severe overreliance on the use of standard MPCI cover for all crops, farmers, and regions; alternative named-peril and index-based products are needed. MPCI programs have been implemented in several developing countries with limited success. MPCI products are complex and require heavy monitoring in order to mitigate moral hazard and adverse selection. Therefore, they are not geared toward small and marginal farmers. Innovative products, such as index-based insurance, as well as alternative channels of delivery, such as rural banks and farmers groups, should be promoted. Governments in the region can assist private sector crop insurers by financing research and development into new products and programs suitable to meet the demand for risk transfer solutions that are not being met by the products available in the market today. Mexico is a good example: both Agroasemex and private insurers have made

major investments in developing a wide range of crop (and livestock) insurance products to fit different circumstances.

Agricultural insurance products should be tailored to the targeted clients. Universal programs have proven to be inefficient: there is no “one size fits all” solution. Insurance policies should be designed with regard to the types of perils, farmers, and agricultural activities, the existing delivery channels, the availability of trained loss adjusters, and fiscal resources available to support agricultural insurance. No one product is better than the others, and different types of products are most suitable in different contexts. MPCI is efficient when the insurer can closely monitor (in a cost-effective fashion) the farming practices and when the risks to agricultural production can be minimized. These criteria are met mainly by large commercial farms that control their risk exposure. Named-peril crop insurance (such as for hail and frost) has proven to be commercially viable for sudden and unforeseen losses that are relatively easy to assess through simplified and objective systems of damage-based loss adjustment. Area-yield index crop insurance is most suited to combinations of crops and hazards in which a series of more complex perils simultaneously affect a crop in a particular region. Area-yield index crop insurance requires, however, an efficient crop-yield sampling and loss adjustment system. Weather index crop insurance offers some promise, but only for certain hazards, such as drought, wind, or frost, that have a direct and simple impact on crop-yield losses. Effective weather-based crop insurance products are difficult to design if losses are caused by a complex interaction of weather variables. Livestock insurance faces the same challenges as crop insurance. Livestock accident and mortality insurance is effective when combined with veterinary services. Epidemic diseases are more difficult to cover, as they can cause catastrophic losses.

Operational challenges

Capacity building is needed in operational procedures for designing and administering agricultural insurance. The development of operational procedures in agricultural insurance is complex and requires specific expertise. Although in many countries this expertise has been developed, in others it is lacking. The countries that lack local expertise have to rely on costly services that are sourced from overseas, so if agricultural insurance is to be promoted, governments should facilitate access to international good practice on underwriting, policy terms and conditions, and loss adjustment procedures. In countries with developed agricultural insurance markets, such as Argentina, private insurers that are concerned with the future of agricultural insurance have signed agreements with universities in order to include courses related to agricultural risk and agricultural insurance in agricultural sciences curricula.

The development of the agricultural insurance market should focus on standard products that are simple to administer. Indemnity-based insurance is viable when insurance companies can discriminate between policyholders (to avoid adverse selection) and monitor them (to avoid moral hazard). In addition, this type of insurance product pays out based on the actual loss suffered by the insured and therefore requires on-site loss assessments. In agriculture, loss assessment procedures can be complex and often crop specific. Loss adjustment procedures can be expensive and require close supervision. Indemnity-based products are suitable for well-defined perils (such as hail) and for large farms so that monitoring costs are acceptable in relation to the overall commercial premium. Index-based insurance can partly avoid informational asymmetries and does not require individual loss adjustment, but it exposes the policyholder to basis risk. Standard agricultural insurance products are needed when the objective is to provide insurance to small and semi-commercial farmers.

Agricultural insurance should be bundled with existing services or networks operating in the rural sector. Delivering and servicing agricultural insurance in rural areas, particularly to scattered small and marginal farmers, can be very expensive and can significantly affect the commercial premium. These costs can be high whatever the type of insurance offered (for example, indemnity based or index based). Governments should promote the role of intermediaries (for example, marketing groups, cooperatives, banks, and mutual groups) that can aggregate clients and risks and service the products at low costs.

Cooperatives, producer associations, rural banks, and microfinance institutions should be promoted as delivery channels for agricultural insurance. These institutions can play an important and low-cost role in delivering agricultural crop and livestock insurance products to small farmers, in particular. They operate at very low overhead costs compared with private commercial insurance companies and could form the basis for future development and scaling-up of agricultural insurance provision in these and other developing countries. In the region, a leading example of the use of partnerships for delivering agricultural insurance is the partnership in Brazil between the insurance company Aliança do Brasil and Banco do Brasil.

Promoting the use of agricultural risk management technical support units (TSU) in start-up situations is needed. In start-up situations where market infrastructure is not yet developed, a TSU could be established to provide specialized services to agricultural insurance companies and other risk-pooling vehicles. This unit should have the support of the government, the insurers, and the reinsurers. The TSU could be either a stand-alone entity or hosted by an insurance provider (such as an agricultural insurance pool or a monopoly insurer). The TSU would aim to (a) create a center of expertise able to support the development and scaling up of agricultural insurance; (b) establish a core team of agricultural insurance experts to provide technical support to agricultural insurers in underwriting, product

development, pricing, product delivery, loss adjustment, and catastrophic risk financing; (c) create and manage a centralized database of agricultural statistics (crop, livestock, forestry, aquaculture) and weather statistics, with the purpose of making this database available to agricultural insurance practitioners; and (d) promote the exchange of expertise among insurance companies and access to international best practice through training courses, operating manuals, and other means.

5. FINAL REMARKS

Agriculture is an important sector in many LAC countries, from both an economic and a social point of view. The agricultural sector contributes 5.5 percent of GDP of the economies of the region and 15.6 percent of total exports in the region. However, its contribution is much higher when considering linkages to the agribusiness and food services sectors. The agricultural sector in Latin America and the Caribbean (LAC) is also relevant from the social point of view.

Agricultural production faces a myriad of risks in the region. Owing to the occurrence of weather events, pests, and diseases, agricultural producers cannot predict with any certainty the amount of output that the production process will yield. Agricultural producers can also be hindered by adverse events during harvesting or collecting that may result in production losses. The perils faced by agricultural production in the region vary among geographic areas. Certainly, all the geographic areas in LAC face risks that can be catastrophic for agricultural production.

Agricultural insurance is just one risk management financial tool that is used by agricultural producers in the region to transfer the risks they face. Farmers and governments have devised risk management strategies to deal with agricultural production risks. These strategies can be divided into informal and formal risk management strategies. The management of agricultural production risks in the region relies on a combination of technical and, when they are available, financial tools.

Overall, agricultural insurance has reached fairly good levels of development in many LAC countries. Agricultural insurance is available in most countries in the region, and the industry offers a comprehensive range of agricultural insurance products. The level of penetration of agricultural insurance, except for livestock insurance, is reasonably high. Total direct agricultural insurance premiums written in LAC during 2009 amounted to US\$780 million, accounting for 4 percent of global agricultural insurance premiums.

Governments in the LAC region are already playing an important role in supporting agricultural insurance. The main roles assumed by governments in supporting agricultural insurance is the provision of premium subsidies and the purchase of catastrophic agricultural insurance products. The total fiscal expenditures in supporting agricultural insurance in 2009 amounted to US\$326 million or 42 percent of total agricultural insurance premiums written that year. Brazil and Mexico account for 90 percent of total regional government expenditures to support agricultural insurance.

The region, however, still has several gaps in the provision of agricultural insurance.

Although the region has made good advances in the development of agricultural insurance, it still has a long way to go to develop fully its agricultural insurance market. The size of the gap in the provision of agricultural insurance varies by geography. Where the agricultural sector is more developed, the gap in the provision of agricultural insurance is smaller.

Agricultural insurance has enormous room for growth in LAC region. The gap in penetration in agricultural insurance represents an opportunity for the insurance industry. Assuming the current terms and conditions of insurance policies, it is estimated that the total agricultural insurance premiums in the region will increase US\$65.3 million for each percentage point of increase in insurance penetration rates across all types of agricultural insurance.

The region still presents several opportunities for the development of crop insurance. Several agricultural activities and geographic areas in the region are still not served by agricultural insurance. In this regard, opportunities exist to enhance the current portfolio of crop insurance products and meet the demand for agricultural insurance, to tailor products to the risk transfer needs of different participants in the agribusiness value chain, and to develop macro-level crop insurance products to meet the government's need to transfer risk related to the implementation of disaster relief assistance programs for farmers. For instance, the insurance industry has not yet designed crop insurance products to transfer the high-risk exposures faced by producers of specialty crops in the region. Additionally, the industry (besides the provision of catastrophic insurance for governments) has not yet designed crop insurance products suited to transfer the risk faced by the vast majority of semi-commercial or traditional subsistence farmers in LAC.

The introduction of policies to enforce livestock production compliance with the requirements of export markets will enhance the development of livestock insurance in the region. This will occur for two reasons. First, as a result of the strengthening of animal health care and prevention policies in LAC countries, the insurance industry will be willing to offer comprehensive livestock coverage. Second, the LAC governments that implement such policies will assume liabilities in connection with the forced slaughter of animals in case of an outbreak of epizootic disease. In addition to the cost of forced slaughter, governments will also face a huge exposure due to the business interruption caused by the closing of markets (ban on exports) following an outbreak of epizootic disease. Both situations, in countries where proven animal health care and prevention protocols are in place, represent an opportunity for the insurance sector in the region.

LAC region offers several opportunities to develop forestry insurance. An opportunity exists to develop suitable forestry insurance products to transfer the risk faced by forestry

plantations situated in tropical climates. To date, forestry insurance in LAC has focused almost exclusively on transferring the risks (mainly, fire and wind) faced by commercial plantations of standing timber in Chile, Argentina, Uruguay, and Brazil. However, the insurance industry has been having relatively limited success in developing suitable forestry insurance products to transfer the risk faced in tropical areas by plantations of standing timber, such as tropical storms, floods, and diseases. The development of suitable forestry insurance products to be used as collateral for reducing carbon dioxide emissions from deforestation and degradation (REDD) credits is another promising area for forestry insurance.

Opportunities exist to develop aquaculture insurance in the region. Many LAC countries have developed professional aquaculture sectors that produce for demanding markets using international best practices. Aquaculture production is a significant economic activity in northeastern Brazil, northern Peru, Ecuador, Colombia, República Bolivariana de Venezuela, Central American countries, and Mexico. However, so far, aquaculture insurance has been scaled up only in Chile and Mexico.

The development of agricultural insurance in LAC will require governments and the insurance industry to overcome several challenges. In order to explore the opportunities for the development of agricultural insurance in the region, institutional, operational, technical, and financial challenges will need to be overcome. The types of challenges will be different in different countries and geographic areas in the region. There is no one-size-fit-all strategy for overcoming the challenges facing the development of agricultural insurance in LAC.

The development of agricultural insurance in LAC requires a long-term public-private partnership (PPP) effort. International experience shows that it takes a long time to develop a comprehensive series of sustainable agricultural insurance products that are attractive to farmers. The process of promoting and enhancing agricultural insurance in LAC countries will demand significant efforts both from the insurance industry and from governments. PPPs are needed, along with direct government support, to foster agricultural insurance. The private insurance industry in isolation will not be able to overcome all of the challenges facing the development of agricultural insurance in the region. This is particularly true in countries with poorly developed infrastructure for the development of agricultural insurance and agricultural insurance markets.

The institutional framework for agricultural insurance in the region should be strengthened. Fostering agricultural insurance will require the promotion of an adequate legal and regulatory framework. Although in most LAC countries, the existing regulatory framework helps to foster agricultural insurance, regulatory issues in a few countries (such as some Caribbean countries) are still hampering development of the industry. The promotion

of coinsurance pools that allow the industry to share the start-up and adaptation costs and to reach economies of scale will help to foster the development of agricultural insurance. The integration of agricultural insurance with other products and services received by the farmers becomes critical when the objective is to provide insurance to traditional subsistence and semi-commercial farmers.

The implementation of appropriate risk financing strategies is critical for the development of agricultural insurance in the region. Farmers groups and insurance companies should be encouraged to pool agricultural risks. There are several examples in the region where farmers groups and insurance companies have organized themselves to pool agricultural risks. Further efforts should be made to spread the implementation of such practices to all LAC countries. Government participation in risk financing on the top layers of catastrophic risk should also be promoted to complement reinsurance markets, particularly in countries where agricultural production faces catastrophic risks.

Governments and the private insurance industry need to overcome technical challenges for the sustainable development of agricultural insurance markets in LAC. The assessment of risk exposures arising out of the agricultural sector and the development of proper agricultural risk models to determine the probable maximum loss curves for the main sectors of agricultural production are keys to enabling governments to develop adequate agricultural risk management policies and to promote the development of agricultural insurance. The implementation of proper measures for controlling the accumulation of agricultural risks is still a challenge for the industry in the region. This challenge should be addressed if the objective is to expand agricultural insurance in the region, in particular, to those agricultural activities with high risk exposures such as high-value crops, aquaculture, and forestry. The proper assessment of agricultural production risks and the design of actuarially sound agricultural insurance products rely on the availability of agricultural production and weather data. Governments should invest in better agricultural and weather information services and infrastructure. Support for research and development of innovative agricultural insurance products targeting traditional subsistence and semi-commercial farmers is needed in the region. Governments can play an important role in assisting private sector crop insurers by financing research and development into new products and programs that are suitable to meet the demands for risk transfer that are not being met by the products available in the market.

Operational challenges are still limiting the development of the agricultural insurance market in the region. The development of operational procedures in agricultural insurance is complex and requires specific expertise. Although many countries have developed this expertise, others have not. In these countries, if agricultural insurance is to be promoted, governments should facilitate access to international good practice on

underwriting, policy terms and conditions, and loss adjustment procedures. The focus should be on standard agricultural insurance products, which are simple to operate. Such products are needed if the objective is to provide insurance to small and semi-commercial farmers. Agricultural insurance should be bundled with existing services or networks operating in the rural sector in order to dilute the transaction costs involved in its provision. The creation of technical support units for agricultural insurance should be promoted.

An additional challenge for the development of agricultural insurance in the region is the fiscal capacity to sustain the current levels of government support to agricultural insurance. LAC agricultural insurance markets have been growing rapidly in recent years, fueled mainly by public sector support, both through agricultural insurance premium subsidies and through direct participation in purchasing catastrophic agricultural insurance for small farmers. Governments in the region have been able, so far, to afford the current levels of financial support. However, it is uncertain whether they will be able to maintain those levels of support if the market continues to grow at the current rates.



BIBLIOGRAPHY

Agroasemex. 2009. *Programa del seguro para contingencias climatológicas: Informe de avance al cierre del ejercicio fiscal 2009*. Querétaro, Mexico: Agroasemex.

———. 2010. *Programa del subsidio a la prima del seguro agropecuario: Informe de avance al cierre del ejercicio fiscal 2009*. Querétaro, Mexico: Agroasemex.

Anderson, J. 2001. "Risk Management in Rural Development: A Review." Rural Strategy Background Paper 7, World Bank, Washington, DC.

Arias, D., and K. Kobarrubias. 2006. *Seguros agropecuarios en Meso America: Una oportunidad para desarrollar el mercado financiero rural*. Washington, DC: Inter-American Development Bank.

Cabrales, M. 2010. "Desafíos técnicos y estructurales para el desarrollo del seguro agropecuario en Brasil." Paper presented at the eleventh meeting of the Asociación Latinoamericana para el Desarrollo del Seguro Agropecuario (ALASA), "El seguro agrícola en América: Logros y desafío," Cartagena de Indias, Colombia.

Celaya del Toro, V. 2010. "El uso de los seguros catastróficos para atender daños por contingencias climatológicas en el sector agropecuario de México." Paper presented at the eleventh meeting of ALASA, "El seguro agrícola en América: Logros y desafíos," Cartagena de Indias, Colombia.

Cullen, J., M. Tüller, and J. Trueb. 2009. "Betting the Farm? Agricultural Risk in Brazil." Swiss Re Company.

ECLAC (Economic Commission for Latin America and the Caribbean). 2008. *Anuario estadístico de América Latina y el Caribe, 2007*. Santiago: ECLAC.

———. 2010. "El potencial acuicultor de América Latina." *Industrias Pesqueras*, May 15. http://www.industriaspesqueras.com/noticias/informes/388/el_potencial_acuicultor_de_america_latina.html.

FAO (Food and Agriculture Organization). 2009. FAOSTAT: FAO Statistical Database 2009. Rome: FAO. <http://faostat.fao.org/>.

FAO and World Bank. 2001. *Farming Systems and Poverty: Improving Farmers' Livelihoods in a Changing World*. Rome: FAO; Washington, DC: World Bank.

Giordano, P. 2006. "La importancia de la Ronda de Doha para la agricultura en América Latina." Paper presented at the workshop "Negociaciones comerciales internacionales en agricultura," Organisation for Economic Co-operation and Development, World Trade Organization, and the World Bank, Buenos Aires.

Guzmán-García, A. 2010. "El seguro agrario en el Perú." Paper presented at the eleventh meeting of ALASA, "El seguro agrícola en América: Logros y desafío," Cartagena de Indias, Colombia.

Hazell, P., C. Pomareda, and A. Valdes. 1992. "The Appropriate Role of Agricultural Insurance in Lower-Income Countries." *Journal of International Development* 4 (6): 567–81.

———. 1986. *Crop Insurance for Agricultural Development*. Baltimore, MD: Johns Hopkins University Press.

Iturrioz, R. 2009. *Agricultural Insurance*. Primer Series on Insurance 12. Washington, DC: World Bank.

———. 2010. "Seguro agropecuario en América Latina: Situación actual, desafíos y oportunidades." Paper presented at the eleventh meeting of ALASA, "El seguro agrícola en América: Logros y desafíos," Cartagena de Indias, Colombia.

Mahul, O., and C. Stutley. 2010. *Government Support to Agricultural Insurance: Challenges and Options for Developing Countries*. Washington, DC: World Bank.

Martínez-Córdova, L. R., and M. C.–J. Martínez Porchas. 2009. "Mexican and World Shrimp Aquaculture: Sustainable Activity or Contaminant Industry?" *Revista Internacional de Contaminación Ambiental* 25 (3, August): 181–96.

Mesquita de Sant'Ana, E. 2010. "Seguro rural en Brasil." Paper presented at the eleventh meeting of ALASA, "El seguro agrícola en América: Logros y desafíos," Cartagena de Indias, Colombia: ALASA.

Methol Petit, M. 2010. "El seguro agrícola en Uruguay: Logros y desafíos." Paper presented at the eleventh meeting of ALASA, "El seguro agrícola en América: Logros y desafíos," Cartagena de Indias, Colombia.

Ministerio de Desenvolvimento Agrario do Brasil. 2010. "Challenges and Opportunities: Brazilian Experience in the Field of Agricultural Insurance." Paper presented at the ninth meeting of the GFDRR (Global Facility for Disaster Reduction and Recovery) Consultative Group, "Agricultural Insurance in Developing Countries," Washington, DC, October 6.

Munich Re Group. 2009. *World Map of Natural Hazards*. Munich: Münchener Rückversicherungs-Gesellschaft.

Ochiuzzi, S. 2010. "Gestión de riesgos agropecuarios en la Argentina: Experiencia y desafíos." Paper presented at the eleventh meeting of ALASA, "El seguro agrícola en América: Logros y desafíos," Cartagena de Indias, Colombia.

OIE (World Organisation for Animal Health). 2007. *Pre-feasibility Study: Supporting Insurance of Disease Losses; Final Report, Part III*. Paris: OIE.

Soto Baquero, F. 2009. "Crisis financiera y financiamiento agropecuario y rural en América Latina: Una mirada más allá del corto plazo." Paper presented at the "Seminario Institucionalidad Agropecuaria y Rural," FAO, Santiago de Chile.

Townsend, R. 2005. "Weather Insurance in Semi-Arid India." Paper prepared for the Commodity Risk Management Group, Agricultural and Rural Development Department, ESW, World Bank, Washington, DC.

Trivelli, C., and H. Venero. 2007. *Banca de Desarrollo para el Agro: Experiencias en curso en Latinoamérica*. Lima: Instituto de Estudios Peruanos.

UNEP (United Nations Environment Programme). 2000. *Global Environment Outlook 2000*. New York: Oxford University Press.

Wenner, M. 2005. *Agricultural Insurance Revisited: New Developments and Perspectives in Latin America and the Caribbean*. Washington, DC: Inter-American Development Bank.

———. 2005. *Natural Disaster Hotspots: A Global Risk Analysis*. Disaster Risk Management Series 5. Washington, DC: World Bank.

———. 2007. *World Development Report 2008: Agriculture for Development*. Washington, DC: World Bank.

———. 2010. *World Development Indicators*. Washington, DC: World Bank.

Annex. Agricultural insurance country fact sheets

Table A.1 Agricultural insurance country fact sheet: Argentina

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
The agricultural insurance market is well developed and has a long history. The use of agricultural insurance is consolidated in Buenos Aires, Santa Fe, Córdoba, Entre Ríos, and La Pampa provinces. However, in the remaining provinces agricultural insurance is far from consolidated.	There are 26 insurance companies that are approved by the insurance regulator to offer agricultural insurance products in this market. Out of them, 23 are private insurance companies, six are cooperatives, and one is a public insurance company. However, out of the 23 companies authorized to offer agricultural insurance, only 10 offer agricultural insurance.	For hail crop insurance, the most important delivery channel is agent brokers who belong to the insurance company network (mainly cooperatives). Private insurance companies do not have a developed network in the countryside and have to rely on retail brokers in order to reach farmers.	Currently, federal government support to agricultural insurance is limited to the provision of technical assistance to provinces and insurance companies for the development of agricultural insurance. The assistance provided by the federal government consists of information and capacity building, product research and development, and risk mapping.	Named-peril	The traditional named-peril coverage is basic hail plus fire insurance. In addition to hail the farmer can elect to cover wind, freeze, excess moisture at harvest, and excess rain. Standard hail coverage has a 6% total sum insured franchise, but several alternatives in terms of franchises and deductibles are available in the market. Original gross rates for hail standard coverage varies from 2% in low-risk areas up to 8% in risk-prone areas. Almost all crops can be insured under this product. The rates vary according to the insured crop, the region, and the selected deductible or franchise level. Additional coverage is only available for wheat, soybeans, corn, barley, and sunflower. Original rates vary depending on the crop, location, and type of additional peril. For example, original gross rates vary from 1 to 3% for freeze and from 1.5 to 2.5% for wind. Deductibles applied for this kind of additional cover can reach 20% of the total sum insured.	1. <u>Crop insurance</u> : High penetration. 137,000 hail insurance policies were issued (45% of farms) spread over 19 million hectares (50% of the total cultivated area).	187,000,000	5,443,000,000
	The two biggest insurers offering agricultural insurance, both cooperatives, account for 39% of written premiums and liabilities. Almost all of the agricultural insurance business is currently reinsured in the international reinsurance market under quota share and stop-loss treaties.	Crop	2. <u>Livestock insurance</u> : Insignificant penetration. Approximately 300 insurance policies cover about 2,000 head of cattle out of an estimated stock of 50 million.					
Forestry insurance started to be offered in recent years. However, the supply of forestry insurance is mostly to big		MPCI and forestry business are placed mostly through retail brokers and cooperatives.	Subnational governments participate actively in managing agricultural insurance schemes. The provinces of Mendoza, Río Negro, Neuquén, Chubut, and Chaco have their own programs in place. In 2009 provincial governments spent US\$5.5 million, both in subsidizing agricultural insurance premiums and in purchasing catastrophic insurance coverage for the subnational (provincial) governments.	MPCI	MPCI is offered only to soybeans, corn, sunflower, wheat, and barley crops. Guaranteed yields under this coverage vary from 40 to 65% of either the actual production history of the zone or the expected yield as it is determined by the insurance company surveyor. The product is offered on an individual basis or on a global MPCI portfolio basis (all crops in all locations). Original gross rates for individual MPCI vary from 4 to 7% of the total sum insured, depending on the crop, region, and coverage level. Original gross rates vary from 1 to 5%, depending on the crop, region, portfolio distribution, and coverage level.	3. <u>Forestry insurance</u> : Approximately 40 insurance policies are issued in the country. The total insured area amounts to 130,000 hectares of standing timber, accounting for 5% of the total man-made forested area in Argentina.		
						4. <u>Remaining lines of business</u> : No penetration. Each line has less than 50 issued policies.		

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
<p>forestry enterprises, and the product has not reached significant levels of penetration in the country.</p> <p>Despite the importance of cattle production in Argentina, the penetration of cattle insurance is insignificant.</p>			<p>At the time of writing, the federal government has presented a bill to parliament for the creation of the Integrated Agricultural Insurance System (SICAF). The SICAF promotes the creation of public-private partnerships for agricultural insurance, including (a) the provision of subsidies for agricultural insurance premiums; (b) the participation of government in the catastrophic risk layers; and (c) information and capacity building in agricultural risk management. SICAF's budget amounts to US\$75 million.</p>	Crop	Despite experiences with both area-yield index and weather index insurance products in the past, no weather index insurance policies are in place in this market. Area-yield index insurance is limited to one facultative policy issued to a large-scale agribusiness firm.			
				Livestock	Livestock insurance covers animal mortality plus some endemic diseases but excludes pandemics and theft. Original gross rates are around 4 to 6%.			
				Forestry	Forestry insurance covers the standing timber value of commercial forestry plantations against fire, wind, hail, and freeze. Additional risk like debris removal and fire-fighting expenses are covered. Valuation criteria in case of indemnities could be formation cost or commercial value, depending on the age of plantation. Coverage is subject to deductibles of 10% of the loss on each and every loss and annual aggregate indemnity limits. Original gross rates vary from 0.3% up to 1% of the total sum insured, depending on the region, type of plantation, protection measures, contingency plans implemented by the insured, and deductibles and indemnity limits.			
				Greenhouse	Greenhouse insurance covers losses on greenhouse structures and contents (crops) due to fire, windstorm, hail, and flood. Deductibles of 10% of the loss apply. Original gross rates vary, depending of the type of structure and the region where the risk is located, but vary from 2 to 6 per mile.			
				Bloodstock	Bloodstock insurance policies cover high-value animals against accidental mortality, mortality during transportation, loss of function, and veterinary and surgical expenses. Deductible and annual aggregate indemnity limits apply, depending on the type of animal, age, and use.			

Table A.2 Agricultural insurance country fact sheet: Bolivia

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
<p>Agricultural insurance was introduced to the country in 2008. Bolivian companies have made strategic alliances with Argentine insurance companies and brokers in order to develop agricultural insurance for the market.</p> <p>Few agricultural insurance mutual schemes promoted by the international donor community are currently in place in Bolivia.</p>	<p>Two insurance companies offer agricultural insurance products in Bolivia.</p> <p>The agricultural insurance business in Bolivia is mainly reinsured by Argentine insurance companies that act as a reinsurer for their counterparts in Bolivia.</p>	<p>The delivery channels for agricultural insurance are insurance brokers and a network of crop input suppliers.</p>	<p>Bolivia may be the only country that addresses agricultural insurance in its constitution (Article 407.4). The government of Bolivia has enacted an ambitious law to promote crop insurance in the country. This law promotes a comprehensive agricultural insurance scheme, aimed to provide MPCl coverage for up to 80 percent of the actual production history (APH) in each of the departments.</p> <p>The law also contemplates the creation of an insurance fund that will be financed by the government, the sectors concerned with agricultural production, and the international community. However, the law does not mention the amount established for such a fund.</p> <p>The law considers the provision of crop insurance premium subsidies, but does not set the amount of such subsidy.</p> <p>Although the agricultural insurance scheme in Bolivia aims to provide insurance coverage for all crops and all regions in the country, crop insurance will initially be offered for potato, rice, corn, wheat, quinoa, and soybean crops.</p>	Crop	<p>Named-peril</p> <p>Not offered</p> <p>Initially MPCl policies are offered basically to cover soybean production (summer and winter crops). Eventually, the product will be offered to other crops. The guaranteed yields under this policy vary from 40 to 60% APH, depending on the crop, region, and guaranteed yield. These products are offered on an individual basis and are linked mainly to input suppliers' loans. The policy covers all types of weather risks and fire, but excludes uncontrollable biological perils.</p> <p>MPCl</p> <p>Original gross rates for individual MPCl vary from 4 to 8% of the total sum insured, depending on the level of coverage, the insured crop, and the region.</p>	Information is not available.	200,000	4,000,000
				Index-based	Weather index-based insurance was offered in the country in 2006. However, not a single policy was sold, and the product was discontinued.			
				Livestock	Animal mortality	Not offered		

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
			The government of Bolivia is advocating the regulation of this law, and none of its benefits has been implemented yet.	Forestry	Forestry insurance covers the standing timber value of commercial forestry plantations against fire and wind damage. Additional risks like debris removal and fire-fighting expenses are covered.			
					Valuation criteria in case of indemnities could be formation cost or commercial value, depending on the age of plantation. Coverage is subject to deductibles of 10% of the loss on each and every loss and annual aggregate indemnity limits.			
					Despite several attempts to introduce forestry insurance in the country, so far, no forestry insurance policies have been issued in Bolivia.			
				Greenhouse	Not offered			
				Bloodstock	Not offered			

Table A.3 Agricultural insurance country fact sheet: Brazil

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Type	Agricultural insurance products		Market volume (US\$)	
					Features	Penetration rate	Premiums	Liabilities
Agricultural insurance was introduced in Brazil in 1955 by the Companhia Nacional do Seguro, a public insurance company that operated until the mid-1990s. In 1998, private insurance companies started to offer hail crop insurance for fruits in southern Brazil.	Nine insurance companies offer agricultural insurance products in Brazil. All of them are private companies.	The delivery channels depend on the line of business.	Since 2005 the federal government has been subsidizing agricultural insurance premiums. Some subnational governments, like São Paulo, have started to complement federal government subsidies.	Named-peril	Named-peril policies are offered for crops, vineyards, fruit plantations, and vegetable crops in Rio Grande do Sul, Santa Catarina, Paraná, and São Paulo states. Hail is the basic covered peril, but for some crops and plantations, freeze or excess rain can also be selected. Original gross rates vary from 6 to 9% of the total sum insured, depending on the deductible level, the type of crop, and the region. For this coverage, a minimum deductible of 20% applies.	1. Crop insurance: Low penetration, but the adoption rate is growing rapidly. In 2009, 6.7 million hectares (10% of cultivated area) were insured. According to information collected for the study, 72,000 insurance policies were issued in 2009.	255,900,000	5,806,000,000
Then in 2003 the companies expanded their line of business to multi-peril crop insurance (MPCI).	The other four companies compete for the remaining market.	For MPCI the main delivery channels are banks, financial institutions, cooperatives, and input suppliers.	Federal government subsidies range from 30 to 60% of the premium, depending on the crop and state of the federation. The federal budget for agricultural insurance subsidization in 2009 was US\$149 million, which, in addition, is complemented by approximately US\$15 million financed by state governments.		MPCI policies are offered for soybean, corn, corn double cropped, peanut, sugarcane, and wheat crops in the states of São Paulo, Mato Grosso, Mato Grosso do Sul, Goiás, Bahia, Minas Gerais, Tocantins, Maranhão, Paraná, Santa Catarina, and Federal District.	2. Livestock insurance: Low penetration. Only 51,000 head of cattle are insured, which represents less than 1% of the national herd.		
This market is growing rapidly, thanks to financial support from the federal government as well as many state governments.	Two companies offer livestock and bloodstock insurance.	The federal government also supports agricultural insurance by sharing part of the catastrophic risk faced by agricultural production in a special PPP fund created with this objective, the Rural Catastrophe Fund (Fundo de Catastrofe Rural).	Federal government manages this subsidy scheme through the Ministry of Agriculture but does not establish the criteria for granting subsidies.	Crop	Guaranteed yields covered vary from 50 to 70% of the actual production history (APH), depending on the crop, region, and guaranteed yield. These products are linked to bank or input supplier loans.	3. Forestry insurance: Low penetration. Only 68,000 hectares out of 5 million forested hectares (less than 2%) are insured.		
Although far to reach maturity, this market is the third agricultural insurance market in Latin America and has enormous growth potential.	Five companies offer forestry insurance. Two of these work exclusively with this product on a facultative basis.	100% of the agricultural insurance business in Brazil is reinsured with international reinsurers and the local reinsurer, the Brazilian Reinsurance Institute (IRB).	The federal government also supports agricultural insurance by sharing part of the catastrophic risk faced by agricultural production in a special PPP fund created with this objective, the Rural Catastrophe Fund (Fundo de Catastrofe Rural). This fund provides stop-loss coverage to private insurance companies offering agricultural insurance. The fund is financed with contributions from the insurance industry, the government, the IRB, and international reinsurers.	MPCI	Covered risks are fire, lightning, drought, floods, excess rain, freeze, excessive heat, and wind. Pests and diseases are totally excluded.			
Crop insurance is the main agricultural insurance product and accounts with 92% of premiums.					Original gross rates for individual MPCI vary from 2 to 8% of the total sum insured for coverage levels of 50% of APH and from 4 to 10% for coverage levels of 70% of APH. Original gross rates vary, depending on the crop and the region.			

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)		
				Type	Features	Penetration rate	Premiums	Liabilities	
Livestock and bloodstock insurance is the second most important product, with 3% of total market premiums. Forestry insurance, which started in 2004, is the third most important product, with 2% of total market premiums. In addition to the commercial farmers' agricultural insurance public-private partnership (PPP), the federal government has implemented PROAGRO (Brazilian Guarantee Program) and SEAF (Insurance for Family Agriculture).				Index-based	Area-yield index-based insurance was introduced in the state of Rio Grande do Sul in 1998. This insurance indemnifies insured farmers when the average yield as determined by the Instituto Brasileiro de Estadísticas for the municipality where the insured farm is located falls short of a guaranteed yield equivalent to 80% of APH in each municipality. So far, the only crop insured is corn in Rio Grande do Sul. The minimum original gross rate for area-yield index-based MPI is 3.54%. In 2010 a large-scale agribusiness firms bought area-yield index insurance to protect its portfolio of crops and farms.				
				Crop					
				Livestock and bloodstock	Cattle, goats, sheep, horses, and pork can be insured. Basic livestock insurance covers death arising from accident, diseases, asphyxia, electrocution, fire, lightning, poisoning, animal bites, abortion, vaccine inoculations, and slaughter due to public order or medical stipulation. For cattle, insurance also covers deaths due to anaplasmosis and babesiosis, for animals born in endemic zones. Additionally the insured can choose to cover transportation, predation, clinical surgery, and autopsy, fertility, penile hematoma, pregnancy, extension of international territory, and herd cover. Original gross rates vary depending on the type of animal, age, and zone.				
				Forestry	Forestry insurance covers the standing timber value of commercial forestry plantations against fire, wind, freeze, cold wind, hail, and flood. Fire-fighting expenses are also covered. Valuation criteria in case of indemnities could be formation cost or commercial value, depending on the age of the plantation. The insurance coverage is subject to a deductible of 10% of the loss on each and every loss and annual aggregate indemnity limits. Original gross rates vary from 3 per mile up to 1% of the total sum insured, depending on the region, plantation, protection, contingency plans, deductible, and indemnity limits.				

Table A.4 Agricultural insurance country fact sheet: Chile

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
Chilean agricultural insurance, although a relatively new market, is well developed.	Five private insurance companies offer agricultural insurance products in the Chilean market.	The delivery channels depend on the line of business.	Government support for agricultural insurance is limited to supporting crop insurance, mainly for small- and medium-size farmers.	Crop	The standard policy wording insures crops against droughts, floods, frost, wind, snow, and hail for almost all of the annual crops sown in Chile (POL 1 03 062 and POL 1 03 050). Although these policies expressly name the covered perils, the breadth of the perils covered and the fact that the loss appraisals are based on yield mean that this cover behaves in practice as MPCl cover.	1. Crop insurance: Low penetration. 11,900 policies were written, totaling 62,000 hectares (approximately 3% of the total cropped area in the country).	46,000,000	3,900,000,000
The main line of business is forestry insurance, which was introduced in 1990.	Out of the five, two offer crop, aquaculture, and forestry insurance. The remaining three offer exclusively forestry insurance.	For example, for crop insurance the main delivery channels are banks and microfinancial institutions (the Small Farmer Lending Bank and Banco de Fomento) and agricultural industries (such as IANSA for sugar beets).	Insurance for forestry and aquaculture does not receive any type of support from the government.		Almost all annual crops, table grape plantations, and vineyards can be insured under this policy. Insurance companies, jointly with COMSA, have launched a crop insurance product for apples, avocados, and berries. The trend is to incorporate specialty products into the crop insurance scheme.	2. Forestry insurance: High penetration. 600 policies have been issued, covering around 85% of the planted forested area.		
Aquaculture insurance (basically for the salmon industry) started in 1999, and most of the industry is insured locally or under international programs.	All of the insurance companies participating in the crop insurance program are reinsured in the international market under quota share and stop-loss reinsurance treaties.	Forestry and aquaculture business is placed through insurance brokers.	The government supports crop insurance in two ways: (a) crop insurance premium subsidies and (b) support for product research and development and capacity building.	MPCl	Under Chilean MPCl policies, if the actual yield obtained by the insured on a farm is below 66.66% of the actual production history corresponding to the area where the farm is located, the insurer has the right to receive an indemnity equivalent to the percentage of the yield shortfall in respect of the guaranteed yield.	3. Aquaculture insurance: High penetration. 50% of aquaculture centers are insured.		
Crop insurance in Chile dates to 1981, when the Consorcio Nacional de Seguros introduced an individual-grower multi-peril crop insurance (MPCl) yield-shortfall policy. The program was discontinued in 1998 due to lack of demand.	One single-crop insurance business is placed on a facultative basis in the market.	The Chilean market is a broker's market. In other words, regardless of the delivery channel used to approach the farmers, retail brokers manage the relation with the bank, agro industry, or government institution used to deliver the insurance product.	Government actively supports crop insurance in Chile through the implementation of crop insurance premium subsidies. The Chilean scheme targets small- and medium-size farmers. It is based on a single fixed subsidy of approximately 50% of the premium, with a baseline subsidy per policy of approximately US\$96 and a maximum subsidy per person per year of approximately US\$2,340.		Original gross rates vary from 3% up to 9% of the total sum insured, depending on the region, and type of crop or plantation.			
In 2000 a pool of three local commercial insurance companies launched the nationally subsidized MPCl scheme. The pool only operated for two years before the insurers elected to underwrite their business separately.	All of the forestry risks written by the local insurance industry are reinsured on a quota share basis. The insurance companies reinsure all of business with the international market under quota share and catastrophic excess-of-loss facultative and semiautomatic treaties.	The government bureau in charge of implementation is COMSA, which is a subsidiary of the Corporación Nacional de Fomento.	The government actively supports crop insurance expenditures to support crop insurance amounted to US\$3.1 million in 2009.	Livestock and bloodstock		Currently there are no livestock insurance products in the market, and the provision of livestock insurance is very limited for horses.		

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
<p>The Chilean government, through COMSA (Comisión Nacional de Seguro Agrícola, the Agricultural Insurance National Commission), assumes an active role in the enhancement of crop insurance in the country. COMSA manages the crop insurance premium subsidies and authorizes the terms and conditions of the insurance policies that will receive this benefit.</p>				Forestry	<p>Forestry insurance covers the standing timber value of commercial forestry plantations against fire, wind, weight of ice and snow, volcanic eruption, and riots and popular disorder. Fire-fighting expenses are covered. Valuation criteria in case of indemnities could be formation cost or commercial value, depending on the age of the plantation. Coverage is subject to a deductible of 10% of the loss on each and every loss, with minimum deductibles and annual aggregate indemnity limits. For forestry plantations original gross rates vary from 3 per mile up to 1% of the total sum insured, depending on the region, type of plantation, protection measures, contingency plans implemented by the insured, and deductibles and indemnity limits. In the case of large forestry plantations, these rates fall to 0.5 per mile, with deductibles higher than US\$1 million on each and every loss.</p>			
				Aquaculture (salmon fish farms)	<p>Named-peril policies (POL 1 04 004 and POL 1 04 005) cover fish farming business, including the rearing of coho salmon, salar salmon, trout, scallops, and other species of fish, in fresh or saltwater as well fish farming installations on land or in water. The perils covered under these insurance policies are mortality due to disease, algae blooms and phytoplankton, predation and theft, perils of nature, deoxygenating and failure of water or energy supplies, pollution and contamination, collision and impact by vessels, legal strikes, and fire.</p> <p>Deductibles are defined per covered peril as all individual losses caused by a single cause during a certain period of time: (a) 90 and 60 consecutive days for known and unknown diseases, respectively; (b) 30 consecutive days for algae bloom; (c) 74 consecutive hours for the remaining covered perils. Deductibles also vary depending on the covered peril: (a) 20% of the value at risk per</p>			

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
				Aquaculture (salmon fish farms)	site for diseases; (b) 17.5% of the value at risk per site for algae bloom; (c) 30% of the value at risk per cage for theft and predators; (d) 15% of the value at risk per site for natural perils. Market average original gross rates are 2.7% for biomass and 1.5% for equipment.			

Table A.5 Agricultural insurance country fact sheet: Colombia

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Type	Agricultural insurance products		Market volume (US\$)	
					Features	Penetration rate	Premiums	Liabilities
Crop insurance was initiated in 1993, with government enactment of crop insurance legislation (Law no. 69 of 1993). This law provided a public-private framework for crop insurance and authorized the provision of premium subsidies. A pilot insurance scheme for bananas was implemented by the public-sector-owned Caja Agraria in 1998, which has quota share treaty reinsurance provided by various European crop reinsurers. The banana treaty was then transferred to La Previsora (national reinsurer) in 1999/2000 and operated up to 2002, when premium subsidies were withdrawn. In 2007, subsidized crop insurance was relaunched by Mapfre Seguros Colombia, with government subsidies of premiums. Livestock insurance in Colombia started in 2000.	Agricultural crop and livestock insurance is offered exclusively by the private commercial insurance sector. Mapfre Colombia is the only company offering a combination of crop and livestock insurance. An additional company, Compañía Suramericana de Seguros, is about to launch a crop insurance program. Two other companies, Liberty and QBE, underwrite livestock. All the agricultural insurance programs currently in place in Colombia are reinsured, through quota share semiautomatic and facultative treaties, in the international market.	Crop and livestock insurance are delivered through insurance brokers and insurance companies' own network.	Federal government support to agricultural insurance takes two forms: (a) Insurance legislation as contained in the agricultural insurance law no. 69 of 1993 and (b) Crop insurance premium subsidies, which vary from 30% of premium for individual policies to 60% for collective policies. Livestock insurance does not attract any form of premium subsidies or other form of support from government. In 2010, the government of Colombia budget to provide crop insurance premium subsidies amounted to approximately US\$10 million. Out of this budget, only US\$4.2 million is effectively used. Several subnational governments are analyzing the option to purchase insurance to provide catastrophic protection to small and marginal farmers. Such is the case of the government of Quindío Department, which purchases catastrophic coverage for small banana farmers.	Crop	Named-peril policies are offered to insure banana and plantain crops against flood, excess moisture, and wind. Coverage is based on the number of plants dead due to any covered peril. The geographic scope of the program is limited to the departments of Magdalena and Urabá. Deductibles for this coverage are variable and depend on the size of the farm. Deductibles vary from 10% for farms smaller than 20 hectares to 5% for farms larger than 150 hectares.	1. Crop insurance: Low penetration. 9,000 policies have been written, covering 49,600 hectares (approximately 1% of the total cropped area in the country). 2. Forestry insurance: Low penetration. Limited to a few policies.	7,100,000	143,000,000
					Since 2007 Mapfre Colombia has underwritten a multi-peril "loss-of-investment-costs" policy (seguro a la inversión), which can be written either as a loss-of-yield indemnity policy (yield guarantee cover) or as a damage-based indemnity policy (direct damage to plant cover). This product is being offered for a wide range of annual crops, including rice, maize, cotton, sorghum, and tobacco.	3. Aquaculture insurance: Nonexistent. 4. Livestock insurance: Low penetration. 250,000 head of cattle are insured, accounting for 2% of the cattle population in the country.		
					This product gives small-size plantain farmers access to insurance-backed disaster relief assistance from the government. The insured perils under this coverage are drought, excess moisture, hail, wind, landslide, avalanche, freeze, and flood. The sum insured, rather than being defined as a function of the value of the crops, is defined as a sum agreed between the insured and the insurance company. This agreed value for the sum insured is, usually, equivalent to the estimated budget for government disaster relief assistance. The coverage triggers when the average yield of plantain production in the department falls below 40 percent of the actual production	Aggregate MPI crop insurance at the departmental level		

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
				Crop	Aggregated MPICI crop insurance at the departmental level "catastrophic product"	history (APH) for the department. In such case, the insurance policy indemnifies the departmental government for the amount equivalent to the proportion of the yield shortfall times the sum insured.		
					Aggregate MPICI crop insurance at the departmental level	The cost of coverage is fully assumed by the departmental government. The federal government only intervenes by providing subsidies for the premium up to 60%.		
				Index based	A product based on a double trigger between rainfalls used to be measured at a basket of weather stations used as reference for the cover and the actual yield obtained by the farmers; this was in place in the Colombian market for cotton and rice crops during 2006 and 2007. The product was discontinued in 2007.			
				Livestock and bloodstock	This coverage was designed for bond securitization for titles backed by livestock production traded on the Bolsa Agropecuaria in Bogotá. The covered peril is theft, including theft caused by terrorist groups. Several conditions with regard to prevention measures are necessary to be eligible for the insurance. Deductibles are 10% on each and every loss with a minimum of four head of cattle. Original gross rate is 0.74% of the total sum insured.			
				Forestry	Forestry insurance covers the standing timber value of commercial forestry plantations against fire, wind, and other perils. The valuation criteria could be the formation cost or the commercial value, depending on the age of the plantation. Coverage is subject to a deductible of 10% of the loss on each and every loss and annual aggregate indemnity limits.			

Table A.6 Agricultural insurance country fact sheet: Costa Rica

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
<p>Crop insurance was first introduced in Costa Rica in 1970. Two years later, in 1972, a livestock insurance product was released on the market.</p> <p>Costa Rica's insurance market was controlled by a state-owned insurance monopoly, Instituto Nacional de Seguros (INS) until 2008, when the insurance market was opened up to competition.</p> <p>This market offers a diverse mix of agricultural insurance products. Products like multi-peril crop insurance (MPCI), livestock insurance, and aquaculture insurance are offered. Despite the high degree of product diversification, penetration is very low.</p>	<p>Costa Rica had an insurance monopoly until 2008. Although the market is open to competition, only the INS is offering agricultural insurance.</p> <p>All agricultural insurance programs operated by the INS are 100% retained by the insurance company.</p>	<p>The most important delivery channels are the cooperatives, farmers associations, and financial institutions.</p> <p>The Ministry of Agriculture used to deliver crop insurance products to farmers. Retail brokers now play an important role in the delivery of livestock insurance.</p>	<p>Crop insurance in Costa Rica is regulated by the Integral Law of the Insurance of Crops, which was promulgated in 1969.</p> <p>The government of Costa Rica, through the INS, supported crop insurance through premium subsidies for rice, bean, onion, potato, plantain, and corn crops. The average crop insurance premium subsidy is 49% for crops involved in the scheme. The premium subsidies received by the farmers depend on the crop and size of farm. Bean crops receive a 50% premium subsidy, and corn crops receive a 65% premium subsidy. For rice, premium subsidies depend on the farm size: small farmers receive a subsidy of 65%; medium farmers, 55%; and big farmers, 40%.</p> <p>The government has enacted a law creating a fund to provide agricultural insurance premium subsidies. This fund will be financed initially by a contribution from the INS of US\$7.8 million. In addition to this initial contribution, the fund will also be financed through contributions from the insurance companies offering agricultural insurance, agribusiness corporations, financial institutions, and donors.</p>	Crop	MPCI is offered for rice, banana, corn, black beans, sugarcane, peppers, melons, palm, potato, passion fruit, pineapples, watermelon, tobacco, and carrots against perils such as excess moisture, volcanic eruption, water-logging of the soil during harvest (prevention of harvest), hail, fire, floods, weeds, drought, earthquakes, and winds.	1. Crop insurance: As of 2008, the crop insurance penetration was very low, and only 2.2% of the total cultivated area is insured (12,000 hectares).	480,000	7,000,000
				MPCI	The policy wording protects the insured from incurring direct costs on its insured unit. Therefore, the guaranteed yield is equal to the direct investment made by the insured, divided by the agreed price for the insured crop at the beginning of the policy period. The maximum guaranteed yield is 70% of the expected yield (based on average yield in the canton in which the farm is located); this implies a 30% deductible. If the actual yield is less than the guaranteed yield, then the insured receives an indemnity equal to the yield shortfall below the guaranteed yield times the agreed price at the beginning of the policy period. Original gross rates vary from 3 to 8%, depending on the crop and location. Original gross rates are also differentiated by the size of farm.	2. Livestock insurance: No data are available. 3. Forestry insurance: No data are available. 4. Aquaculture insurance: No data are available.		
				Livestock and bloodstock	Since 2007 Mapfre Colombia has underwritten a multi-peril "loss-of-investment-costs" policy (seguro a la inversión), which can be written either as a loss-of-yield indemnity policy (yield guarantee cover) or as a damage-based indemnity policy (direct damage to plant cover). This product is being offered for a wide range of annual crops, including rice, maize, cotton, sorghum, and tobacco.			
				Forestry	Forestry insurance covers the standing timber value of commercial forestry plantations exclusively against fire. Valuation criteria in case of indemnities could be the initial costs or the commercial value, depending on the age of the plantation. Coverage is subject to a deductible of 15% of			

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
				Forestry	the loss on each and every loss. For normal forestry plantations, original gross rates vary from 2.0 to 3.5% of the total sum insured depending on the region, type of plantation, protection measures, contingency plans implemented by the insured, deductibles, and indemnity limits.			
				Aquaculture	Basic coverage is against biomass mortality and natural perils. Coverage also includes the following perils: extreme temperatures, excessive rain, uncontrollable pests and diseases, volcanic eruptions, floods, and earthquakes. For both covers, the deductible is between 15 and 20% of the total sum insured.			

Table A.7 Agricultural insurance country fact sheet: Dominican Republic

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
Agricultural insurance was first introduced in 1984 by Aseguradora Dominicana Agropecuaria, CA (ADACA), a majority state-owned entity, in order to provide crop and livestock insurance as collateral for the loans given by Banco Agrícola de la República Dominicana to subsistence farmers; most policies were issued on a collective basis, linked to group loans. ADACA ceased operating in 1997 mainly due to the withdrawal of support from the Banco Agrícola.	AGRODOSA is the only insurance company offering agricultural crop insurance to farmers in the Dominican Republic. The company is a private-public partnership, but it is managed on strictly commercial insurance principles and is subject to private insurance regulations. More recently, other companies have expressed interest in offering agricultural insurance in the Dominican Republic, but so far none of them has done so. The crop insurance program implemented by AGRODOSA is reinsured in the international market through a quota share reinsurance treaty.	The most important delivery channel is the Banco Agrícola, which is the main finance institution for the rural sector. Recently other channels like agents and farmers associations and cooperatives have grown in importance. The specialized delivery channel for small and marginal farmers is Banco Agrícola.	The government had an active role in formulating the agricultural insurance law and in the AGRODOSA start-up. The government supports agricultural insurance through the provision of crop insurance premium subsidies. Crop insurance premium subsidies range from 33 to 50% of crop insurance premiums. In 2009 the government spent approximately US\$1.25 million on subsidies for crop insurance premiums. Currently, a draft agricultural insurance act is in the Dominican Parliament, but at the time of writing, it has not been enacted.	Crop	MPCI	1. Crop insurance: Low penetration. As of 2010, 23,000 hectares of crops were insured, accounting for 2% of the total crop area in the country.	3,000,000	49,000,000
					Named-peril			
				Greenhouse	AGRODOSA offers insurance coverage for greenhouses against windstorm.			

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
The federal government supports agricultural insurance mainly by subsidizing premiums and by financing the start-up costs for AGRODOSA, in which it owns a share of 50%.								

Table A.8 Agricultural insurance country fact sheet: Ecuador

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
Crop and livestock insurance was first introduced in 1980 under CONASA (Consejo Nacional de Salud), a federal government public sector insurance company. The program was discontinued at the end of the 1980s. Crop and livestock insurance was reintroduced in 1997/98 by Colonial de Seguros, the leading private commercial insurance company.	In 2010 there was only one private commercial crop and livestock insurer in Ecuador, Colonial de Seguros. However, an additional insurance company is about to start offering agricultural insurance in the country.	For crops, the most important delivery channel is the banks. Colonial de Seguros is offering a crop-credit insurance product. For livestock, most policies are sold through the company's own sales agents.	Since May 2010, the government of Ecuador through the Agricultural Insurance Unit of the Ministry of Agriculture is supporting crop insurance through a premium subsidy scheme. Initially, the scheme financed 60% of the cost of crop insurance premiums for maize, potato, rice, and wheat crops. As of August 2010, the subsidies were benefiting 850 farmers who were cropping a total area of 4,713 hectares. The crop insurance subsidy scheme is financed by a government contribution of US\$2.7 million. As of August 2010, government expenditures due to the subsidization of crop insurance premiums amounted to US\$145,000 (approximately 5% of the total budget).	Crop	Multiple-peril crop insurance (MPCI) is offered only to rice, bean, sugarcane, onion, soybean, corn, potato, tomato, oil palm, banana, wheat, and barley crops. Guaranteed yields under this coverage vary from 30 to 70% of the actual production history (APH) depending on the crop, region, and selected guaranteed yield. The product is offered on an individual basis through Banco de Fomento branches. The market MPCI average original gross rate is approximately 3.8%.	1. Crop insurance: Low penetration. In underwriting year 2009/10, about 4,200 insurance policies were issued, totaling 22,300 hectares of annual crops (1% of total national cropped area).	1,264,000	36,000,000
				MPCI				
				Livestock and bloodstock	Individual animal mortality insurance and epidemic disease insurance are offered for beef cattle, goats, sheep, horses, and pigs. Original gross rates vary, depending on the type of animal, age, and zone. The average original gross rate for the market is 3.8% of the total sum insured.	2.- Livestock insurance: As of 2010, only 250 head of cattle and 250 horses were insured in the country.		
The government of Ecuador has created a technical support unit at the Ministry of Agriculture and implemented crop insurance premium subsidies and a catastrophic protection insurance scheme for small farmers.		All of the agricultural insurance programs in the country are reinsured in the international market through quota share reinsurance treaties.		Forestry	Forestry insurance covers the standing timber value of commercial forestry plantations against fire and wind perils. Valuation criteria in case of indemnities could be the initial costs or the commercial value, depending on the age of the plantation. Coverage is subject to a deductible of 10% of the loss on each and every loss. Original gross rates vary from 0.5 to 1% of the total sum insured, depending on the region, type of plantation, and risk management measures implemented by the insured.	3.- Forestry insurance: As of 2010, 8,400 hectares of forestry plantations were insured in the country.		

Table A.9 Agricultural insurance country fact sheet: El Salvador

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
Crop insurance was first introduced in the country in 2001 after the severe losses caused by Hurricane Mitch and El Niño event.	Two insurance companies, Seguros e Inversiones S.A., and Aseguradora Pacifico S.A., are offering crop and livestock insurance products in the country. Crop insurance programs in El Salvador have been supported by international reinsurers on a quota share basis (10% retained, 90% ceded), mainly through a facility provided by PROAGRO, a Mexican agricultural insurer.	Insurance agents are the main delivery channel for agricultural insurance.	Agricultural insurance premiums are not subsidized by the government.	Crop	Guaranteed-yield, multiple-peril crop insurance (MPCI) protects a percentage of the expected individual crop yield at the farm level. Covered perils are weather, biological, and crop pre-emergence perils. Farmers can choose among three levels of guaranteed yield: 70, 60, or 50% of the expected crop yield. The insured has to retain 30% of losses due to drought and 25% due to biological perils.	1. Crop insurance: Low penetration. In underwriting year 2006, about 4,700 hectares of annual crops (0.5% of total cropped area) were insured. 2.- Livestock insurance: Low penetration. In underwriting year 2006, about 4,000 head of cattle (less than 1% of the national herd) were insured.	200,000	2,700,000
					Crop investment insurance (seguro a la inversión) bases loss adjustment on insured crop yield performance. This insurance product protects the direct investment made by the insured in the insured crop against weather and biological perils and also against crop germination or pre-emergence failure (due to perils such as soil capping associated with excess rain). The sum insured is defined as the direct investments made by the insured on the insured crop up to the time of the claim. Under this coverage the insured has to bear part of the risk by sharing 5, 30, and 25% of the claim for losses in regard to weather perils and drought, pests, and diseases, respectively. In the case of a claim, the policy indemnifies the amount of the investment made by the insured up to the date of the loss, deducting the revenue obtained on the insured unit and the insured loss participation.			
					Individual plant insurance (a named-peril, damage-based policy) protects against damage to individual plants caused by adverse weather conditions and biological perils. The sum insured is defined by the value of each individual plant that compounds the insured plantation. A deductible from 5 to 10% over the sum insured applies. This crop insurance product is targeted at high-value crops, including banana plantations. In case of losses due to any of the covered perils, the insured will be indemnified with the agreed value established for the plant times the number of affected plants, above an aggregate deductible.			

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
				Crop	Crop investment insurance (seguro a la inversion) bases loss adjustment on crop damage. It protects the direct investment (production costs, including input costs: land preparation, sowing costs, and so forth) in the insured crop against losses due to frost, flood, hail, fire, hurricane, tornado, wind, and windstorm. The sum insured is defined by the direct investments in growing the insured crop. In case of a claim, the policy indemnifies the amount of the investment made by the insured up to the date of the loss. Deductibles vary from 5 to 15% of the sum insured.			
				Named-peril				
				Livestock and bloodstock	Such policies cover animal mortality due to accidents, disease, or slaughter ordered by the authorities for cattle, hogs, sheep, goats, and poultry under individual, group, and herd modalities.			

Table A.10 Agricultural insurance country fact sheet: Guatemala

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
<p>Agricultural crop insurance was first introduced in the country in 1998. One private insurance company, with the support of the Ministry of Agriculture and Livestock, piloted crop insurance for corn against drought, rain, wind, and flood perils on the southern coast. This product was discontinued due to lack of demand from farmers.</p> <p>In late 1998, after Hurricane Mitch, agricultural insurance was offered again and expanded to crops other than corn. Several insurance companies provided agricultural insurance with technical support from Mexican insurance companies.</p> <p>Currently there are plans to implement agricultural weather index insurance in the country.</p>	<p>Three insurance companies offer crop and livestock insurance products.</p> <p>Crop insurance programs have been supported by international reinsurers on a quota share basis (10% retained, 90% ceded), mainly through a facility provided by PROAGRO, a Mexican agricultural insurer.</p>	<p>Insurance agents are the main delivery channel for agricultural insurance.</p>	<p>The government of Guatemala does not provide any type of support for agricultural insurance at this time.</p> <p>In the recent past, the government subsidized cotton crop insurance premiums through the Guate-invierte Program.</p>	Crop	<p>Guaranteed-yield, multi-peril crop insurance (MPCI) protects a percentage of the expected individual crop yield at the farm level. Covered perils are weather, biological, and crop pre-emergence perils. Farmers can choose among three levels of guaranteed yield: 70, 60, or 50% of the expected crop yield. The insured has to retain 30% of losses due to drought and 25% of losses due to biological perils.</p>	<p>1. Crop insurance: Low penetration. In underwriting year 2007, about 20,000 hectares of annual crops (0.9% of total cropped area) were insured.</p> <p>2. Livestock insurance: Low penetration. In underwriting year 2007, about 1,400 head of cattle (less than 1% of the national herd) were insured.</p>	1,700,000	27,000,000
					<p>Crop investment insurance (seguro a la inversión) bases loss adjustment on insured crop yield performance. This insurance product protects the direct investment made by the insured in the insured crop against weather and biological perils and also against crop germination or pre-emergence failure (due to perils such as soil capping associated with excess rain). The sum insured is defined by the direct investments made by the insured on the insured crop up to the time of the claim. Under this coverage, the insured has to bear part of the risk by sharing 5, 30, and 25% of the claim for losses in regard to weather perils and drought, pests, and diseases, respectively. In case of a claim, the policy indemnifies the amount of the investment made by the insured up to the date of the loss, deducting the revenue obtained on the insured unit and the insured loss participation.</p>			
					<p>Individual plant insurance (a named-peril, damage-based policy) protects against damage to individual plants caused by adverse weather conditions and biological perils. The sum insured is defined by the value of each individual plant that makes up the insured plantation. A deductible from 5 to 10% of the sum insured applies. This crop insurance product is targeted at high-value crops, including banana plantations. In case of losses due to any of the covered perils, the insured will be indemnified with the agreed value established for the plant times the number of affected plants, above an aggregate deductible.</p>			

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
				Crop	Crop investment insurance (seguro a la inversión) bases loss adjustment on crop damage. This product protects the direct investment (production costs, including input costs, land preparation, and sowing costs) in the insured crop against losses due to frost, flooding, hail, fire, hurricane, tornado, wind, and windstorm. The sum insured is defined by the direct investments in growing the insured crop. In case of a claim, the policy indemnifies the amount of the investment made by the insured up to the date of the loss. Deductibles vary from 5 to 15% of the sum insured.			
				Named-peril				
				Livestock and bloodstock	This product covers animal mortality due to accidents, disease, or slaughter ordered by the authorities for cattle, hogs, sheep, goats, and poultry under individual, group, and herd modalities.			

Table A.11 Agricultural insurance country fact sheet: Honduras

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
<p>Agricultural insurance has a 10-year history in Honduras. Crop insurance was first introduced in 2000 and livestock insurance in 2004.</p> <p>Although agricultural insurance is relatively new, several insurance products for crops, livestock, greenhouses, and aquaculture are available on the market. Crop insurance products include traditional named-peril crop insurance, multi-peril crop insurance (MPCI), and weather index insurance. Livestock insurance is undeveloped in Honduras. Less than 1% of the national herd is insured.</p> <p>Federal government support for agricultural insurance is restricted to technical assistance, capacity building (such as workshops and training programs), and tax exemptions on agricultural insurance premiums. The government does not finance premium subsidies at this time.</p>	<p>Three private insurance companies provide agricultural insurance in Honduras, namely, Interamericana, Equidad, and Atlantida.</p> <p>All of these companies offer crop insurance, but only two underwrite small livestock portfolios.</p> <p>The agricultural insurance programs are available on currently in place in Honduras have support from the international reinsurance market. Capacity is available for MPCI and may be slightly more difficult to secure for livestock insurance and index-based crop insurance.</p>	<p>Insurance agents are the main delivery channel. Some financial institutions (for example, rural banks) also deliver agricultural insurance.</p>	<p>There are no forms of government financial support for agricultural crop and livestock insurance.</p> <p>Other forms of government support are finance for workshops or training programs that build capacity with regard to agricultural insurance and the instrumentation of tax exemptions for agricultural insurance premiums.</p>	Crop	<p>Guaranteed-yield MPCI protects a percentage of the expected individual crop yield at the farm level. Covered perils are weather, biological, and crop pre-emergence. Farmers can choose among three levels of guaranteed yield: 70, 60, or 50% of the expected crop yield. The insured has to retain 30% of losses due to drought and 25% due to biological perils.</p> <p>Crop investment insurance (seguro a la inversión), which is loss adjustment based on insured crop yield performance, protects the direct investment made by the insured in the insured crop against weather and biological perils and also against crop germination or pre-emergence failure (due to perils such as soil capping associated with excess rain). The sum insured is defined as the direct investment made by the insured on the insured crop up to the time of the claim. Under this coverage, the insured has to bear part of the risk by sharing 5, 30, and 25% of the claim for losses in regard to weather perils and drought, pests, and diseases, respectively. In case of a claim, the policy indemnifies the amount of investment made by the insured up to the date of the loss, deducting the revenue obtained on the insured unit and the insured loss participation.</p>	<p>1. Crop insurance: Low penetration. In underwriting year 2009, about 20,000 hectares of annual crops (3% of total cropped area) were insured.</p> <p>2. Livestock insurance: Low penetration. In underwriting year 2009, about 600 head of cattle (less than 1% of the national herd) were insured.</p>	1,000,000	14,000,000
					<p>Individual plant insurance (a named-peril, damage-based policy) protects against damage to individual plants caused by adverse weather conditions and biological perils. The sum insured is defined by the value of each individual plant that makes up the insured plantation. A deductible of 5 to 10% over the sum insured applies. This crop insurance product is targeted at high-value crops, including banana plantations. In case of losses due to any of the covered perils, the insured will be indemnified with the agreed value established for the plant times the number of affected plants, above an aggregate deductible.</p>			

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
<p>Agricultural insurance is mainly voluntary. However, the state-owned bank, BANADESA (Banco Nacional de Desarrollo Agrícola), requires farmers to insure their agricultural loans. This is the main reason for the expansion of agricultural insurance in Honduras. However, BANADESA recently reduced its agricultural lending, which has contributed to the stagnation of agricultural insurance.</p>				Crop	Named-peril Crop investment insurance (seguro a la inversión), which is loss adjustment based on crop damage, protects the direct investment (production costs, including input costs, land preparation, and sowing costs) in the insured crop against losses due to frost, flooding, hail, fire, hurricane, tornado, wind, and windstorm. The sum insured is defined as the direct investments in growing the insured crop. In case of a claim, the policy indemnifies the amount of the investment made by the insured up to the date of the loss. Deductibles vary from 5 to 15% of the sum insured.			
				Livestock and bloodstock	Insurance covers animal mortality due to accidents, disease, or slaughter ordered by the authorities for cattle, hogs, sheep, goats, and poultry under individual, group, and herd modalities.			
				Aquaculture	Insurance covers biomass mortality due to storm, disease, water supply fluctuation, exposure to debris intake, and theft on tilapia and shrimp fish farms.			

Table A.12 Agricultural insurance country fact sheet: Mexico

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products		Market volume (US\$)	
				Main Features	Penetration rate	Premiums	Liabilities
Crop insurance in Mexico dates back to 1926. In 1961 the government, through Aseguradora Nacional Agrícola y Ganadera S.A. (ANAGSA), started to underwrite a multi-peril crop insurance (MPCI) policy supported by federal government premium subsidies. The ANAGSA program was crop-credit compulsory insurance. ANAGSA experienced very poor underwriting results. Therefore, in 1990 the federal government terminated the program.	Mexico has a well-defined public-private partnership for agricultural insurance, the National System for Insurance of the Rural Sector, which involves three key insurance entities: Agroasemex, the national agricultural reinsurer; private commercial insurance companies; and mutual insurance companies, including the ANAGSA fondos. Up to six private insurance companies are authorized to offer agricultural insurance in Mexico. In addition, there are one mutual insurance society and about 270 fondos.	The private insurance companies market their crop and livestock insurance products through their own agent networks. The fondos and mutual companies market directly to their members. Catastrophic crop insurance products are marketed through federal and state governments. Very little agricultural insurance is sold through retail brokers.	Government support to agricultural insurance takes the following forms: 1. Premium subsidy support 2. Agricultural reinsurance 3. Subsidies for training and education for the fondos, such as (a) assistance in product design, rating, and the design of loss adjustment and (b) catastrophic insurance protection for small farmers under the PACC (Program to Assist Climatologic Contingencies), which are 100% subsidized by government. A group of basic or priority crops carries premium subsidy levels of between 35% and a maximum of 60%, according to geographic region and exposure to loss; for all other crops a flat-rate premium subsidy of 35% applies. For livestock, premium subsidy levels range between 20% for aquaculture and a maximum of 50% for exotic diseases, flood, and high-mortality insurance. For catastrophic index insurance, the costs of premiums are 100% subsidized by government on the following basis: 70–90% by federal government and 10–30% by state governments. The government expenditures in both agricultural insurance premium subsidies and the provision of catastrophic insurance for small and marginal farmers amounted to approximately US\$145 million in 2009. The volume of premium subsidies for the	A wide range of agricultural (crop and livestock) insurance products is available on the Mexican market. These are classified into two major categories. First, traditional or commercial crop and livestock insurance products, which are offered by private commercial insurance companies, mutual societies, and fondos, are conventional indemnity-based insurance products that can be contracted individually or on a collective basis. For crops, a wide range of product types is available through private companies and the fondos, including (a) single-peril hail and named-peril damage-based insurance and indemnity policies (termed “individual plant insurance”), (b) loss-of-investment-cost insurance (seguro a la inversión), multiple-peril salvage-based loss-of-yield insurance policies, which indemnify growers against loss of their production costs invested in growing the crop up to the time of loss, and (c) traditional MPCI yield-based indemnity insurance policies, whereby farmers are provided a yield guarantee (which typically ranges from 50 to 70% of the maximum expected yield) against a wide range of climatic, biological (pests and diseases), and pre-emergence perils (including germination failure and soil capping). Greenhouse material damage insurance and forestry insurance are also available. Mexico has the largest and most developed livestock insurance market in Latin America. Livestock insurance is available for a wide range of livestock, including dairy and beef cattle, pigs (swine), sheep and goats, horses, deer, poultry, and bees. In addition, aquaculture insurance is available for shrimp and fish species. For livestock, there are two main covers: (a) accident and mortality insurance and (b) livestock epidemic disease cover. Traditionally, the most popular form of cover was individual animal insurance, but in 2005 premium subsidy support was switched from individual animal covers to a new livestock insurance policy for high-mortality events, which is a herd-based policy carrying a number of animals per event deductible. This policy insures against accidents, diseases, and forced slaughter of injured animals. The policy specifically excludes government-ordered slaughter, preexisting diseases, or diseases for which vaccines are available. The policy charges very low premium	1. Crop insurance: In underwriting year 2009, about 1.8 million hectares (36.5% of total cropped area) were insured. 2. Livestock insurance: In underwriting year 2009, about 4.4 million head of cattle (less than 15% of the national herd) were insured. 3. Aquaculture insurance: In underwriting year 2009, about 10,000 hectares of shrimp ponds (approximately 14% of the national area) were insured. 4. Forestry insurance: In underwriting year 2009, about 10,000 hectares of shrimp ponds (approximately 14% of the national area) were insured. 5. Catastrophic insurance: During underwriting year 2009, 8 million hectares of crops and 4.16 million animal units were insured under catastrophic insurance; 30 states adhere to this program.	222,000,000	10,740,000,000

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products		Market volume (US\$)	
				Main Features	Penetration rate	Premiums	Liabilities
In 2001, the Mexican government redefined the role of Agroasemex in order to focus on its new role as a national agricultural reinsurer, provider of research and development, and manager of the federal agricultural insurance premium subsidy scheme.			whole market (traditional or commercial insurance and catastrophic index insurance) amounted to US\$51.7 million in 2009. Total government expenditures for catastrophic insurance amounted to US\$93 million in the same year.	<p>rates. The second and most important type of policy is epidemic disease cover against classical swine fever (CSF). The CSF policy indemnifies against mortality and compulsory slaughter ordered by the Ministry of Agriculture in the event of a CSF outbreak. The policy is only offered in states that are declared free of CSF.</p> <p>Second, catastrophic insurance products are the second major category. First introduced in 2002, they include parametric (index) products, protecting against catastrophic climatic events, which are aimed at small-scale producers who cannot access commercial crop or livestock insurance. The catastrophic insurance schemes operate under the regulations of the Program to Assist Climatologic Contingencies (PACC). These large-scale insurance programs operate at a macro level (as opposed to providing cover to individual farmers) and are purchased by the federal or state governments through (a) the private commercial insurers (area-yield index insurance) and through Agroasemex (rainfall deficit insurance and normalized dry vegetative index, NDVI, insurance). The catastrophic insurance programs are 100% subsidized by federal and state governments. Private commercial insurers have been involved for several years in offering area-yield index insurance and catastrophic livestock insurance covers on a massive scale to the state governments.</p> <p>Since 2003 Agroasemex has insured a macro-level rainfall deficit index insurance cover for the federal government under the PACC. The PACC is administered by the Ministry of Agriculture (SAGARPA) and implemented either in conjunction with the state governments or directly with low-income farmers, defined as those owning less than 5 hectares. If a rainfall deficit is triggered at an insured weather station, Agroasemex indemnifies the state government, which is responsible for distributing the indemnity to the insured farmers (beneficiaries). In 2007 Agroasemex also launched a pilot pasture satellite insurance program, which uses NDVI to measure the amount of biomass available as cattle fodder.</p>			

Table A.13 Agricultural insurance country fact sheet: Nicaragua

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
<p>A first attempt to introduce crop insurance on an indemnity basis was made in 2004, but due to commercial and legal reasons, this endeavor failed.</p> <p>Afterward, government and the Instituto Nicaragüense de Seguros y Reaseguros (INISER) have been working to develop a weather index insurance scheme for Nicaragua.</p> <p>In 2006 Nicaragua's Insurance Authority approved a regulation for weather index insurance, and in 2007 INISER started to market and underwrite a weather index product for peanuts.</p> <p>The federal government supports the development of agricultural insurance by promoting a legal framework, by financing the start-up, administrative, and operational costs and research and development for new products, and by providing tax exemptions for agricultural insurance.</p>	<p>Three private insurance companies provide agricultural insurance in Honduras, namely, Interamericana, Equidad, and Atlantida.</p> <p>All of these companies offer crop insurance, but only two underwrite small livestock portfolios.</p> <p>The agricultural insurance programs currently in place in Honduras have support from the international reinsurance market. Capacity is available for MPCI and may be slightly more difficult to secure for livestock insurance and index-based crop insurance.</p>	<p>The most important delivery channel for agricultural insurance is the insurance company's network of agents. However, recently other channels such as banks and farmers' associations and cooperatives have become more prominent in marketing crop insurance products.</p>	<p>The public sector supports the development of agricultural insurance products in several ways. First, government had an active role in formulating the regulatory framework for agricultural insurance. Second, government indirectly subsidizes agricultural insurance development by financing research and development and start-up costs of pilot programs (such as those of the Ministry for Agriculture) in order to develop a weather index insurance scheme for corn, rice, and beans targeted to small farmers. Third, government, through the National Weather Service, invests in efforts to improve the national weather station network and data collection. Finally, government supports the development of agricultural insurance products by establishing tax exemptions for agricultural insurance premiums.</p> <p>The government does not subsidize premiums.</p>	Crop	Weather index-based insurance	<p>Weather index-based insurance covers excess or lack of rainfall in select weather stations. The insured crop is peanuts, but insurance companies are analyzing the feasibility of expanding their portfolio to soybeans, sorghum, rice, beans, sesame, and corn.</p> <p>The total sum insured under this policy is based on the investment made by the insured on the insured crop in the insured location.</p> <p>The insured's economic loss is defined as the insured crop yield shortfall due to the occurrence of an adverse weather event as measured by an index on the agreed weather station used as reference for the area where the insured unit is located.</p> <p>Therefore, if the underlying weather index measured at the agreed weather station is below (cover for lack of rain) or above (cover for excess rain) the agreed strike, the insured will receive an indemnity according to the policy terms and conditions.</p>	80,000	1,000,000

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
No livestock insurance product is being offered.								

Table A.14 Agricultural insurance country fact sheet: Panama

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products		Market volume (US\$)	
				Type	Features	Premiums	Liabilities
Crop insurance was first introduced in 1975 under Law no. 68 which led to the creation of the Instituto de Seguro Agropecuario (ISA), a public sector company, to provide agricultural insurance. Subsequently, in 1996, the government enacted Law no. 39 updating the crop insurance scheme and incorporating livestock and forestry insurance. The federal government does not provide financial support for agricultural insurance.	Currently, three insurance companies offer crop, livestock, aquaculture, and forestry insurance products in Panama. The traditional agricultural insurer is ISA, which has underwritten individual-grower multi-peril crop insurance (MPCI) since 1977 and livestock insurance since 1978; the other two companies are privately owned insurers. One of the private insurance companies operates a crop insurance program backed from Mexico, and the other acts as a front company, issuing the policy for a large facultative contract for an agribusiness firm.	For crops and livestock insurance, the most important delivery channels are, first, insurance brokers second, the insurance companies' own agents. Currently there is no formal provision for special channels to deliver agricultural insurance to small and marginal farmers in Panama.	Currently, there are no forms of government financial support to agricultural crop and livestock insurance. ISA has underwritten agriculture for 31 years. Traditionally, the government of Panama did not provide any premium subsidy support, but since 2008 government reportedly has been studying proposals to introduce a flat 50% premium subsidy on agricultural insurance policies.	Crop and MPCI	ISA's MPCI yield-loss policies protect a wide range of annual and perennial crops against excess rain, floods, drought, wind, fire or lightning, and exotic pests and diseases. Maize and sorghum are the main insured crops in the country. The ISA MPCI policy is a salvage-based loss-of-investment-cost cover that insures against loss of the direct costs of production invested in growing the crop; in the event of loss only the direct costs incurred by the insured on its insured unit up to the moment of the loss are indemnified. In the case of partial loss, the value of the remaining production and yield (salvage) is deducted from the loss. A deductible (coinsurance) of 10% of the loss is applicable for maize and rice crops, while a deductible of 20% of the loss is applicable for sorghum, and a deductible of between 25 and 30% of the loss is applicable for melon crops. Original gross rates vary from (a) rice, 4.5%–7% depending on the location, (b) maize, 6%, (c) sorghum, 7%, and (d) melons, 8%. ISA offers livestock insurance for cattle, goats, sheep, horses, buffaloes, and swine for grassland production, expositions, and inland transportation. Basic livestock insurance covers death arising from accidents, asphyxia, electrocution, fire, lightning, attack by wild animals, fractures, abortion, death due to birth-related complications, and slaughter of an injured animal if stipulated by a certified veterinarian. All diseases are excluded from cover. Deductibles vary according to the class of insured animal, breed, and production system. In the event of loss, the insured is responsible for a coinsurance (retention) of between 10% (cattle and pigs) and 20% (horses and goats) of the value of the claim. ISA's original gross rates also vary, depending on the type of animal and age of the animal. For cattle, rates vary for calves (7%), extensive fattening cows (3%), and dairy cattle (2.5%); for swine,	4,400,000	98,000,000
				Livestock and bloodstock	1. Crop insurance: Low penetration. In underwriting year 2009, about 29,000 hectares of annual crops (4% of total cropped area) were insured. 2. Livestock insurance: Low penetration. In underwriting year 2009, about 53,000 head of cattle (less than 1% of the national herd) were insured.		

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
<p>Agricultural insurance is mainly voluntary. However, the state-owned bank, BANADESA (Banco Nacional de Desarrollo Agrícola), requires farmers to insure their agricultural loans. This is the main reason for the expansion of agricultural insurance in Honduras. However, BANADESA recently reduced its agricultural lending, which has contributed to the stagnation of agricultural insurance.</p>				Livestock and bloodstock	rates vary for boars (4.75–5.50%), hogs (3%), and sows (4–6%); for sheep and goats, rates vary from 2 to 3.5%, depending on the production system.			
				Aquaculture	Insurance covers biomass mortality due to storm, disease, water supply fluctuation, debris exposure intake, and theft on tilapia and shrimp fish farms.			
				Forestry	Forestry insurance covers the standing timber value of commercial forestry plantations against fire exclusively. The sum insured for standing timber insurance is typically based on (a) the establishment and annual maintenance costs of the forest plantation up to the age when the trees have a commercial timber volume or value and (b) for older plantation stands, the commercial value of the standing timber (volume of timber valued at the market price for in-field standing timber). Coverage is subject to coinsurance on the claim of 20% of the loss on each and every loss. For normal forestry plantations original gross rates vary from 1 to 2% of the total sum insured, depending on the region, type of plantation, protection measures, contingency plans implemented by the insured, and deductibles and indemnity limits.			

Table A.15 Agricultural insurance country fact sheet: Paraguay

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
Paraguay's market for agricultural insurance is in the initial stage of development but is growing rapidly. Crop insurance is provided by private local insurance companies that offer multi-peril crop insurance (MPCI) in partnership with agricultural input suppliers. Currently, no insurance company is offering livestock insurance. The country does not have any form of special agricultural insurance legislation, and there is no public sector intervention.	Nine insurance companies have agricultural insurance products approved by the regulator, but only four of them were actively underwriting crop insurance products in 2009. All of the crop insurance risks written in Paraguay are reinsured in the international reinsurance market under quota share treaties.	The agricultural insurance delivery channels rely heavily on insurance brokers, who have contacts with the network of agricultural input suppliers. Currently there are no special channels to deliver agricultural insurance to small and marginal farmers in the country. However, reinsurers are cautious in writing agricultural business in Paraguay.	There is no public sector financial or other support for agricultural insurance in Paraguay.	Crop and MPCI	MPCI is offered only for soybeans, corn, sunflower, wheat, and barley crops. Guaranteed yields under this coverage vary from 50 to 70% of either the actual production history (APH) of the zone or the expected yield, as determined by the insurance company surveyor. The product is offered on an individual basis or on a global MPCI portfolio basis (all crops in all locations). Original gross rates for individual MPCI vary from 5 to 8% of the total sum insured, depending on the crop, region, and coverage level. Original gross rates for MPCI portfolio cover vary from 1 to 5%, depending on the crop, region, portfolio distribution, and coverage level.	1. Crop insurance: 950,000 hectares (10% of the total cultivated area) are insured. 2. Forestry insurance: Poor penetration.	9,500,000	190,000,000
				Forestry	Forestry insurance covers the standing timber value of commercial forestry plantations against fire, wind, hail, and freeze. Additional risks like debris removal and fire-fighting expenses are covered. Valuation criteria in case of indemnities could be formation cost or commercial value, depending on the age of plantation. Coverage is subject to deductibles of 10% of the loss on each and every loss and annual aggregate indemnity limits. Original gross rates vary from 3 per mile up to 1% of the sum insured, depending on the region, type of plantation, protection measures, contingency plan implemented by the insured, and deductible and indemnity limit.			

Table A.16 Agricultural insurance country fact sheet: Peru

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Type	Agricultural insurance products		Market volume (US\$)	
					Features	Penetration rate	Premiums	Liabilities
Multiple-peril crop insurance (MPCI) was formally introduced in Peru in 1996/97 by five private insurers, several of which were subsidiaries of financial banking groups lending to agriculture. The product had high demand during the first year of introduction due to the existence of El Niño phenomena. However, in 1997/98, few of the insurers or their banks were willing to link credit and crop insurance once the El Niño conditions had dissipated.	Currently, two private commercial insurance companies are underwriting agricultural insurance products. All of the agricultural insurance business in Peru is reinsured in the international market.	The crop insurance scheme is new, and the commercial channels of delivery are not yet fully defined. However, due to the characteristics of the insurance products, provincial governments and municipalities probably will have an important role to play in delivering agricultural insurance to farmers. Bank lending to agriculture may also be important for distributing this product to farmers. The Agro Protégé program is specifically targeted at small and marginal farmers.	The Peruvian government enacted a law (28.939) creating the Guarantee Fund for Crop Insurance (FOGASA), with US\$1.4 million for the development of crop insurance. FOGASA funds will be applied to agricultural insurance premium subsidies. The government's objective is to help farmers to access agricultural insurance. The priority is to support small- and medium-size farmers. Subsidy levels will vary from 30% up to 100% of original gross premiums, depending on the insurance product.	Crop	(a) Catastrophic aggregate yield-shortfall cover for rural communities is designed to provide insurance for small- and medium-size farmers through an associative frame. Under this coverage, insured farmers are organized into rural communities and offered insurance for rice, corn, potato, and cotton crops against drought, excess moisture, hail, wind, frost, and flood perils. Rural community for the purposes of this cover is defined as a group of farmers who decide to associate in order to be insured, and this definition is used to define the insured unit. Therefore, the actual yield obtained by the insured at the end of the policy period would be the whole area sown by the community with the insured crop. The indemnity will proceed when the actual aggregate yield obtained by the community is below the guaranteed aggregate yield established on the policy, which is standardized at 40% of the actual production history. The original gross rates are not known, but the cost of this coverage for the farmer shall not exceed US\$25 per hectare. The federal government can subsidize premiums up to 100% of the premium cost.	Catastrophic aggregate yield-shortfall cover is purchased in seven subnational regions in Peru, benefiting 400,000 small- and medium-size farmers covering 5 million hectares of cropland. The penetration of traditional MPCI individual yield-shortfall	13,800,000	77,000,000
In 2008, aiming to protect farmers' income against natural catastrophes, the government of Peru enacted a law (28.939), creating a fund of S/.40 million (US\$14 million) to develop crop insurance in the country. This fund is used to subsidize agricultural insurance premiums.				Group risk plan (area-yield index) "catastrophic product"	(b) Area-yield index crop insurance is being implemented on a pilot basis in 2008 for cotton producers in the Ica valley. Under this coverage, insured farmers located within one municipality or district considered as an insured unit protect their crops against the adverse effects of drought, excess rain, hail, wind, frost, and flood perils. Under this insurance, indemnity is paid when the actual average yield for the insured crop over the whole insured unit (the municipality or district where the insured is located) is below the agreed guaranteed yield. In such cases, the insured farmers all receive an indemnity equal to the proportion of shortfall below the guaranteed yield times the sum insured. Original gross rates are not			

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
				Group risk plan "catastrophic product" (area-yield index)	known, but the cost of this coverage for the farmer shall not exceed US\$25 per hectare. The federal government can subsidize premiums up to 100% of its cost.			
				Crop	A conventional MPCl loss-of-yield product is offered to commercial farmers on an individual basis covering drought, excess rain, hail, wind, frost, and flood perils in rice, corn, potato, and cotton crops. In case of a claim, this insurance considers the whole area sown with the insured crop within the insured farm as one insured unit. Indemnity proceeds only if the actual yield obtained by the farmer on its insured unit is below the guaranteed yield established on the policy. In such cases, the farmer receives an indemnity equivalent to the proportion of its actual yield shortfall below the guaranteed yield times the sum insured. Government subsidies for this kind of product are capped at 30% of original gross premiums.			
					Livestock	Cattle, goats, sheep, horses, and pork are insured. Basic livestock insurance covers death arising from accident, disease, slaughter due to public order or medical stipulation, and loss of function. Due to its nature, no deductibles apply for the basic cover. Original gross rates vary, depending on the type of animal, age, and zone.		

Table A.17 Agricultural insurance country fact sheet: Uruguay

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
<p>The Uruguayan agricultural insurance market is highly developed and has a long history. Crop insurance was introduced in 1912.</p> <p>The most demanded and marketed crop insurance products are hail insurance and hail plus additional named perils (wind, freeze, excess moisture). In recent years, new insurance products like multi-peril crop insurance (MPCI) have become popular, particularly among large farmers.</p> <p>Forestry insurance is also very popular in Uruguay. Introduced in the 1990s, this line of business has expanded over time.</p> <p>Livestock insurance is marginal</p>	<p>Four insurance companies offer agricultural insurance products. Two of the four are private insurance companies, one is a cooperative, and one is a public company.</p> <p>Agricultural mutual insurance is well developed in Uruguay. Although mutuals are not considered insurance, they are active and have an important share of premiums and insured area as well. For example, Malteria Uruguay covers around 100,000 hectares of barley, and the mutual created by the Rice Farmer Association covers another 30,000 hectares.</p> <p>At least for the commonly marketed insurance products, insurance companies do not face specific constraints on access to private reinsurance. Six international reinsurers are supporting crops and forestry programs in the country.</p>	<p>The delivery channel depends on the product. For standard hail crop insurance, agent brokers who belong to the insurance company network are the most common delivery channel. MPCI and forestry insurance are more often delivered through insurance brokers. There is no provision for special channels to deliver agricultural insurance to small and marginal farmers.</p>	<p>Federal government support for agricultural insurance is very active in Uruguay. The main government efforts are through (a) value added tax exemption for agricultural insurance premiums; (b) the development of information systems, capacity building, and insurance schemes; and (c) premium subsidies for horticulture and fruit production. In 2002 Congress enacted a bill creating the Fondo de Reconstrucción y Fomento de la Granja (Fund for the Reconstruction of Farms). Under this program, the Ministry of Livestock, Agriculture, and Fisheries manages a fund of up to US\$2 million that it uses to subsidize up to 50% of hail insurance premiums and fund a Climatic Emergency Fund for the horticulture and fruit sector.</p>	Named-peril	<p>The traditional named-peril coverage is the standard hail plus fire insurance. In addition to hail, the farmer can elect to cover wind, freeze, and excess moisture at harvest. The standard hail coverage has a 6% total sum insured franchise, but several alternatives in terms of franchises and deductibles are available in the market. Almost all crops, fruits, and vegetables growing in Uruguay are eligible for this product. Original gross rates for standard coverage for hail vary from 2% in low-risk areas up to 4.5% in risk-prone areas. The rates vary according to the crop insured, region, and deductible or franchise level.</p> <p>Additional coverage for wind, freeze, and excess moisture at harvest are only offered for wheat, soybeans, corn, barley, and sunflower. Original rates vary, depending on the crop and type of additional peril. Deductibles apply for these additional perils and can reach up to 20% of the total sum insured. Another named-peril product offered in Uruguay is the vineyard freeze damage insurance, covering yield shortfall in vineyards due to freeze perils.</p>	<p>1. Crop insurance: High penetration. 850,000 hectares (above 60% of the total cultivated area) are insured.</p> <p>2. Livestock insurance: Insignificant penetration.</p> <p>3. Forestry insurance: High penetration. Total insured area amounts to 500,000 hectares of standing timber, accounting for more than 80% of the total forested plantations area in Uruguay.</p> <p>4. Greenhouse insurance: Low penetration</p>	24,500,000	1,364,000,000
				Crop				
				MPCI	<p>MPCI is offered on a very restricted basis only for soybeans, corn, sunflower, wheat, and barley. Guaranteed yields under this coverage vary from 50 to 65% of the actual production history depending on the crop, region, guaranteed yield, and recommendations of the inspection report. The product is offered on an individual or portfolio basis (all crops in all locations). Original gross rates for individual MPCI vary from 3.5 to 5.5% of the total sum insured, depending on the crop, region, and coverage level. Original gross rates vary from 1 to 4%, depending on the crop, region, portfolio distribution, and coverage level.</p> <p>Global MPCI portfolio coverage is offered to large-scale farmers.</p>			

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products			Market volume (US\$)	
				Type	Features	Penetration rate	Premiums	Liabilities
				Forestry	Forestry insurance covers the standing timber value of commercial forestry plantations against fire, wind, and, in very specific cases, hail and freeze. Optional additional coverage includes debris removal and fire-fighting expenses. This type of insurance is subject to the application of a deductible per event and an annual aggregate indemnity limit. Original gross rates vary from 0.3 to 1% of the total sum insured, depending on the region, type of plantation, protection measures, contingency plans implemented by the insured in case of fire, level of deductible, and indemnity limit.			
				Greenhouse	Greenhouse insurance covers losses on greenhouse structures with an option to cover content (crops) due to fire, windstorm, hail, and flood. A 10% deductible applies. Original gross rates vary, depending on the type of structure and the region in which the risk is located, but range from 0.2 to 0.6%.			
				Livestock	Accidental animal mortality coverage is offered for beef cattle and dairy cows. This coverage includes additional coverage for inland transportation.			

Table A.18 Agricultural insurance country fact sheet: República Bolivariana de Venezuela

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products		Market volume (US\$)	
				Type	Features	Premiums	Liabilities
<p>Agricultural insurance was first introduced in República Bolivariana de Venezuela in 1998. The product was named-peril crop insurance covering production costs made on the insured crop up to the time of the claim.</p> <p>In 2003 the product was modified to become traditional multi-peril crop insurance (MPCI) to respond to farmers' demand.</p>	<p>The Venezuelan agricultural insurance market has unique features. The market is controlled by an international reinsurance broker, which acts, in practice, as an underwriting agency for local insurance companies.</p> <p>Six private insurance companies offer agricultural insurance in the country. Two offer crop and livestock insurance; the others only offer crop insurance.</p>	<p>The most common channels for delivering agricultural insurance are financial agents (for example, rural banks) or farmers associations. Agent brokers participate actively in delivering the product to individual farmers and brokering with farmers associations. There are no specialized delivery channels for small and marginal farmers.</p>	<p>The government does not provide any support for agricultural insurance.</p>	Crop	MPCI is offered to protect a wide spectrum of annual and perennial crops (corn and sorghum are the main crops) against excess rain, floods, drought, wind, fire or lighting, social risks, and pests and diseases. Guaranteed yields under this coverage vary from 50 to 65% of the farmers' actual production history, depending on the crop and the region. The insured unit is the field sown. The coverage indemnifies production costs. Original gross rates vary from 6.5 to 12.4%, depending on the crop, location, and coverage level.	1,000,000	16,000,000
				Livestock	<p>Livestock and bloodstock insurance covers "all risk": accidental mortality and nominated diseases are covered, but epidemic diseases are excluded. In the case of bloodstock insurance, coverage has an annual aggregate limit of US\$25,000 per animal. There are two options for the deductible: 10 and 20% of the total sum insured. Medical and surgical expenses are not covered. Rates vary from 3.75 to 6.05%. Livestock insurance is offered only to cattle herds. The coverage has a deductible of 10% of the loss, and original gross rates vary according to the final animal (dairy, breeding, or fattening) and herd size. For example, original gross rates for herds of between 30 and 100 animals are 4% for dairy cattle and 3% for fattening cattle.</p>		

Table A.19 Agricultural insurance country fact sheet: Windward Islands

Market status	Market structure	Agricultural insurance delivery channels	Government support to agricultural insurance	Agricultural insurance products		Market volume (US\$)	
				Type	Features	Penetration rate	Premiums
The Windward Islands, comprising Dominica, St. Lucia, St. Vincent, and Grenada, lie at the western fringe of the Caribbean. The islands are extremely exposed to North Atlantic and Caribbean tropical cyclones. Bananas are vulnerable to windstorm damage.	WINCROP is the only insurance company in the Windward Islands that offers crop insurance. No insurance is available for other crops or livestock.	Between 1988 and 2002 all the BGAs required their banana-exporting members to be insured by WINCROP. Any registered active member producing and exporting bananas was therefore automatically insured by WINCROP, and the premium was deducted by the BGAs on the sales of each grower's bananas and paid to WINCROP.	In the establishment phase of WINCROP, government support was provided in two forms: 1. Enactment of crop insurance legislation (the Banana Insurance Act of 1988). This legislation has been very important to the success of WINCROP by giving it a mandate to provide compulsory windstorm insurance in export bananas on all islands, thereby permitting the company to achieve both spread of risk and a critical premium mass and also to experience much-reduced marketing and operating costs because of the compulsory nature of cover.	WINCROP provides named-peril crop insurance for damage from windstorms (including localized windstorms, tropical storms, and hurricanes) and volcanic eruption in the single crop of bananas. The WINCROP banana policy is a standard damage-based indemnity policy that was specifically designed to be simple and transparent and to operate at low cost for large numbers of smallholder banana growers, often with an average of 1 hectare or less of bananas. The policy protects against physical damage by wind to the banana plants, defined as snapping, toppling, and uprooting of the plant and leaf stripping. The sum insured is established on the basis of each grower's three-year rolling average banana production and deliveries to the BGAs. The premium is deducted at source by the BGAs and paid to WINCROP. Simple damage count loss assessment procedures are used to estimate the percentage damage to the total number of banana plants insured, and this percentage damage is applied to the sum insured. For the past 15 years the policy on all islands has maintained a standard 20% deductible for each and every loss. This high deductible is required to maintain premium rates at affordable levels for farmers.	450,000	4,400,000	
Since the 1950s the island governments and the Banana Growers Associations (BGAs), at various times, have attempted to operate mutual insurance schemes against windstorm in bananas. Most of these earlier mutual schemes failed due to a lack of spread of risk because individual islands elected to insure by themselves as opposed to pooling their risk.	WINCROP operates on a strictly commercial basis but does not pay dividends to its shareholders. Trading surpluses are used to strengthen claims reserves. In recent years most of the BGAs have been privatized.	Since 2002 the BGAs have been privatized on all islands except St. Vincent. In St. Lucia the banana export business has been divided up between five private companies, and crop insurance has been made voluntary.	2. Start-up capital provided by the island governments through the BGAs to form WINCROP's paid-up share capital. Since WINCROP commenced operations in the 1987-88 season, government has not provided any form of financial subsidy or support to WINCROP. In the past, one of the BGAs elected to provide premium subsidy support to its grower members but was forced to withdraw this support when its reserves were exhausted.	Crop named-peril			
The Windward Islands Crop Insurance Ltd. (WINCROP) was established under the special crop insurance legislation of the Banana Insurance Act of 1988, which made windstorm cover in bananas compulsory for all export banana growers on the four islands. The act sets out the basis of windstorm insurance cover provided to farmers.	WINCROP insurance scheme is reinsured in the international reinsurance market through a stop-loss facultative treaty.	Under the voluntary scheme now operating on this island, crop insurance is beginning to be marketed through WINCROP's local brokers, insurance companies, and the banks.		The actuarially determined premiums for windstorm cover are high, ranging from 20% on the most exposed northern islands to 11% on the least exposed southern islands in the Windward chain. In view of the high premium rates, the BGAs have traditionally maintained the sums insured at about 35% of the full production costs for bananas. In the event of windstorm damage the indemnity amount has therefore only covered the basic costs to reestablish the banana holding.			

World Bank Insurance for the Poor Program

1818 H Street, NW
Washington, DC 20433
www.insuranceforthe poor.org