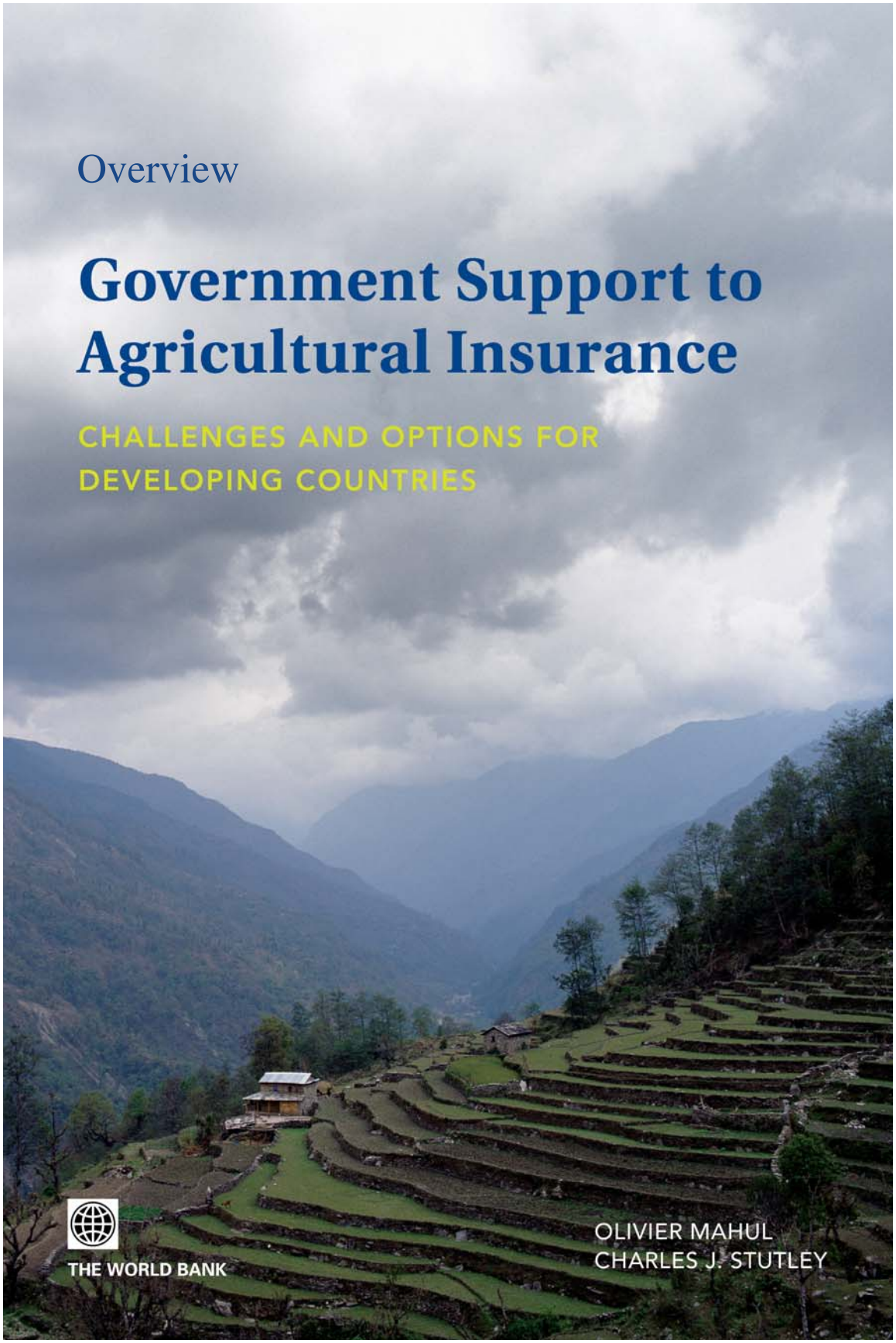

Government Support to Agricultural Insurance

Challenges and Options for Developing Countries

Overview

Olivier Mahul
and
Charles J. Stutley

THE WORLD BANK
Washington, D.C.

1818 H Street NW
Washington DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org
E-mail: feedback@worldbank.org

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Foreword

Agriculture remains a source of livelihood for almost half of humanity. It is also a source of growth for national economies and can be a provider of investment opportunities for the private sector. However, millions of poor people face prospects of tragic crop failure or livestock mortality when, as a result of climate change, rainfall patterns shift or extreme events such as drought and floods become more frequent. Agricultural insurance is key in assisting farmers, herders, and governments lessen the negative financial impact of these adverse natural events.

This book is the result of 10 years of involvement in agricultural insurance by the Insurance for the Poor team, Non-Bank Financial Institutions unit in the Global Capital Markets Development Department of the World Bank's Financial and Private Sector Development (FPD) Vice Presidency. Working together with our World Bank regional colleagues, our team has assisted countries in developing sustainable agricultural insurance programs in more than 20 countries. Noteworthy examples are the weather-based crop insurance scheme in India, in which more than one million farmers are currently insured; and the index-based livestock insurance program in Mongolia, where more than 600,000 animals are covered against adverse weather.

Based on a unique review of agricultural insurance programs in 65 advanced and emerging countries, this book pulls together collective knowledge and experiences to help policy makers promote sound agricultural insurance programs. It provides policy makers with a current

picture of the spectrum of institutional frameworks and experiences with agricultural insurance, ranging from countries in which the public sector provides no support to those in which governments heavily subsidize agricultural insurance.

This book makes a compelling case for public-private partnerships in the promotion of agricultural insurance, supported by the donor community and international financial institutions like the World Bank. It provides a systemic approach to making agricultural insurance markets more stable, efficient, and accessible.

I hope that this book will further contribute to the dialogue on agricultural risk management, highlighting the need for countries to strengthen their policy and institutional frameworks to support agricultural insurance, and also assisting governments in meeting the ensuing challenges.

Janamitra Devan
Vice President
Financial and Private Sector Development Network
World Bank/International Finance Corporation

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This book is based on a World Bank survey of agricultural insurance markets conducted in 2008 under the leadership of Olivier Mahul and Charles Stutley. The team also comprised William Dick (consultant, Commodity Risk Management Group, Agricultural and Rural Development, World Bank), Barry Goodwin (Professor of Agricultural Economics, North Carolina State University), Ramiro Iturrioz (Senior Agricultural Insurance Specialist, GCMNB, World Bank); Roman Shynkarenko (consultant, GCMNB, World Bank), and Ligia Vado (consultant, GCMNB, World Bank). The team owes thanks to Sevara Atamuratova, Uloaku Echebiri, Ernst Lutz, and Tina Lutz for their editorial contributions and technical work.

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Agria Djurförsäkring (Sweden)
Agriculture Financial Services Corporation (Alberta, Canada)
Agricultural Insurance Fund (A.P.I.F.) (Iran)
Agriculture Insurance Company of India Ltd. (AICI) (India)
Agriculture Insurance Consultant (China)
Agricultural Insurance Pool (TARSIM) (Turkey)
Agroasemex, S.A. (Mexico)
Agrodosa (Dominican Republic)
Agroseguro, S.A. (Spain)
Aon Re (Argentina)
Aon Re (Australia)
Aon Re (New Zealand)
Aon Re (South Africa)
Aseguradora Magallanes (Chile)
Asiban SA (Romania)
Banco de Seguros del Estado del (Uruguay)
CA Seguros, S.A. (Portugal)
Cámara Hondureña de Aseguradores (Honduras)
CGM Gallagher Group (Jamaica)
Concordia Polska TUW (Poland)
Ethiopian Insurance Corporation (Ethiopia)
Federal Agency of State Support of Insurance in Agroindustrial Production (Russia)
GlobalAgRisk (United States)
Hannover Re (Germany)
Index Based Livestock Insurance Project Implementation Unit (Mongolia)
Instituto Nacional de Seguros (Costa Rica)
Instituto Nicaragüense de Seguros y Reaseguros (Nicaragua)
Ismea (Italy)
Kanat (Israel)
League of Insurance Organizations of Ukraine (Ukraine)
Mapfre Colombia (Colombia)
Mclarens Toplis Peru S.A. (Peru)
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Ministerio de Ganadería, Agricultura y Pesca (MGAP) (Uruguay)
Ministry of Finance (Azerbaijan)
Moldasig (Republic of Moldova)
Munich Re (Argentina)
Nico General Insurance Company Limited (Malawi)
Nigerian Agricultural Insurance Corporation (Nigeria)
North Carolina State University (United States)
Nyala Insurance S.C. (Ethiopia)
Office of the Insurance Commission (Thailand)

Oficina de Riesgo Agropecuario (Argentina)
OTP Garancia Insurance Ltd. Co. (Hungary)
Paris Re (France)
Partner Re (Chile)
Philippine Crop Insurance Corporation (The Philippines)
Schweizer Hagel (Switzerland)
Seguros Colonial (Ecuador)
Shiekan Insurance & Reinsurance Co. Ltd. (Sudan)
Siam Commercial Samaggi Insurance Public Company Limited (Thailand)
Société Centrale de Réassurance (Morocco)
State Agency for Regulation of Finance Market and Finance Institutions (Kazakhstan)
Swiss Re (Brazil)
Swiss Re (Switzerland)
Swiss Re America Corporation (United States)
TAGH Gestión (Argentina)
Thai Re Insurance Public Co., Ltd. (Thailand)
Windward Islands Crop Insurance Ltd. (Dominica)

Abbreviations

Agroseguro	Agrupación Española de Entidaded Aseguradores de los Seguros Agrarios Cominados, S.A. (Spanish Pool of Insurers of the Combined Agricultural Insurance Program)
AICI	Agricultural Insurance Company of India
A&O	administration and operating
EU	European Union
FAO	Food and Agriculture Organization
FCIP	Federal Crop Insurance Program
GDP	gross domestic product
GNI	gross national income
INS	Instituto Nacional de Seguros (Costa Rican public insurance company)
LIIP	Livestock Indemnity Insurance Pool
MPCI	multiple peril crop insurance
NAIS	National Agricultural Insurance Scheme
NASFAM	National Association of Small Farmers
NDVI	normalized dry vegetative index
PCIC	Philippines Crop Insurance Corporation
PPP	public-private partnership
PRONAF	Programa Nacional de Fortalecimento da Agricultura Familiar (National Program for the Strengthening of Family Agriculture)
R&D	research and development

SEAF	Seguro da Agricultura Familiar (Brazilian Insurance for Family Agriculture)
SIPAC	System for the Protection of Climatic Risks
UNCTAD	United Nations Conference on Trade and Development
WTO	World Trade Organization

Glossary

Accumulation Concentration of similar risks in a particular area such that an insured event may result in several losses at the same time.

Actuarial Branch of statistics dealing with the probability of an event occurring. Accurate actuarial calculations require basic data over a sufficient time period to permit the likelihood of future events to be predicted with a degree of certainty.

Ad Hoc Response Relief arranged in the aftermath of a disaster. Ad hoc responses are generally less efficient than planned responses or a well-designed risk management framework.

Adverse Selection Situation in which potential insurance purchasers know more about their risks than the insurer does, leading to participation by high-risk individuals and nonparticipation by low-risk individuals. Insurers react by charging higher premiums or not insuring at all.

Agricultural Insurance Insurance applied to crops, livestock, aquaculture, and forestry. Buildings and equipment are not usually covered by agricultural insurance, although they may be insured by the same insurer under a different policy.

Area-based Index Insurance Insurance contracts written against specific perils or events defined and recorded at a regional level (county or district in the case of yields, local weather station in the case of insured weather events). Indemnities are paid based on losses at the regional rather than farm level.

Asset Risk Risk of damage to or theft of production equipment or other assets.

Asymmetric Information Information imbalance that occurs when one party to a transaction possesses more or better information than the other. Buyers

of insurance products typically have better information about their level of risk exposure, which they may hide from insurers in order to obtain lower premium rates.

Basis Risk Risk that index measurements will not match individual losses. As the geographical area covered by the index increases, basis risk increases as well.

Capacity Maximum amount of insurance or reinsurance that an insurer, reinsurer, or insurance market will accept.

Catastrophe Severe, usually sudden, disaster that results in heavy losses.

Ceding Company Direct insurer that places all or part of an original risk on a reinsurer.

Claim An insurer's application for indemnity payment after a covered loss occurs.

Cognitive Failure Failure of decision makers to correctly assess the possibility of infrequent catastrophic risks.

Coinsurance 1. Situation in which the insured is liable for part of every loss, often expressed as a percentage of the sum insured. 2. Situation in which each of several insurers covers part of a risk.

Collective Policy Policy issued on behalf of a number of insurers or covering a number of items, each insured separately.

Combined Loss Ratio Proportion of claims paid (or payable) plus administrative and operating expenses (A&O) to premiums earned. A combined loss ratio greater than 1 (or 100 percent) indicates that the premiums collected from the insured are not sufficient to pay the claim (indemnity) and cover A&O expenses (that is, the insurer faces an underwriting loss).

Commission Proportion of the premium paid by the insurer to the agent for procuring and serving the policyholder.

Correlated Risks Risks that are likely to affect many individuals or households at the same time. For example, coffee growers in the same community are likely to be simultaneously affected by a decrease in the price of coffee. Futures and options markets can be used to transfer these risks to parties outside the local community.

Country Risk Profile Level of risk exposure of a country, determined by the occurrence of events such as price shocks and adverse weather events that affect major private and public assets and economic activities within a country at the micro, meso, and macro levels.

Crop Insurance Insurance that provides financial compensation for production or revenue losses resulting from specified or multiple perils, such as hail, windstorm, fire, or flood. Most crop insurance pays for the loss of physical production or yield. Coverage is also often available for loss of the productive asset, such as trees in the case of fruit crops.

Deductible Amount of a claim the insured has to bear, expressed as a percentage of the sum insured or as a fixed amount.

Default Failure to fulfill the obligations of a contract.

Direct Premium Subsidy Subsidy calculated as a percentage of the insurance premium paid. Such a subsidy is problematic because it disproportionately benefits high-risk farmers who pay higher premiums. Attracting higher-risk farmers can significantly increase the costs of insurance.

Disaster-index Insurance Insurance contract in which payments are triggered by extreme weather events. Disaster-index insurance is a form of weather insurance. See also *Index insurance* and *weather index insurance*.

Ex Ante Risk Mechanism Risk management action taken before a potential risk event occurs.

Excess-of-loss Form of reinsurance under which recoveries are due when given loss exceeds ceding company's retention defined in agreement.

Ex Post Risk Mechanism Risk management action developed in reaction to an event.

Exposure Amount (sum insured) exposed to insured perils at any one time. In crop insurance, exposure may increase and then decrease during the coverage period, following the growth stages of the crop from planting to harvest.

Fondos Nonprofit civil associations in Mexico that pool crop yield risks among farmers with similar risk profiles.

Gross Net Premium Income Gross written premium of a primary insurer minus cancellations, refunds, and reinsurance premium paid to other reinsurers. See also *Original gross premium* and *producer premium*.

Hazard Physical or moral feature that increases the potential for a loss arising from an insured peril or the degree of damage.

High-probability Low-consequence Events Frequent risks that cause mild to moderate damage. Insurance products are seldom offered for such events, because the transactions costs associated with them make the insurance cost prohibitive for most potential purchasers. The high transactions costs partly reflect information asymmetries that cause moral hazard and adverse selection. See also *Adverse selection* and *moral hazard*.

Indemnity Amount the insurer pays the insured, in the form of cash, repair, replacement, or reinstatement, in the event of an insured loss. The indemnity cannot exceed the actual value of the asset insured just before the loss. For many crops, an escalating indemnity level is often established as the growing season progresses.

Independent Risks Risks—such as the risks of automobile accidents, fire, or illness—that generally occur independently across households. Such statistical independence allows effective risk pooling across entities in the same insurance pool, making insurance possible. For independent risks, the law of large numbers suggests that, on average, the insurance indemnity paid to claimants in a particular year can be offset by the premiums received from clients who did not incur indemnifiable losses. See also *Risk pooling*.

Index Insurance Insurance that makes indemnity payments based not on an assessment of the policyholder's individual loss but rather on measures of an index that is assumed to proxy actual losses. See also *Area-based index insurance* and *weather-index insurance*.

Informational Constraint Constraint imposed by limited access to or availability of reliable data.

Institutional Risk Risk generated by unexpected changes in regulations, especially in import and export regimes, that affect producers' activities and profits.

Insurability Conditions that determine the viability of insurance as a method of managing a particular risk.

Insurable Interest Interest that exists when an insured derives a financial benefit from the continuous existence of the insured object or suffers a financial loss from the loss of the insured object.

Insurance Financial mechanism that aims to reduce the uncertainty of loss by pooling a large number of uncertainties so that the burden of loss is distributed. Generally, each policyholder pays a contribution to a fund in the form of a premium, commensurate with the risk he or she introduces. The insurer uses these funds to pay the losses (indemnities) suffered by any insured.

Insurance Agent Person who solicits, negotiates, or implements insurance contracts on behalf of the insurer.

Insurance Broker Person who represents the insured in finding an insurer or insurers for a risk and negotiating the terms of the insurance contract. A broker may also act as an agent (for the insurer) for the purposes of delivering a policy to and collecting premiums from the insured.

Insurance Policy Formal document (including all clauses, riders, and endorsements) that expresses the terms, exceptions, and conditions of the contract of insurance between the insurer and the insured.

Insured Peril Cause of loss stated in the policy, which on its occurrence entitles the insured to make a claim.

Layer Range of potential loss covered by insurance. See also *Risk layering*.

Loss Adjustment Determination of the extent of damage resulting from occurrence of an insured peril and the settlement of the claim.

Loss Ratio Proportion of claims paid (or payable) to premiums earned, usually expressed as the total gross claim or indemnity divided by the total or original gross premium, expressed as a ratio or percentage. A loss ratio greater than 1 (or 100 percent) indicates that the amount of the claim (indemnity) paid by the insurer exceeds the amount of the premiums collected from the insured (inclusive of premium subsidy). See also *Producer loss ratio*.

Low-probability High-consequence Events Events that occur infrequently but cause substantial damage. Decision makers, including agricultural producers, tend to underestimate their exposure to such events, because they forget the severity of the loss experienced during infrequent extreme weather events. For

this reason, an insurance product that protects against these losses is frequently discounted or ignored by producers trying to determine the value of an insurance contract. See also *Cognitive failure*.

Market Failure Inability of a market to provide certain goods at the optimal level because market prices are not equal to the social opportunity costs of resources. The high cost of financing catastrophic disaster risk prohibits most private insurance companies from covering this risk, resulting in market failure.

Moral Hazard Problems generated when the insured's behavior can influence the extent of damage that qualifies for insurance payouts. Examples of moral hazard are carelessness and irresponsibility.

Nonproportional Treaty Reinsurance Agreement in which the reinsurer agrees to pay all losses that exceed a specified limit arising from an insured portfolio of business. The limit, which is set by the reinsurer, may be monetary (for example, excess of loss) or a percentage of original gross premiums (for example, stop loss). The rates charged by the reinsurer are calculated independently of the original rates for the insurance charged to the insured.

Original Gross Premium Amount payable by the insured to the original insurer, including the technical premium, to cover expected losses and catastrophe losses plus commercial loadings to cover marketing and acquisition costs, administration and operating expenses, and profit margin.

Premium Monetary sum payable by the insured to the insurers for the period (or term) of insurance granted by the policy; the premium rate x the amount of the insurance; the cost of an option contract paid by the buyer to the seller. See also *Original gross premium*.

Premium Rate Price per unit of insurance, normally expressed as a percentage of the sum insured.

Premium Subsidy Amount of the total premium paid by the government or a third party.

Producer Loss Ratio Proportion of claims paid (or payable) by the insured that is net of the premium subsidy paid by the government.

Producer Premium Amount of the total premium paid by the insured following deduction of the subsidized proportion of premium.

Probable Maximum Loss Largest loss believed possible for a certain type of business in a defined return period, such as 100 or 250 years.

Proportional Treaty Reinsurance Agreement in which the insurer agrees to cede and the reinsurer agrees to accept a proportional share of all reinsurances offered within the limits of a treaty, as specified on the slip. Limits can be monetary, geographical, by branch, by class of business, or by some other measure. Reinsurers are obliged to accept all good and bad risks that fall within the scope of the treaty.

Quota Share Treaty Reinsurance Agreement in which 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. A quota share often specifies a monetary limit over which the reinsurer will not be committed on any one risk (for example, 70 percent of each risk, not to exceed $700,000 any one risk).

Rapid-onset Shock Sudden shock, such as a flood, hurricane, frost, freeze, storm, or large change in a commodity price.

Rate on Line Rate of premium for a reinsurance contract that, if applied to the reinsurer's liability, will result in an annual premium sufficient to meet expected losses over a number of years.

Regulatory Risk Risk generated by unexpected changes in regulations, especially in import and export regimes, that affect producers' activities and profits.

Reinsurance Insurance of insurance, used to smooth an insurance company's income over time, limit its exposure to individual risks and restrict losses, and increase its solvency margin (percent of capital and reserves to net premium income).

Risk Aggregation Process of creating a risk-sharing arrangement that pools risks, thereby reducing transactions costs and giving small households or other participants a stronger bargaining position.

Risk Assessment Qualitative and quantitative evaluation of risk. Process includes describing potential adverse effects, evaluating the magnitude of each risk, estimating potential exposure to the risk, estimating the range of likely effects given the likely exposures, and assessing uncertainties.

Risk Coping Strategies employed to cope with a shock after it occurs. Examples of risk-coping strategies include selling assets, seeking additional employment, and applying for social assistance.

Risk Financing Process of managing risk and the consequences of residual risk through products such as insurance contracts, catastrophe bonds, reinsurance, and options.

Risk Layering Process of separating risk into tiers in order to finance and manage risk efficiently. Individuals can retain small but recurrent losses, which can be managed through risk mitigation techniques and self-insurance. More severe but less frequent losses can be transferred to cooperative/mutual insurance schemes, commercial insurers, and reinsurers. Governments often assume responsibility after major disasters, acting as reinsurers of last resort and providing postdisaster aid

Risk Management Actions—including physical mechanisms (spraying a crop against aphids, using hail netting, planting windbreaks) and financial mechanisms (hedging, insurance, self-insurance)—taken to prevent or reduce losses caused by undesirable events.

Risk Mitigation Actions taken to reduce the probability or impact of a risk event or exposure to risk events.

Risk Pooling Aggregation of individual risks for the purpose of managing the consequences of independent risks. Pooling large numbers of homogenous, independent exposure units can produce an average loss that is close to the expected loss. It provides a statistically accurate prediction of future losses and helps determine premium rates.

Risk Retention Process in which a party holds on to the financial responsibility for loss in the event of a shock.

Risk Transfer Process of shifting the burden of financial loss or responsibility for risk financing to another party, through insurance, reinsurance, legislation, or other means.

Shock Unexpected traumatic event, such as loss of land or livestock, caused by catastrophic weather events or other unexpected phenomena. A price shock occurs when the price of a commodity changes dramatically.

Slip Document, usually prepared by a broker and submitted to underwriters, outlining the terms and conditions of an insurance proposal.

Slow-onset Shock Shock, such as drought, that unfolds slowly and whose impact is difficult to assess or may not be recognized until high losses are incurred.

Social Safety Net Various services, usually provided by the government, designed to prevent individuals or households from falling below a certain level of poverty. Such services include free or subsidized health care, child care, housing, and food as well as cash payments to people in need.

Stop-loss Treaty Reinsurance Policy that covers claims once they exceed a certain amount. A policy with a stop-loss provision is a nonproportional type of reinsurance, in which the reinsurer agrees to pay the reinsured for losses that exceed a specified limit arising from any risk or any one event. For example, a reinsurer may agree to pay claims of $200,000 in excess of $100,000. If the claims are more than $300,000, the reinsured (that is, the insurer) will have to bear the remainder of the claims or make additional financing arrangements to cover the remaining risk exposure.

Transactions Costs Costs, including the cost and time spent obtaining information, required to engage in an economic exchange. Transactions costs in insurance include those associated with underwriting, contract design, rate-making, adverse selection, and moral hazard.

Underwrite To select or rate risks for insurance purposes.

Weather Index Insurance Contingent claims contracts for which payouts are determined by an objective weather parameter (such as rainfall, temperature, or soil moisture) that is highly correlated with farm-level yields or revenue outcomes. See also *Index insurance*.

Yield Risk Risk associated with the inability of an agricultural producer to predict the volume of output a production process will yield, because of external factors such as weather, pests, and diseases.

Overview

Governments in developing countries have been increasingly involved in the support of commercial agricultural (crop and livestock) insurance programs in recent years. A striking example is China, where, with support (and premium subsidies) from the central and provincial governments, the agricultural insurance market grew dramatically to become the second largest market in the world (after the United States) in 2008. In India and Mexico, weather-based crop insurance has been developed on a large scale to protect farmers against the vagaries of the weather. Many other countries have investigated the feasibility of agricultural insurance, and some have implemented pilot programs.

One common feature of many agricultural insurance programs is public support for agricultural insurance. With some rare exceptions, such as the hail insurance market, governments are supporting the development and particularly the expansion of agricultural insurance, often by subsidizing premiums.

In their attempt to design and implement agricultural insurance, many governments in developing countries have sought technical assistance from the international community, including the World Bank. The Bank is one of the few international financial organizations that has a fully dedicated insurance team of agricultural insurance experts, who currently provide technical assistance in more than 20 countries.

A recurrent request from governments is for information on the international experience with agricultural insurance, not only in developed countries, in some of which agricultural insurance has been offered for more than a century, but also in middle- and low-income countries. In particular, there is interest in the experience of public support for agricultural insurance, including its technical, operational, financial, and institutional aspects.

This book aims to inform and update public and private decision makers involved in promoting agricultural insurance about recent developments in agriculture insurance. The literature is heavily biased toward the practice and experience of a few very large public-private programs in Northern America and Europe, which are driven by large public financial subsidies. This book provides decision makers with a framework for developing agricultural insurance. It is based on an analytical review of the rationale for public intervention in agricultural insurance and a detailed comparative analysis of crop and livestock insurance programs provided with and without government support in more than 65 developed and developing countries. The comparative analysis is based on a survey conducted by the World Bank's agricultural insurance team in 2008. Drawing on the survey results, the book identifies some key roles governments can play to support the development of sustainable, affordable, and cost-effective agricultural insurance programs.

The book does not provide decision makers with a prescriptive model for government-supported agricultural insurance, nor does it prescribe the specific support and intervention roles that government should adopt in order to promote the development of commercially sustainable agricultural insurance in their countries. The book does not provide a detailed technical analysis of the different types of traditional indemnity-based and new weather index crop insurance products and programs adopted in the 65 countries covered by the World Bank survey. Rather, the book is designed to provide policymakers with an updated picture of the spectrum of institutional frameworks and experiences with agricultural insurance, ranging from countries in which the public sector provides no support to those in which governments heavily subsidize agricultural insurance. The book provides some simple financial performance indicators and comparisons between country programs that subsidize and those that do not

subsidize premiums. It is hoped that the book will stimulate debate among local government, local insurance companies, international reinsurers, and aid agencies on the role of government support in promoting the introduction and development of market-based and commercially sustainable agricultural insurance in developing countries.

Why Should Governments Support Agricultural Insurance?

Market and regulatory impediments are often invoked to justify public intervention in the provision of agricultural insurance. Governments should identify and address these impediments, described briefly below, to help farmers complement their risk management activities with potentially cost-effective financial tools such as insurance.

Systemic Risk

One of the central arguments for government intervention in the provision, administration, and oversight of agricultural insurance programs involves the presence of systemic risk (that is, risk that affects a large number of economic units, such as farmers and herders, simultaneously). The systemic component of agricultural risks can generate major losses in the portfolio of agricultural insurers. Estimated probable maximum losses for major events, such as those occurring once every hundred years, may exceed average expected losses by many times and seriously affect the financial solvency of insurance companies. Public intervention would be justified because no private reinsurer or pool of reinsurers has the capacity to cover such a large liability when the risks, even though small, may be difficult to diversify.

Informational Asymmetries

The two critical informational problems that any insurance program faces are adverse selection and moral hazard. They are intimately tied to the difficulties associated with measuring risks and monitoring farmer behavior. It may be very difficult for private entities to measure risks, collect relevant

data, monitor producer behavior, and establish and enforce underwriting guidelines. These difficulties can result in high, sometimes prohibitive, transactions costs that preclude the development of private insurance markets. Governments have a major role to play in reducing informational asymmetry. The development and maintenance of agricultural and weather databases as public goods can help insurers properly design and price agricultural insurance contracts, thus reducing adverse selection. Public extension services assisting and supervising farmers in the management of their production risks before and after the occurrence of a loss can help reduce moral hazard.

Postdisaster Assistance Programs

Governments tend to alleviate the effects of crop failures or other disasters by providing postdisaster direct compensation as a relief measure. This poses a "Samaritan's dilemma," whereby postdisaster aid discourages programs such as insurance, which provide more-efficient financial solutions and reduce the magnitude of losses from future events.

Limited Access to International Reinsurance Markets

Access to the international reinsurance market is often limited in developing countries, particularly for specialized lines of business such as agricultural insurance. In recent years, agricultural reinsurers and brokers have shown increasing interest in developing their business in low- and middle-income countries, particularly in large countries such as China and India. Smaller countries with far fewer business opportunities may have more difficulty attracting these international companies. Reinsurers report that reinsurance capacity is available for crop and livestock programs that are properly designed and have rates that generate sufficient premium volume to cover expected losses, operating costs, and cost of capital (including profit).

Agricultural Risk Market Infrastructure

An important supply-side impediment to the provision of agricultural insurance in developing countries is the lack of infrastructure support for

agricultural insurance. Government could create these public goods, such as agricultural and weather databases and crop risk models, providing domestic agricultural insurers with reliable data and quantitative tools to better assess their catastrophe risk exposure and thus design actuarially sound agricultural insurance products.

Low Risk Awareness

Farmers tend to be very aware of their production risks. They may exhibit "cognitive failure," however, in that they may underestimate the likelihood or severity of catastrophic events. Stakeholder consultations in India and Mongolia reveal that farmers and herders recall the occurrence of major past events but tend to underestimate their severity. Governments may play an important role in providing farmer awareness and education programs and in supporting the marketing and promotion programs of the private commercial insurance sector.

Lack of Insurance Culture

A commonly cited reason for the low demand for agricultural insurance in developing countries is the limited understanding of its benefits. Insurance is often perceived as a nonviable investment, because premiums are collected every year but indemnities are paid much less frequently. The general population views insurance—particularly agricultural insurance, which, by definition, pays only when infrequent events occur coverage—as a privilege of the rich.

Regulatory Impediments

The regulatory frameworks governing insurance markets in many low- and middle-income countries tend to be underdeveloped. As a result, regulatory overlay can in some cases inhibit increased penetration of insurance, including agricultural insurance. Innovative agricultural insurance products, such as index-based crop insurance or parametric (weather-based) crop insurance, require an enabling regulatory framework.

What Can We Learn from International Experience?

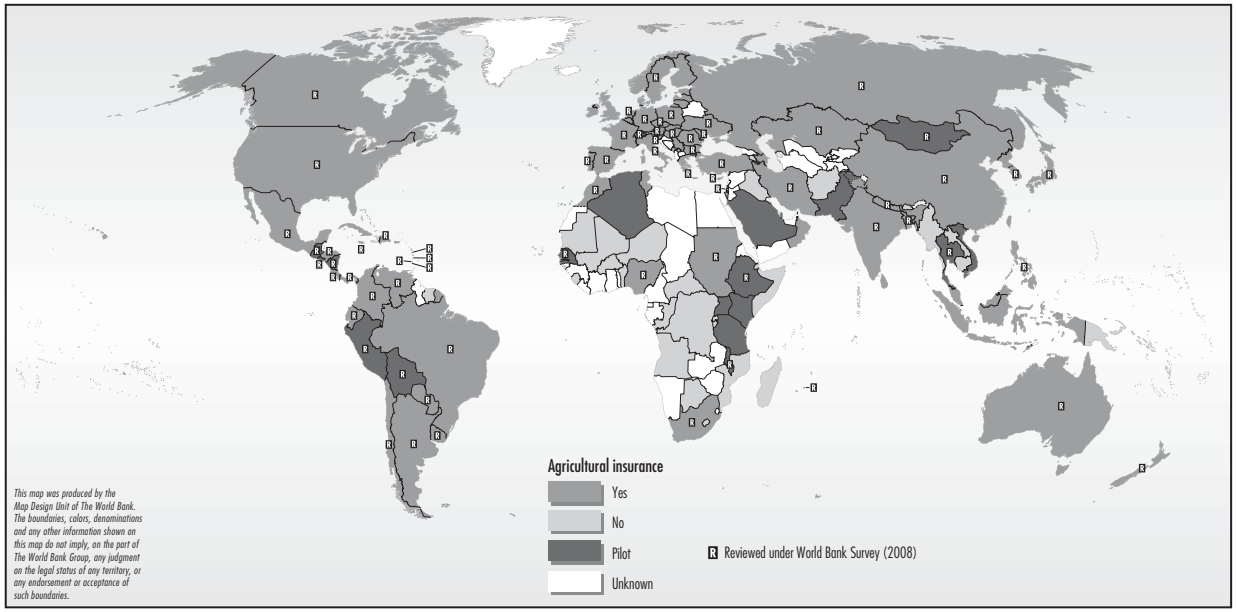
More than half of all countries—104 countries—offered some form of agricultural insurance in 2008. In 2008 the World Bank conducted a survey on agricultural insurance programs in 65 countries, covering 52 percent of high-income countries, 69 percent of middle-income countries, and 50 percent of low-income countries that are known to offer some form of agricultural insurance (figure 1). The key objectives of the survey were to update international experience with public and private agricultural insurance in developed and developing economies and to examine the different ways in which governments support or do not support agricultural insurance. The survey provides a good overview of agricultural insurance markets worldwide, particularly in low- and middle-income countries, the primary focus of this book.

Most developing countries witnessed a shift from public to market-based agricultural insurance since the 1990s. The period 1950–90 saw a major growth in public sector multiple peril crop insurance programs (MPCI), particularly in Latin America and in Asia. Historically, these programs have performed very poorly. Since the 1990s, governments have promoted agricultural insurance through the commercial insurance sector, often under public-private partnerships (PPPs). As of 2008, private insurance providers operated in 54 percent of the surveyed countries, and PPPs were implemented in 37 percent of them. The development of the private agricultural insurance sector increases with the development level. Coinsurance pools, usually relying on PPPs, have been established, mainly in middle-income countries, as a way to strengthen the supply of agricultural insurance.

Global agricultural premium volume increased dramatically between 2004 and 2007, rising from $8 billion to about $20 billion, $15 billion of which is captured by the World Bank survey (table 1). This stunning increase was caused by rising agricultural commodity prices and sum insured values on which premium was paid; the expansion of agricultural insurance in China, Brazil, and Eastern Europe; and increasing government subsidy support in major countries, including Brazil, China, the Republic of Korea, Turkey, and the United States.

Despite this recent growth, penetration is still much lower than non–life insurance penetration in most countries. Agricultural insurance

Figure 1 Availability of Agricultural Insurance in 2008



Source: World Bank Survey 2008.

Table 1 Estimated 2007 Agricultural Insurance Premiums, by Country Development Status

Development status	Number of countries	Estimated crop premiums ($ million)	Estimated livestock premiums ($ million)	Estimated agricultural premiums ($ million)	Percentage of global agricultural premiums	Agriculture insurance penetration (premiums as a percentage of 2007 agricultural GDP)
High-Income	21	11,869.0	1,192.3	13,061.3	86.5	2.3
Upper Middle-Income	18	872.6	40.1	912.7	6.0	0.3
Lower Middle-Income	20	789.3	334.1	1,123.5	7.4	0.2
Low-Income	6	0.2	4.8	5.0	0.0	0.0
All Countries	65	13,531.1	1,571.4	15,102.4	100.0	0.9

Source: World Bank Survey 2008.

penetration rate is expressed as the ratio between agricultural insurance premium volume and agricultural GDP; non–life insurance penetration is expressed as the ratio between non–life insurance premium volume and GDP. The agricultural insurance penetration rate is lower than the non–life insurance penetration in all groups of countries classified by development status. The gap decreases with development level.

Agricultural insurance takes a long time to take off. The United States and many European countries have had some form of crop or livestock insurance for more than a century and are mature markets with high penetration rates. In contrast, in many developing countries, agricultural insurance has been operating for only 5–10 years (even less in countries introducing index-based insurance), and agricultural insurance demand and uptake have yet to take off.

Agricultural insurance provision is dominated by high-income countries and China. Almost 90 percent of global agricultural insurance premium volume is underwritten in high-income countries. In 2008 the agricultural insurance premium volume in China was estimated at $1.75 billion, making this middle-income country the second-largest agricultural insurance market after the United States.

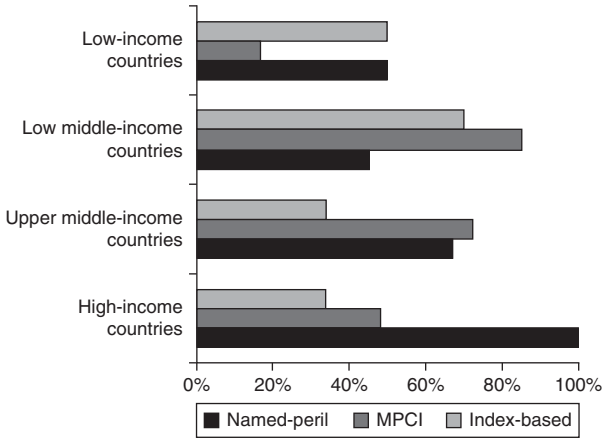
Agricultural insurance provision is largely dominated by crop insurance. The World Bank survey captures about 80 percent of the estimated

global agricultural insurance premium volume (an even higher percentage in low- and middle-income countries). This survey is therefore representative of the global market. It shows that 91 percent of the agricultural insurance business by premium volume comes from crop insurance.

Traditional named-peril crop insurance and MPCI are the two main lines of the agricultural insurance business. Named-peril crop insurance (such as hail insurance) is underwritten in all of the high-income surveyed countries but in less than half of the surveyed developing countries (figure 2). Major advantages of named-peril crop insurance include the low-cost damage-based indemnity system, the restriction to key perils, and the affordability of premiums.

Individual-grower MPCI is available in about half of the high-income and almost 80 percent of the middle-income countries, particularly in Latin America. This yield-based indemnity product is much more complex, usually with higher premium rates, because it generally provides all-risk cover for the insured crop and is more costly to administer, because it requires preinspections and in-field measurement of crop yields in order to assess losses. International experience throughout the world shows that individual-farmer MPCI can be subject to adverse selection and moral hazard.

Figure 2 Availability of Crop Insurance Products in 2008 among Countries with Agricultural Insurance, by Development Status



Source: World Bank Survey 2008.

Index-based crop insurance is available, mainly at a pilot stage, in one out of three surveyed countries. Such insurance—in which indemnity payments are based on an index (such as cumulative rainfall or aggregate crop yields in a geographical area)—is available in 20 percent of high-income and more than 40 percent of middle-income countries, usually under weather-based crop insurance programs. The aggregate premium volume for index insurance remains very low, however, as markets are not mature. Except in India and Mexico, most of the weather-based crop insurance programs are still under pilot implementation, with only few farmers insured. Many index initiatives in middle- and low-income countries have been supported by the donor community and the international reinsurance market.

Livestock insurance is available in 85 percent of the surveyed countries. It is offered, usually in the form of individual animal accident and mortality cover, in a very high proportion of the surveyed countries. Many programs are very small, however, with demand and penetration rates generally low. Consequently, premium volume is much lower for livestock insurance than for crop insurance. Almost 80 percent of high-income and 63 percent of low- and middle-income countries surveyed offer livestock insurance. Insurance against epidemic diseases is offered mainly in high-income countries. Countries with large and specialized livestock insurance markets include China, Germany, Mexico, and Spain. Mongolia has been piloting index-based livestock insurance since 2006.

Delivery channels are highly dependent on the development status of private insurance markets. In developed insurance markets in high-income and upper-middle-income countries, insurance is traditionally marketed through insurance agents employed by insurance companies or insurance brokers. In low-income countries, where the insurance market is underdeveloped, agricultural insurance is provided mainly through cooperatives and farmers' groups. The provision of agricultural insurance through rural banking networks, including microfinance institutions, is still very limited, although several initiatives are under preparation in Africa and Asia.

Almost 80 percent of agricultural insurance programs are offered on a voluntary basis. In lower-middle- and low-income countries, agricultural insurance is often compulsory for borrowers of agricultural loans. This type

of credit-linked insurance may offer new opportunities to develop agricultural insurance in middle- and low-income countries.

Agricultural reinsurance is purchased mainly from private reinsurers. It is usually critical for domestic agricultural insurers to secure enough risk capital in case of a major disaster causing catastrophic insurance losses. In two-thirds of the surveyed countries, the provision of agricultural reinsurance is from private reinsurers. In 22 percent of the surveyed countries, agricultural reinsurance is provided by both public and private entities. Some countries (including Costa Rica, Iran, Japan, and Kazakhstan) rely only on public reinsurance.

Premium subsidies are the most common form of public intervention in agricultural insurance. Almost two-thirds of the surveyed countries (at all levels of development) provide agricultural insurance premium subsidies, with subsidies usually on the order of 50 percent of the original gross premium. Some countries also offer variable premium subsidies. A few countries, such as India, cap premiums. Premium subsidy programs are offered mainly under MPCI or area-yield insurance (a major exception is South Africa, which offers nonsubsidized MPCI to individual farmers). Most named-peril crop insurance products, such as hail insurance, have been offered for many years without any public subsidies. Government intervention in livestock insurance is much lower than for crop insurance: only 35 percent of the surveyed countries offer livestock insurance premium subsidies.

Governments also provide public reinsurance (32 percent of surveyed countries), subsidies on administrative and operational expenses (16 percent), and loss adjustment subsidies (6 percent). Public sector support to reinsurance is higher in high-income than middle-income economies. Forms of support range from national reinsurance companies to agreements under which governments act as excess-of-loss reinsurers (in such cases, the government charges no reinsurance premium). Governments can also provide support with legislation (51 percent of crop programs and 33 percent of livestock programs reviewed) and research, development, and training (44 percent of crop programs and 33 percent of livestock programs reviewed).

Only 11 percent of the surveyed countries have developed special programs for small and marginal farmers, usually in the form of additional

premium subsidies. In some countries, such as Chile, rural banks and insurance companies have developed such programs. In Mexico the public reinsurance company supports small farmers' self-insurance groups.

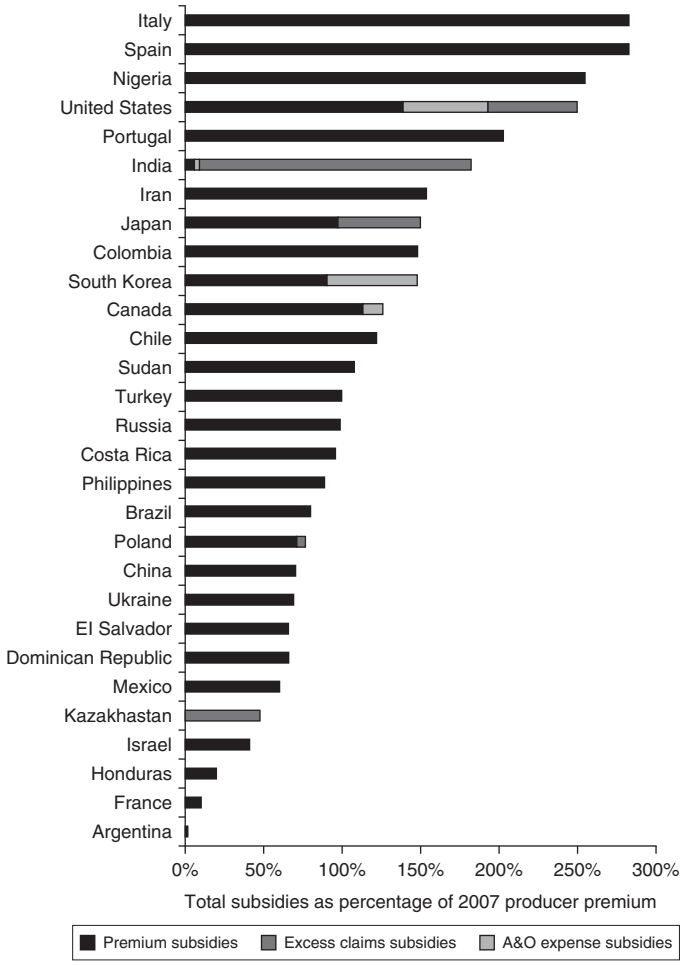
The total public cost of agricultural insurance programs is estimated at 68 percent of the 2007 global premium volume, of which upfront premium subsidies represent 44 percent. On the basis of the World Bank survey in 65 countries, the overall government cost of upfront premium subsidies is estimated at 44 percent of original gross premiums. With the inclusion of administrative and operating subsidies and claim subsidies, the total cost to governments of agricultural insurance provision may be as high as 68 percent of original gross premiums.

The public cost of agricultural insurance subsidies represents 50–300 percent of the premiums paid by farmers in the majority of the countries surveyed. Public support to agricultural insurance in many high-income countries (including Italy, Spain, and the United States) represents more than twice the premium paid by farmers. In contrast, in most of the middle- and low-income countries surveyed, public support to agricultural insurance represents 50–150 percent of the premium paid by farmers (figure 3).

Subsidies are not always a precondition for high penetration. High levels of agricultural insurance uptake can be found not only for programs that carry high premium subsidy levels (such as MPCI in Canada, India, and the United States) but also in countries that have strong traditions in agricultural insurance through unsubsidized named-peril crop insurance and livestock insurance (such as Argentina, Australia, and Germany). The survey results thus do not support the argument that premium subsidies are a precondition for farmers and herders to purchase agricultural insurance.

PPPs in agricultural insurance tend to improve the financial performance of government-sponsored agricultural insurance programs. Loss ratios (a simple measure of the financial performance of an insurance program) seem to be lower when programs are managed by the private sector, sometimes with support from the government through PPPs. This may be a consequence of better implementation of insurance principles, such as sound underwriting procedures and better pricing of risk; lower administrative costs; and greater financial discipline of private insurers.

Figure 3 Government Subsidies as Percentage of 2007 Premium Paid by Producers in Selected Countries



Source: World Bank Survey 2008.
Note: The producer premium is the share of total premium paid by the farmer after deduction of premium subsidies. Excess claims subsidies in Kazakhstan are based on a three-year average for 2004–07. The figure for the United States excludes private crop hail insurance.

How Should Governments Support Agricultural Insurance?

Where it is offered, public support to agricultural insurance is part of the government's overall agricultural policy, which may seek to correct market and regulatory inefficiencies and be part of broader objectives.

Each agricultural insurance program is unique and requires tailor-made solutions. That said, several key features emerge that governments may want to consider when designing and implementing agricultural insurance.

Agricultural insurance is part of a comprehensive agricultural risk management framework. It can contribute to the modernization of agriculture. However, it cannot operate in isolation. It should be promoted only when basic agricultural services—such as timely availability of inputs, extension services, and efficient marketing channels for agricultural outputs—are in place.

Agricultural insurance programs need to be customized to beneficiaries. The emerging commercial agricultural sector needs more standardized insurance products offered through cooperatives or rural finance institutions, such as credit-linked agricultural insurance. The traditional farming sector may not be geared toward commercial insurance; governments may therefore need to consider alternative support mechanisms, in the form of social safety net schemes, for example.

Agricultural insurance is a complex line of business that requires highly technical expertise, both in development and operational phases. Private insurance markets have proved to be efficient, without public intervention, for dealing with nonsystemic risk and large farmers, but purely commercial insurance may not be viable for systemic risks or smaller farmers. The primary role of governments should be to address market and regulatory imperfections in order to encourage participation by the private insurance and reinsurance industry.

In competitive markets, insurance premiums should be risk based and differentiated, thus reflecting the underlying risk exposure. Actuarially sound rates draw attention to the agricultural production risk exposure of individuals, firms, or governments and allow them to evaluate the benefits of agricultural risk management programs by comparing the cost of risk reduction investments with the resulting reduction in potential losses. They inform farmers and herders about their risk exposure and provide them with incentives to invest in risk mitigation activities (for example, irrigation) or to shift from nonviable crops to more viable crops. Risk-based premiums can also assist governments in the financial planning of agricultural losses through improved assessment of their contingent liability. By understanding their exposure, governments can

better assess their liabilities in case of natural calamities and devise appropriate financial strategies.

Governments must carefully analyze the fiscal implications of government-sponsored agricultural insurance programs, whose costs may not be sustainable in the long term. Subsidies on agricultural insurance premiums should be carefully considered, because they can distort price signals and provide inappropriate incentives to farmers and herders to invest in unprofitable farming activities. The World Bank survey does not support the argument that premium subsidies are always a prerequisite if farmers and livestock breeders are to purchase voluntary crop and livestock insurance, as shown by several named-peril crop insurance programs. Where subsidies are offered, planners should carefully identify which beneficiaries, crop or livestock sectors, and regions to target and whether the subsidies will be provided for a limited period or phased out over time once agricultural insurance takes off and achieves a critical presence in the market.

In start-up situations, where market infrastructure is not yet developed, a technical support unit could be established to provide specialized services to agricultural insurance companies and other risk-pooling vehicles. This unit should have support from the government, insurers, and reinsurers. It could be either a stand-alone entity or hosted by an insurance provider (such as agricultural insurance pools or monopoly insurer). The goals of the technical support unit would include the following:

- Create a center of expertise able to support the development and scaling up of agricultural insurance.
- Establish a core team of agricultural insurance experts to provide technical support to agricultural insurers in underwriting, product development, pricing, product delivery, loss adjustment, catastrophe risk financing, and so forth.
- Create and manage a centralized database of agricultural and weather statistics, and make the database available to agricultural insurance practitioners.
- Promote the exchange of expertise among insurance companies and access to international best practice through training courses, operations manuals, and other means.

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