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Foreword

Asia and the Pacific region has one of the highest exposures of any region in the world to natural hazards including typhoons, floods, landslides, droughts, earthquakes, volcanic eruptions and tsunamis. Weather-related risks, particularly hurricanes, flooding and drought, are a frequent occurrence and affect crop yields, livelihoods and assets, and the personal safety of vulnerable groups across the region. The frequency with which these disasters occur often taxes the ability of such groups to rebound quickly, increasing their risk of hunger and malnutrition. Low-cost agricultural insurance schemes are increasingly viewed as mechanisms for providing social protection to the increasing numbers of people affected by such risks and in helping to lessen the impacts they suffer owing to such shocks.

Agricultural insurance systems in the region range from major public sector programmes of India and the Philippines through to public-private partnerships in China and the Republic of Korea and finally to purely private markets encountered in Australia and New Zealand and non-formal private mutual and community-based crop and livestock initiatives in Bangladesh, India and Nepal.

This publication is based largely on the outcome of a study commissioned by FAO to provide a comprehensive up-to-date review and assessment of different models of agricultural insurance provision in Asia and the Pacific region, together with guidelines and recommendations to policy-makers seeking to introduce agricultural insurance programmes.

Information presented in the publication is based on data collected through field visits of the author to four countries in the region – China, India, Indonesia and Thailand – and draws on the experience of the insurance programmes in other countries of the region. The information is presented in a comprehensive but easy-to-read format that allows direct comparisons to be made between countries. The document also provides valuable insights into the sustainable implementation of insurance programmes.

This publication provides the basis of FAO's future work on capacity building on the subject of agricultural insurance in the region. It is hoped that the information presented in this publication provides a useful basis for countries in developing their policies and programmes on the subject.

Hiroyuki Konuma
Assistant Director-General and
FAO Regional Representative for Asia and the Pacific

Acknowledgements

This report was authored by Charles Stutley, an agricultural economist who has worked for more than 20 years in the assessment of risk in agriculture and in the design and implementation of agricultural insurance and reinsurance solutions in a wide range of developed and developing countries. He currently works as a consultant for various international development organizations including FAO, GTZ and the World Bank in Africa, Asia and Latin America.

The author is grateful for the assistance given by FAO and APRACA in Bangkok in arranging the survey visits to Thailand, China, Indonesia and India. Similar thanks are extended to all the individuals and insurance companies and government ministries and other organizations met during the conduct of the survey visits. Finally, thanks are due to those persons in the insurance and reinsurance market who contributed useful information on agricultural insurance in other countries.

This publication is dedicated to the memory of

Ake Olofsson
Rural Infrastructure and Agro-Industries Division (AGS)
FAO Headquarters

who contributed greatly to the preparation of this publication

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Abbreviations and acronyms

AAACP	All ACP Agriculture Commodities Programme
AAIB	Agricultural and Agrarian Insurance Board
ACP	Africa, Caribbean and Pacific countries
ADB	Asian Development Bank
AIC	Agriculture Insurance Company of India Limited
APRACA	Asia-Pacific Rural and Agricultural Credit Association
ARD	Agriculture and Rural Development
BASIX	Hyderabad-based microfinance group of companies involved in promoting sustainable rural livelihoods through financial and technical services including microcrop weather index insurance
CCE	Crop-Cutting Experiments
CCIS	Comprehensive Crop Insurance Scheme (India's national area yield index crop insurance scheme introduced in 1985)
CCRIF	Caribbean Catastrophe Rick Insurance Fund
CIDA	Canadian International Development Agency
CIRC	China Insurance Regulatory Commission
CLDDP	Community Livestock and Dairy Development Project
CLDP	Community Livestock Development Programme
CRF	Calamity Relief Fund
CRM	Climate Risk Management
CRMG	Commodity Risk Management Group, ARD, World Bank
CUPIC	China United Property Insurance Company
CWII	Crop Weather Index Insurance
DBM	Department of Budget and Management
DICGC	Deposit Insurance and Credit Guarantee Corporation
DID	Development International Desjardins
DMO	Disaster Management Office
DND	Department of National Defence
ENSO	El Niño Southern Oscillation
FAO	Food and Agriculture Organization of the United Nations
FELCRA	Federal Land Consolidation and Rehabilitation Authority
FELDA	Federal Land Development Authority
GFDRR	Global Facility for Disaster Reduction and Recovery
GIC	General Insurance Corporation of India
GSIS	Government Service Insurance System

GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit GmbH, the German Society for Technical Cooperation
HIC	High Income Countries
HVCC	High-Value Commercial Crop
IFAD	International Fund for Agricultural Development
IPCC	Interngovernmental Panel on Climate Change
IRI	International Research Institute for Climate and Society, Columbia University
KFIC	Korea Foreign Insurance Corporation
KNIC	Korea National Insurance Corporation
MFI	Microfinance Institutions
MNAIS	Modified National Agricultural Insurance Scheme
MPCI	Multiple Peril Crop Insurance
NACF	National Agricultural Cooperative Federation
NAIS	National Agricultural Insurance Scheme
NCCF	National Calamity Contingency Fund
NDCC	National Disaster Coordinating Council
NDVI	Normalized Difference Vegetation Index
PCIC	Philippines Crop Insurance Corporation
PCRAFI	Pacific Catastrophe Risk Assessment and Financing Initiative
PIC	Pacific Island Countries
PICC	People's Insurance Company of China
PLCF	Participatory Livestock Compensation Fund
PLMSC	Philippines Livestock Management Services Corporation
PPP	Public Private Partnerships
RISDA	Rubber Industries Smallholder Development Authority
RS	Remote Sensing
SBC	Sadharin Bima Corporation
SFCL	Small Farmer Cooperatives Limited
SICL	SANASA Insurance Company Limited
SST	Sea Surface Temperature
TSI	Total Sum Insured
UMI	Upper Middle Income
UNFCCC	United Nations Framework Convention on Climate Change
WBCIS	Weather Based Crop Insurance Scheme
WFP	World Food Programme
WII	Weather Index Insurance
WRMF	Weather Risk Management Facility – a joint initiative between IFAD and WFP

Executive summary

In 2010 FAO commissioned this study to review and assess agricultural insurance models in Asia and the Pacific region and to provide guidelines and recommendations to policy-makers seeking to introduce agricultural insurance programmes into their own countries. Agricultural insurance systems in the region are varied and include the major public sector programmes of India and the Philippines, the public-private partnerships (PPPs) in China and the Republic of Korea, the purely private markets encountered in Australia and New Zealand and the non-formal private mutual and community-based crop and livestock initiatives found in Bangladesh, India and Nepal.

Asia and the Pacific region has one of the highest exposures of any region in the world to natural hazards including typhoons, floods, landslides, droughts, earthquakes, volcanic eruptions and tsunamis. This presents major challenges for the design and implementation of agricultural insurance systems.

This study of agricultural insurance in Asia and the Pacific region covers a total of 44 countries, territories and areas including 31 low income to upper middle income countries, territories and areas and 13 high income countries, territories and areas. Eight of the countries are located in South Asia and 36 countries, territories and areas are in East Asia and the Pacific, including 15 Pacific Island countries and territories.

Risk management and the role of agricultural insurance

Chapter 2 of this report presents a review of the role of agricultural insurance as one risk management tool. It highlights the fact that agriculture is subject to a very wide range of risks, only some of which can be dealt with under a crop or livestock insurance policy. A frequent mistake of policy-makers is to regard agricultural insurance as a silver bullet for risk management and climate adaptation and to opt for insurance without conducting a systematic supply chain risk assessment to determine whether agricultural insurance is the most appropriate or most cost-effective risk management tool.

Farmers in the region use a wide range of strategies to manage risk in agriculture and these can conveniently be categorized into informal (farm-household and community-based) and formal (market-based or publicly provided) risk management strategies. Traditional or informal risk management practices adopted by farmers cannot provide protection against high severity low frequency covariate risks that in this region centre on typhoons, floods, tsunamis and droughts. In these cases, risk transfer and insurance either through private mutual insurance and commercial insurance and/or publicly provided agricultural insurance may have an important role to play.

This report shows that agricultural insurance and particularly new index insurance may have important roles to play in managing climatic and natural risks at different levels of aggregation, including at the individual farmer or micro level to smooth production and incomes against major weather shocks, at the mesolevel as a business interruption cover to protect the agricultural loan portfolio of financial institutions and even input suppliers, and also at a macro or government level to ensure early relief and food security after natural disasters.

The limitations of agricultural insurance are also identified in Chapter 2, including the fact that agricultural insurance is not a panacea and cannot replace sound risk management. It cannot operate effectively in isolation and it is seldom an appropriate product for subsistence farmers.

Agricultural insurance provision in Asia and the Pacific region

There is a lengthy tradition of agricultural insurance in the region with Australia, Japan and New Zealand providing crop and livestock insurance for more than 75 years.

Currently in 2010 agricultural insurance is present either in a pilot form or a fully mature national-level programme in 20 (45 percent) of the 44 countries, territories and areas in the region (Chapter 3). Fourteen (32 percent) countries in the region are identified as having no agricultural insurance in 2010 and in ten (23 percent) small Pacific Island Countries (PIC) the status of agricultural insurance provision is unknown; although it is believed that there is no agricultural insurance in any of the PIC territories.

In 2010 agricultural insurance is available in five (63 percent) of the eight South Asia region low income (LI) and lower middle income (LMI) countries, namely Bangladesh, India, Nepal, Pakistan and Sri Lanka, but is not available in Afghanistan, Bhutan and Maldives.

In the East Asia and Pacific region, agricultural insurance is available in 15 (42 percent) countries, comprising two LI countries Democratic People's Republic of Korea and Viet Nam, five LMI countries, China, Indonesia, Mongolia, the Philippines and Thailand, one upper middle income (UMI) country, Malaysia, and seven high income countries, territories and areas (HIC), namely Australia, French Polynesia, Guam, Hong Kong SAR (China), Japan, New Zealand and the Republic of Korea.

Over the past five years there has been huge growth in agricultural insurance provision in Asia and the Pacific region. The agricultural insurance premium volume for the region has increased from US$1.6 billion in 2005 to nearly US$4.0 billion in 2009 and now represents slightly over 20 percent of the total global agricultural insurance premium. The major growth in agricultural insurance has occurred in China, which now accounts for nearly US$2 billion or 50 percent of the total regional agricultural insurance premium.

There are a wide range of institutional frameworks for agricultural insurance in Asia and the Pacific region, including the public sector crop insurance models found in Democratic People's Republic of Korea, India, and Philippines, public-private partnerships that are increasingly popular throughout the region, and the pure market-based models found in Australia and New Zealand.

The public sector subsidized multiple peril crop insurance schemes in Asia and the Pacific region have mostly performed very poorly and many of these programmes have either been reformed or replaced by public-private partnerships. In Bangladesh, the former public sector crop insurance scheme has ceased operating; in the Philippines the national rice and maize insurance scheme implemented by the Philippines Crop Insurance Corporation (PCIC) has undergone major rate increases over time to improve performance, and in India the government has decided to start reforming the National Agricultural Insurance Scheme (NAIS) in 2010/11 and to move this from a social insurance programme to a market-based and commercially implemented crop insurance scheme. Finally, in China where PICC, the former state insurance company, has enjoyed a near monopoly over agricultural insurance since the mid 2000s, the government has promoted a major expansion of private sector led agricultural crop and livestock insurance.

Major growth in public-private partnerships for agricultural insurance has occurred in China and in the Republic of Korea over the past decade. In both countries their respective governments have provided major support to agricultural insurance in the form of premium subsidies and in reinsurance protection.

In 2009 the major agricultural insurance markets in Asia and the Pacific region by premium volume were China (50 percent of total premium), Japan (31 percent), India (11 percent), Australia (4 percent) and the Republic of Korea (3 percent), and overall these five markets accounted for over 98 percent of the total regional premium. In contrast, agricultural insurance in most of the other 15 countries in the region that have some sort of agricultural insurance is comparatively new and the penetration levels are very low.

In 2010 crop insurance was present in 80 percent of the countries reviewed under this study that had some form of agricultural insurance. The most popular form of traditional indemnity-based crop insurance product is Multiple Peril Crop Insurance (MPCI) found in 53 percent of countries, followed by named-peril crop insurance (41 percent of countries) and greenhouse insurance (35 percent of countries). Forestry insurance is also available in 53 percent of the countries.

Weather index insurance (WII) was first introduced into India as recently as 2003 and is receiving major attention in the region and is now being researched and/or pilot tested in a total of 8 (47 percent) of the 17 countries with agricultural insurance, namely China, India, Indonesia, New Zealand, Philippines, Sri Lanka, Thailand and Viet Nam. All the programmes in the region are developmental or micro level programmes targeted at individual farmers. In India, both the public sector and the private sector are involved in underwriting WII and this product is being scaled up massively with premium subsidy support from the government as an alternative to the traditional NAIS area-yield-based scheme. Thailand is now in its fourth year of operating a private sector rainfall deficit index scheme for maize: this scheme is purely voluntary and carries no premium subsidies and the main challenge is to create demand for the product and to scale up the programme.

Livestock insurance is also available in 88 percent of the countries with agricultural insurance. The largest livestock insurance markets are China, where the government provides subsidies for epidemic disease cover for a national sow and dairy cow programme, Japan, the Republic of Korea

and India. Aquaculture insurance is available in 41 percent of the countries, but usually on a very small-scale, and poultry insurance is available in 29 percent of the countries. Mongolia is unique in having the only livestock index mortality scheme in the world. Thailand and Democratic People's Republic of Korea are the only countries studied that did not have livestock insurance in 2010.

A feature of several Asian countries is the mutual or community-based microlivestock insurance schemes in Bangladesh, India and Nepal. These schemes have usually been designed by farmer cooperatives and MFIs where small and marginal livestock breeders do not have access to commercial livestock insurance and the schemes provide livestock-credit guarantee protection against the death of the animal. These mutual insurance schemes are reviewed in Chapter 5 of the report.

The highest insurance penetration rates are found in countries that have large national subsidized schemes and where crop and livestock insurance is either compulsory (e.g. Japan for cereals, China for livestock epidemic disease cover) or compulsory for crop-credit recipients (e.g. India under the NAIS scheme). Similar adoption rates tend to be high in the richest countries such as Australia and New Zealand: these two markets demonstrate clearly that subsidies are not necessarily the only driver of agricultural insurance uptake and that where a competitive market exists with a comprehensive range of products, voluntary demand may also be very high.

The analysis also shows that in many of the LI or LMI countries where there is little or no tradition of crop and livestock insurance and where the supply of products and services is very restricted current penetration levels are correspondingly low (e.g. Bangladesh, Indonesia, Malaysia, Nepal, Pakistan, Thailand and Viet Nam). The major challenge for policy-makers in these countries is how to support and encourage private commercial insurers to develop and implement and scale-up the range of products and services they offer to farmers in their countries.

The financial performance of subsidized and non-subsidized crop and livestock insurance is reviewed in Chapter 3. The analysis shows that many of the subsidized crop insurance schemes continue to perform very poorly today. In contrast, most of the private crop and livestock insurance programmes are operating profitably with loss ratios of less than 75 percent.

Public sector support to agricultural insurance

Government support to crop insurance is very high in Asia and the Pacific region (see Chapter 4). The most popular form of support is crop insurance premium subsidies that are provided by governments in eight (57 percent) of the 14 countries with commercial and pilot crop insurance programmes, namely China, Democratic People's Republic of Korea, India, Indonesia, Japan, Pakistan, the Philippines and the Republic of Korea (Table 4.1 and Figure 4.1). China and Japan have very heavily subsidized crop insurance markets and the costs to governments run into many hundreds of millions of dollars (in 2010). Governments also subsidize the costs of crop insurance administration and operating (A&O) expenses in 38 percent of the countries and provide support to the reinsurance programmes in 38 percent of countries.

Japan is the most heavily supported crop insurance market and other very heavily subsidized crop insurance markets include China, Democratic People's Republic of Korea, India and the Republic of Korea. In contrast, there is no government support to the mature crop insurance markets in Australia and New Zealand. In the group of LI or LMI countries, governments currently provide little or no support to crop insurance and no premium subsidies. In several countries that have introduced crop insurance in recent years, including Thailand (since 2007), Nepal (since 2009) and Indonesia (since 2010) and Viet Nam (WII pilots awaiting implementation since 2008), the governments currently provide little or no support to crop insurance and no premium subsidies. In Viet Nam, however, the government is planning in 2011 to introduce a national PPPs pilot scheme for crops, livestock and aquaculture and it will receive premium subsidies.

Livestock insurance premium subsidies are again the most popular form of government support to livestock insurance in Asia and the Pacific region and are found in six countries (43 percent of the 14 countries with livestock insurance) namely China, India (since 2007), Indonesia, Japan, Nepal, and the Republic of Korea. The next most common form of government support is livestock reinsurance protection and this applies to China, India, Japan and Mongolia. Japan again has the most comprehensive government support to livestock insurance of any country.

In 2009 the total cost of agricultural insurance premium subsidies to governments in Asia and the Pacific region rose to nearly US$2 billion or a 250 percent increase over 2007 subsidy levels. In 2009 total agricultural insurance premiums in the region were US$3.9 billion and total premium subsidies were US$1.96 billion or 50 percent of the total premium. Five countries accounted for 99 percent of these premium subsidies with China and Japan the most heavily subsidized countries.

Whereas China and India, the fastest growing emerging economies in Asia and the Pacific region, can probably continue to increase their agricultural premium subsidies, it is very debatable whether the smaller nations in the region that are only now seeking to scale up their agricultural insurance programmes would be able to afford the huge premium subsidy costs implied.

Small farmer agricultural insurance initiatives in Asia

The first part of Chapter 5 deals with a review of some of the small-scale private livestock and occasional crop insurance initiatives that are being implemented by the informal or non-regulated insurance sectors in Bangladesh, India and Nepal. The key features of these programmes are: (1) most of the programmes are livestock microinsurance schemes linked to MFI credit, or in other words the products offered by the microinsurers are "credit-guarantee" policies where the sum insured is closely linked to the amount of the loan; and (2) the cover period terminates once the loan has been repaid. The livestock microinsurance schemes in most cases are not approved by or authorized by the insurance regulatory authority in any of the three countries.

The lack of formal recognition of these microinsurance programmes means that the MFIs cannot access formal loss protection from local commercial insurers and/or reinsurers and this leaves the MFIs very exposed to catastrophe disease losses that would undermine the financial

viability of the schemes. Only one of the microagricultural insurance programmes reviewed attracts any form of financial or other support from national or local governments. As such, the premiums and claims are usually financed exclusively by the private mutual insurer and its members.

Issues and options for agricultural insurance in the Pacific Islands countries

Currently there is no commercial crop or livestock insurance programme in the 15 Pacific Islands countries. Chapter 5 presents a review of the various initiatives that are currently being implemented at both macro level and micro level in the Pacific Islands region to assess natural hazard exposures including typhoons, floods and earthquakes and to investigate the potential for catastrophe risk transfer and insurance.

Research is being conducted in the Pacific region at a macro level to assist the Pacific Island governments to develop disaster risk assessment tools and financial instruments to reduce their vulnerability to natural disasters (e.g. typhoons, floods and earthquakes). The macro level work includes the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI), which is being funded jointly by the Global Facility for Disaster Reduction and Recovery (GFDRR) of the World Bank and the Government of Japan. This aims to provide Pacific Island governments with a combination of disaster risk assessment tools to strengthen their abilities to model the financial impact of natural disasters and also financial instruments in the form of a pooled Disaster Risk Fund to reduce their financial vulnerability to natural disasters.

At a micro or individual farmer level, there is currently only one commercial typhoon index insurance scheme operating in Asia and the Pacific region, in this case for rice farmers in the Philippines, and this product may have useful applications to agriculture in the Pacific Islands Countries (PIC).

In 2010 research into macro level and micro level agricultural risk management options was also being conducted at an island level, starting with Samoa, as part of the Pacific Regional Work Plan of the All ACP Agricultural Commodities Programme (AAACP). This study concluded that in Samoa options appear to exist for initially introducing meso level typhoon index cover linked to an existing disaster management programme and then once experience has been gained, to develop micro level individual farmer top-up index cover.

On the basis of this study, it appears that traditional indemnity-based crop insurance options may be very limited for farmers in the Pacific Island countries, but that there may be scope for weather index covers that insure against key perils such as typhoon, excess rain (as a proxy for flood) and possibly also for rainfall deficit (drought).

Options and recommendations for government support to agricultural insurance in Asia and the Pacific region

The final Chapter of this report presents a series of recommendations on the supporting roles governments can play in promoting the introduction of agricultural insurance. In start-up situations, where there is currently no agricultural insurance supply, governments can play a very

important role in creating an agricultural insurance infrastructure, including: establishing an enabling legal and regulatory framework; enhancing weather station infrastructure and data and information systems; carrying out insurance product research and development; and arranging education, training and capacity building for insurers, distributors (banks, MFIs, input suppliers) and farmers. In some situations it may also be cost-effective for governments to provide high layer catastrophe reinsurance protection. Finally, whereas governments may wish to use carefully targeted premium subsidies to promote agricultural insurance uptake, this report recommends that they should exercise extreme caution about offering open-ended premium subsidy support that once introduced is very difficult to withdraw.

Chapter 1
Introduction

Importance of agriculture in Asia and the Pacific region and exposure to climatic hazards

Asia and the Pacific region comprises 31 low income to upper middle income countries, territories and areas and 13 high income countries, territories and areas (Annex 1.1).[1] The region includes the world's two most populated nations, China and India, with 2009 populations of 1.33 billion and 1.16 billion respectively. At the other extreme, the region includes many very small Pacific Island countries with populations of less than 0.5 million including the smallest territory, Palau, with a 2009 population of only twenty thousand. Overall, these 44 countries, territories and areas had a total regional population of 3.7 billion people or 55 percent of the total global population in 2009 (Annex 1.2).[2]

In economic terms, the group of 31 low and middle income nations range in size from Kiribati with a 2008 GDP of US$137 million to China with a 2008 GDP of US$4.3 trillion, making it the third largest economy in the world. The group of high income countries, territories and areas ranges in size from Brunei Darussalam with a 2008 GDP of US$11.5 billion to a high in Japan of US$4.9 trillion, which makes it the world's second largest economy in 2008. (Annex 1.2).

Agriculture continues to be extremely important in many of the low and middle income countries in Asia and the Pacific region, accounting for about one-third of the 2008 GDP in Afghanistan, Cambodia, the Lao People's Democratic Republic, Nepal and the Solomon Islands, 19 percent of the GDP in India and 13 percent of the GDP in China. Overall, agriculture accounted for 13 percent of the total 2008 GDP for the 31 low and middle income countries in Asia and the Pacific region in 2008. In contrast, agriculture contributed only 1.3 percent of the total GDP in the 13 high income countries, territories and areas in the region in 2008. (Annex 1.2).

Asia and the Pacific region has one of the highest exposures of any region in the world to natural disasters, including typhoons, floods, landslides, droughts, earthquakes, volcanic eruptions and tsunamis. The region includes seven of the world's 15 most exposed countries to multiple hazards (by area) including the most exposed area Taiwan Province of China, which has 73 percent of land area and its population exposed to four hazards. This is followed by Vanuatu (ranked 3rd in terms of exposure to four hazards), the Philippines (4th), Japan, (8th), Viet Nam (9th), the Solomon Islands

[1] See http://databank.worldbank.org
[2] See http://databank.worldbank.org

and Nepal. For example, 62 percent of the area of the Philippines and 74 percent of its population are exposed to two or more of these natural hazards and it is one of only three countries in the world that is exposed to five or more natural hazards (World Bank, 2005a). Between 1905 and 2007, natural disasters caused more than 54 000 deaths and more than US$9.0 billion in estimated damage to property and infrastructure in the Philippines.[3]

Agriculture in Asia and the Pacific region is highly exposed to the key climatic risks of typhoon, flood and drought and for many of the Pacific islands there is also a major exposure to tsunamis. In the most northerly territories (e.g. China, Japan, Mongolia and Nepal) agriculture is also exposed to hail, frost (freeze) and snow damage. Hail and frost are also major exposures in parts of Australia and in New Zealand. The annual average losses to crop production are varied in the region. For example, in China the figure is about 9 percent; in India insured losses under the National Agricultural Insurance Scheme (NAIS) averaged nearly 10 percent per annum over the past 30 years; in Bangladesh it is estimated that annual average losses in the national paddy crop to droughts, floods and typhoons is about 6.4 percent per annum and in Nepal about 6.5 percent of national food crop production is lost each year because of natural perils.[4]

In response to the major climatic hazards faced by farmers in Asia and the Pacific region, there has been a lengthy history of public and private crop and livestock insurance.

Growth of public and private agricultural insurance in the region

The earliest agricultural insurance programmes in Asia and the Pacific region date back more than 75 years and include Japan, which has a very large and government subsidized cooperative crop and livestock insurance programme and Australia and New Zealand, which have the largest private commercial crop, forestry and livestock insurance sectors in the region.

During the late 1970s major public sector Multiple Peril Crop Insurance (MPCI) initiatives, targeting primarily small and marginal farmers, were launched by governments in Bangladesh, china, India, the Philippines and Thailand. The programmes in Bangladesh and Thailand were launched on a pilot basis, never achieved scale-up and were terminated in the 1990s following very poor financial performance. The national programmes in India and the Philippines have continued up to today, and in China, where PICC formerly enjoyed a near monopoly over crop insurance up to the 1990s, the Chinese government embarked on a major programme to promote decentralized agricultural insurance in 2006, and there is now a much larger number of national and provincial commercial crop insurance companies.

There has been a major expansion in Public Private Partnerships (PPP) for agricultural (crop and livestock) insurance in Asia and the Pacific region over the past decade. The major new programmes include China, which in the past three years has grown to become the second largest subsidized PPPs agricultural insurance market in the world and the Republic of Korea where the

[3] Data retrieved from EM-DAT: The International Disaster Database, Centre for Research on the Epidemiology of Disasters (CRED), School of Public Health, Universitá Catholique de Louvain, Brussels, Belgium. (Available at www.emdat.be).

[4] For China, see World Bank, 2007; for India, see Rao, 2010a; for Nepal see World Bank, 2009a; and for Bangladesh see World Bank, 2010a.

government has supported the cooperative and private insurance companies to introduce crop and livestock insurance since 2001.

There has also been a major interest in new product types including mainly private-sector crop weather index insurance (WII). The first micro level or individual farmer WII insurance programme was launched in India in Andhra Pradesh in 2003 by ICIC Lombard Insurance Company in conjunction with BASIX a local MFI, for small and marginal farmers growing castor and groundnuts. Since then WII has been scaled up in India by both the public and private insurance sectors with government premium subsidy support. Other countries that are either conducting research and development into or implementing pilot WII include Bangladesh, China, Indonesia, the Philippines, Sri Lanka, Thailand and Viet Nam. There is also a livestock-mortality index programme in Mongolia.

In several territories, including Bangladesh, India and Nepal, there are also examples of mutual and or community-based livestock insurance initiatives that have been designed and implemented by small farmer organizations. In Nepal there is also a small community-based crop insurance pilot programme.

There is, however, a major gap in agricultural insurance provision in the mainly small island economies of the Pacific region. To a greater or lesser extent these territories are small and the agricultural crop and livestock sectors are correspondingly small and highly exposed to natural perils including typhoons, floods, tsunamis, and droughts. This report reviews research that is being conducted under the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) at a macro level to assist 15 Pacific Island governments to develop disaster risk assessment tools and financial instruments to reduce their vulnerability to natural disasters, especially typhoons, floods and earthquakes.

FAO's role in promoting agricultural insurance in the region

FAO has been involved in the promotion of agricultural insurance in Asia and the Pacific region, dating as far back as in 1986 when it sponsored a regional expert consultation on agricultural insurance programmes in Asia that was held in Tianjin, China. The expert consultation reviewed existing public-sector multiple-peril crop insurance MPCI programmes in Bangladesh, China, the Philippines, and Thailand, all of which were operating at a loss (loss ratios in excess of 100 percent) and a series of specific risk programmes that exhibited more commercially viable loss ratios, including Malaysia's private-sector named peril cover for plantation crops (loss ratio 41 percent) and in Pakistan's two private livestock insurance programmes (loss ratio 81 percent). Other countries that participated in this consultation and that did not have formal crop or livestock insurance at the time included Indonesia, Nepal, and the Republic of Korea.

In 1991 FAO commissioned a series of case studies into the lessons and experience of crop insurance and this included reviews of agricultural insurance provision in India, Pakistan and the Philippines (FAO, 1991a).

In 1991 FAO also commissioned a global survey of agricultural insurance provision (FAO, 1991b). A total of 74 countries responded to this survey and 51 of these had some form of crop insurance.

In Asia and the Pacific region twelve countries that provided crop insurance were identified – in most cases the programmes were public sector or government crop insurance schemes. This compendium has subsequently acted as one of the main sources of information on agricultural insurance provision at global and regional level.

FAO is also active in supporting specialist agricultural insurance networks and workshops in the region, including participation on the Asia-Pacific Organization workshop on agricultural insurance in New Delhi in 2007 and a workshop to promote aquaculture insurance in Asia that was held in Bali, Indonesia in 2007.

More recently, FAO has published two bulletins that update crop and forestry insurance provision in developing countries (FAO, 2005) and livestock and aquaculture insurance in developing countries (FAO, 2007b).

Objectives and methodology of this overview of agricultural insurance

This study was commissioned by FAO to provide an up-to-date review and assessment of the different models of agricultural insurance provision in Asia and the Pacific region and to provide guidelines and recommendations to policy-makers seeking to introduce agricultural insurance into their own countries. Agricultural insurance systems in the region range from the major public sector programmes of India and the Philippines through to the PPPs in China and the Republic of Korea and finally the purely private markets encountered in Australia and New Zealand and the non-formal private mutual and community-based crop and livestock initiatives encountered in Bangladesh, India and Nepal.

In the conduct of this regional agricultural insurance study, it was decided not to attempt a formal survey given the complexity of public and private sector agricultural insurance provision in many of the territories. Instead, visits were made to four key countries including China, India, Indonesia and Thailand.[5] In addition, the Writer had visited Bangladesh, Nepal, the Philippines and Viet Nam in the past 12 months and the report draws on the findings of these earlier visits.

The study was restricted to the 44 countries, territories and areas of Asia and the Pacific region as listed in Table 1.1 and Annex 1.2.

Table 1.1: List of countries, territories and areas in Asia and the Pacific region by income group (2008)*

Income group	South Asia	East Asia and the Pacific	Total
Lower income	3	5	8
Lower middle income	5	14	19
Upper middle income	0	4	4
High income	0	13	13
Total	8	36	44

* Income group classification in 2009 as per World Bank, http://databank.worldbank.org

[5] Sri Lanka was included in the list of countries to be visited, but had to be cancelled at short notice.

The report also draws on the findings of a major World Bank 2008 global survey of agricultural insurance provision that covered ten Asia-Pacific territories: Australia, China, India, Japan, Mongolia, Nepal, New Zealand, Philippines, the Republic of Korea and Thailand (Mahul and Stutley, 2010). For other countries, secondary published sources have been used wherever possible, including the FAO 1991 Crop Compendium and the UNCTAD 1994 agricultural insurance survey of developing countries. Finally, this report draws on the author's contacts in the insurance and reinsurance sectors and in international development agencies.

The author is very grateful to FAO for their assistance in the conduct of this study and to the many individuals and organizations who were met during the country survey visits and subsequently.

Report outline

This report is set out in six chapters, including this introductory Chapter. This is followed by a review in Chapter 2 of the role of agricultural insurance in agricultural risk management and development. Chapter 3 reviews the historical and current patterns of agricultural insurance provision in Asia and the Pacific region, including countries, territories and areas with and without agricultural insurance supply; the type of programme (private or public sector or PPPs); the range of crop insurance products and services provided; and, where possible, performance figures are presented. Chapter 4 presents a detailed analysis of the different types of public sector support to agricultural insurance in Asia and the Pacific region and the financial costs of this support. Chapter 5 is divided into two parts, the first deals with private sector initiatives in Asia, especially some small farmer case-studies, and the second part reviews the options and issues for agricultural insurance provision in the Pacific Islands countries where there is currently no agricultural insurance provision. Finally, Chapter 6 draws conclusions on the policy options and recommendations for governments' supporting role(s) to agricultural insurance in Asia and the Pacific region.

Annex 4 contains 17 detailed country level reports for selected countries in Asia and the Pacific region drawing on material collected under the World Bank Study (Mahul and Stutley, 2008) and additional material collected under the 2010 FAO/APRACA agricultural insurance survey. It is intended to act as a reference source for policy-makers and planners.

Chapter 2
Risk management and the role of agricultural insurance

Risk management in agriculture

Sources of risk in agriculture

Agriculture is subject to a multitude of risks and uncertainties that affect different actors in agricultural supply chains in different ways. Traditional agricultural risk assessment tends to focus on specific risks faced by different groups, for example climate risk affecting farmers' crop production and yields or the risk of disease in livestock, or the impact of price risk on commodity traders, rather than adopting an integrated approach to studying different sources of risk throughout the agricultural supply chain. In recent years the Agricultural Risk Management Team (ARMT) of the Agriculture and Rural Development (ARD) Department of the World Bank has developed a more holistic approach to analysing and quantifying risk in the agriculture supply chain leading on to risk transfer solutions where appropriate. This approach is referred to as Rapid Agricultural Supply Chain Risk Assessment (RapAgRisk). Table 2.1 presents a classification of the main sources of risk facing agricultural supply chains along with examples of the risk events that can lead to losses for farmers, input suppliers and output traders and other players in the chain.

Weather related risks including extreme weather events will not only impact adversely on the farmers' crop production and yields and the quality of the yield, but this in turn will affect the farmers' demand for inputs and other support services and their ability to repay loans and will also have an impact on buyers and processors upstream in the supply chain. Extreme natural or weather events, wherever they occur, may cause major disruptions in transport, communications and energy supplies affecting both upstream and downstream participants in the supply chain as well as the farmers. The RapAgRisk approach highlights the transmission of risk responses and the effects on each participant in the supply chain and their interdependency.

Agricultural crop insurance is a restricted instrument in that it only addresses production and yield loss because of weather, natural and (occasionally) biological risks. Crop insurance provides limited coverage for the growing crop from the time of sowing or crop emergency through to completion of harvest. It does not, however, usually address downstream sources of risk including post-harvest storage losses, or market price risk.[6]

[6] The US Federal Crop Insurance Programme (FCIP) is a rare example of a programme where both yield and price loss can be insured for specific commodities such as maize, wheat and soybeans.

Table 2.1: Categories of major risks facing agricultural supply chains

Type of risk	Examples
Weather related risks	Periodic deficit and/or excess rainfall or temperature, hail storms, strong winds.
Natural disasters (including extreme weather events)	Major floods and droughts, hurricanes, cyclones, typhoons, earthquakes, volcanic activity.
Biological and environmental risks	Crop and livestock pests and diseases, contamination related to poor sanitation, human contamination and illnesses, contamination affecting food safety, contamination and degradation of natural resources and environment, contamination and degradation of production processes and processing.
Market related risks	Changes in supply and/or demand that impact domestic and/or international prices of inputs and/or outputs, changes in market demands for quantity and/or quality attributes, changes in food safety requirements, changes in market demands for timing of product delivery, changes in enterprise/supply chain reputation and dependability.
Logistical and infrastructural risks	Changes in transport, communication, energy costs, degraded and/or undependable transport, communication, energy infrastructure, physical destruction, conflicts, labour disputes affecting transport, communications, energy infrastructure and services.
Management and operational risks	Poor management decisions in asset allocation and livelihood/enterprise selection, poor decision-making in use of inputs, poor quality control, forecast and planning errors, breakdowns in farm or firm equipment, use of outdated seeds, not prepared to change product, process, markets, inability to adapt to changes in cash and labour flows, etc.
Policy and institutional risks	Changing and/or uncertain monetary, fiscal and tax policies, changing and/or uncertain financial (credit, savings, insurance) policies, changing and/or uncertain regulatory and legal policies, and enforcement, changing and/or uncertain trade and market policies, changing and/or uncertain land policies and tenure system, governance related uncertainty (e.g. corruption), weak institutional capacity to implement regulatory mandates.
Political risks	Security-related risks and uncertainty (e.g. threats to property and/or life) associated with politico-social instability within a country or in neighbouring countries, interruption of trade because of disputes with other countries, nationalization/confiscation of assets, especially for foreign investors.

Source: Jaffee, Siegel and Andrews, 2008

Farmer strategies to manage risk in agriculture

Farmers all over the world use a range of strategies to manage risk in agriculture and it is useful to categorize these strategies as "informal" (farm-household or community-based) and "formal" (market-based or publicly provided) risk management strategies. Table 2.2 presents a classification of risk management strategies using this categorization into informal and formal strategies and then this is further divided into ex-ante (before the event) prevention and mitigation actions and ex-post (after the event) risk coping or risk minimizing actions (Jaffee, Siegel and Anderson, 2009).

Table 2.2: Informal and formal risk management strategies in agriculture

Informal risk management strategies		
	Farm household (mitigating risk)	**Community-level (sharing risk)**
Ex-ante	Savings Buffer stocks Enterprise diversification Low risk, low return cropping patterns Production techniques	Food crop sharing Common property resource management Social reciprocity Rotating savings/credit
Ex-post	Sale of assets Reallocation of labour Reduced consumption Borrowing from relatives	Sale of assets Transfers from mutual support networks
Formal risk management measures		
	Market-based (share/transfer risk)	**Publicly-provided (transfer-absorb risk)**
Ex-ante	Contract marketing Financial hedging tools (options) Traditional agricultural insurance Weather index insurance (WII) Contingent funds for disaster relief	Pest/disease management Physical crop/food stocks Price guarantees or stabilization funds Input subsidies Public agricultural insurance
Ex-post	Savings Credit	Disaster assistance Social funds Cash transfers Waiver (cancellation) of crop loans

Source: Jaffee, Siegel and Andrews, 2008

In many countries in Asia and the Pacific region, informal risk management strategies predominate in rural and farming households, especially in those countries where there is no market-based or public sector agricultural insurance. It was not within the scope of this current study of agricultural insurance provision in Asia and the Pacific region to report on the different types of risk management strategy adopted at farm and community levels. In general terms, agriculture in the region is small-scale and intensive with a high proportion of irrigated cropping in the winter dry season and mono-crop cultivation of paddy rice throughout much of South Asia in the monsoon summer season. The livelihoods of many of the poorest households in the region are supplemented through sharecropping and/or off-farm employment and income that act as a buffer in the event of major catastrophic events (typhoons, floods or tsunamis). In parts of South Asia, semi-commercial and commercial farmers have invested heavily in private tube-well irrigation as an ex-ante measure to reduce the risk of drought in the winter dry season. For larger semi-commercial farmers, savings and credit are important mechanisms of coping with major risks. Remittances from abroad are also very important in some Asian countries such as Bangladesh, Nepal, Thailand, Indonesia and the Philippines.

Traditional or informal risk management arrangements cannot provide protection against high severity, low frequency covariate risks in Asia and the Pacific region such as typhoons, floods, tsunamis and droughts. In times of severe loss, small and marginal farmers who own few assets

and who do not have savings or access to consumption credit, may be forced to sell their productive assets (e.g. livestock). Repeated asset losses and income shocks can conspire to keep poor households trapped in poverty and may even lead to the sale of farms and forced migration.

Farmers may also adopt risk avoiding strategies such as the adoption of local varieties that are often more resistant to drought or diseases, but which do not have the potential to generate high yields and surplus production for sale. They also purchase low levels of chemical inputs (fertilizer and plant protection chemicals). These strategies are less reliant on the use of credit to purchase high yielding technology and therefore less risky in the event of major crop loss. They do, however, carry a high opportunity cost in terms of forgone income and this is especially important in Asia and the Pacific region where land is the limiting factor and where farm incomes can only be increased through productivity gains.

Formal market-based risk management strategies in Asia the Pacific region include savings and credit and in many Asian countries private commercial (and public sector) crop and/or livestock insurance. Agricultural insurance is, however, not available in any of the Pacific Islands countries. Chapter 3 of this report shows that in South and Southeast Asia about 50 percent of countries have private commercial (and or public) agricultural insurance systems, including the large mature agricultural insurance markets in Australia, Japan and New Zealand and the rapidly growing public-private partnership (PPP) models in China and the Republic of Korea. In contrast, none of the mainly smaller Pacific Islands nations currently have any formal agricultural insurance markets. Other market based financial instruments such as warehouse financing and price hedging are not well established in the developing countries of the region.

A high proportion of rural households in Asia and the Pacific region are dependent on publicly provided ex-post disaster relief assistance. In response to the very high exposure to loss associated with typhoons and associated flooding and tsunamis, most countries in the region have well developed natural disaster risk management programmes that combine preventative measures with well established post-disaster response programmes involving relief, recovery and reconstruction operations. Farmers in these countries typically receive post-disaster compensation in the form of replacement poultry and small livestock and free seeds and fertilizers to enable them to replant their crops.

Several countries in Asia and the Pacific region also have a long history of public sector crop and/or livestock insurance, e.g. Democratic People's Republic of Korea, India and the Philippines. These public-sector programmes have targeted small and marginal farmers and have been heavily subsidized.

Other forms of state-sponsored agricultural risk management in Asia include investment in public irrigation infrastructure, agricultural research into new high yielding crop varieties, major investment in national agricultural training and extension systems and in state sponsored lending to farmers that is often linked to compulsory crop insurance (e.g. India and the Philippines).

Role and scope of agricultural insurance

There area number of key potential benefits from managing weather risk through agricultural risk transfer and insurance either at the individual farmer level (micro level insurance) or at a government-level (macro level) including:

- protecting rural livelihoods and smoothing incomes during major events, thereby reducing the potential for farmers to fall into the poverty trap;
- protecting the productive capacity of rural enterprises and farm households;
- protecting financial institutions against weather-related loan defaults; and
- financing disaster relief and encouraging structured social safety net polices (Skees and Murphy, 2009).

Crop insurance enables farmers to remain creditworthy even in years of major crop loss and to avoid falling into the poverty trap. Individual farmer traditional or index crop and livestock insurance can play an important role in protecting farmers' consumption and productive assets in years of major production losses, thereby enabling them to avoid falling into the poverty trap. More importantly, it may enable them to pursue riskier, but potentially much more profitable farming activities which usually centre on the use of credit to purchase new production enhancing technology (IFAD and WFP, 2010).

Agricultural insurance has the potential to play an important role in leveraging small farmers' access to rural finance. The introduction of weather index insurance in India and parts of Africa has shown that financial institutions are often willing to use a crop insurance policy as a substitute for traditional collateral requirements and that they are more willing to lend to these farmers because their loan is protected against climatic risk and production shortfall induced default.

Experience shows that bundling agricultural insurance with rural credit provision and input supplies could offer major advantages. The bundling of crop insurance with credit and input supplies has been shown to provide a win-win situation for farmers, lending institutions and insurers alike. The farmer gains access to seasonal crop credit, lending institutions are more willing to lend to small farmers because their loans are protected by crop insurance and the insurer benefits from: (a) reduced anti-selection, which in turn reduces the need for pre-inspections; (b) the reduced costs of marketing crop insurance; and (c) the insurance uptake and spread of risk is much better than would normally be achieved under a purely voluntary programme. Malawi is an example of a bundled crop weather index insurance and credit and input supply and output marketing programme that is showing early promise.

Agricultural insurance can also be used as a meso level instrument to protect rural bank lending (loan portfolio or business interruption protection). From the bank's perspective, farmers who have crop insurance protection are less likely to default on their loans in the event of major weather induced crop failure. It also means that in the event of a major regional flood or drought the bank's loan portfolio is protected against loss, enabling the bank to remain solvent and to reschedule farmers' loans and to continue lending. Claiming on a crop insurance policy and

rescheduling loans are generally much more acceptable to a bank than having to resort to the courts to recover their debts.

At a national level there also appears to be an important role for linking disaster risk management with an ex-ante macro level weather index insurance policy.[7] To date, several countries including Ethiopia, Malawi and Mexico have designed macro level rainfall deficit index covers that have been designed to provide governments with immediate cash liquidity following a natural disaster and to enable the government to provide an early response. There appears to be considerable scope for using macro index products as a social safety net product for small subsistence farmers for whom commercial crop insurance is not necessarily an appropriate or cost-effective mechanism.

Agricultural crop insurance generally works best where there are one or two key risks that impact on the crop infrequently (every seven to ten years) and cause significant economic loss to the farmer. Although individual-grower multiple peril crop insurance (MPCI), is the most widely practiced form of agricultural insurance in the world, by providing all risk yield shortfall guarantee cover, the claims frequency tends to be very high and premium rates are often higher than 10 percent to 15 percent and in the most extreme cases reported in the current study, rates for maize insurance cover in the Philippines are as high as 25 percent. Similarly, where all risk individual animal mortality cover is provided, rates are typically of the order of 10 percent or more. With such high premium rates, agricultural insurance is not a particularly attractive or cost-effective proposition for small farmers.

Climate change and agricultural insurance

There is much debate about the role of agricultural crop insurance and especially weather index insurance as a climate change adaptation tool. IRI (2009) list three ways in which index insurance may contribute to climate change adaptation strategies in developing countries. First, index insurance may help as a risk transfer mechanism within a comprehensive adaptation strategy involving, for example, more drought resistant crop varieties, micro irrigation, rainwater harvesting and improved soil conservation practices such as zero tillage and direct seeding: crop index insurance would cover the unmanageable or catastrophe risk exposure. Second, index insurance can contribute to adaptation through building more resilient livelihoods by increasing farmers' access to credit and thereby enabling them to invest in more resistant crop production systems, technology and inputs. Third, crop insurance might be used as a mechanism to incentivize farmers facing climate change to adopt risk reducing strategies, for example by insisting that drought resistant varieties must be used if the crop is to be deemed insurable. In this case it is worth noting that all crop and livestock insurance policies make cover conditional on the farmer adopting in full, the recommended technical and husbandry practices for that crop/class of livestock.

Climate change poses specific challenges for the design and rating of traditional and index-based crop insurance products. Most of the climate change predictive modelling work suggests that over the twenty-first century the trend in global warming will lead to significant increases in average temperatures of between three to five degrees in much of Africa and Asia. Trends in rainfall

[7] For a comprehensive review of linkages between disaster risk reduction and index insurance see Warner *et al.*, 2009.

patterns are more mixed, for example, varying from no discernable trend in average annual precipitation in Ethiopia, to a general reduction in rainfall in Nicaragua, through to uncertainty in the Sahel region where the declining rainfall trend from the 1950s through to the mid-19080s has been reversed over the past 20 years with an increasing precipitation trend that is probably related to reduced deforestation and improved land use management. It is, however, likely that the variation in mean annual and season precipitation is likely to be accentuated by climate change with more extreme drought and or excess rain years and higher variation in the start of the rainy season(s). The greater uncertainty associated with future weather patterns will pose challenges to the design and rating of crop weather index insurance (CWII) products which rely on long-term historical (and where necessary) detrended rainfall and temperature data to construct and rate the indexes. However, as significant changes in climate typically take decades or more to develop, whereas crop insurance contracts are designed for a single cropping season, it is feasible for crop insurers to adapt their design and rating as these climatic changes take hold (IRI, 2009).

Climate change may lead to some risks and locations being uninsurable in future. This applies particularly to perils such as river flood and tidal surge leading to flooding in coastal regions. The rise in sea levels associated with global warming and melting of the ice-caps, may therefore be particularly detrimental to the future provision of crop and livestock insurance in Asia and the Pacific region, most notably in the low lying coastal plains of Bangladesh, the Philippines, Viet Nam and the Pacific Islands.

Limitations of agricultural insurance

Agricultural insurance is not a panacea and cannot replace sound risk management. Agricultural insurance has many limitations: it does not prevent the loss of the insured crop or tree or animal or other farm assets. It is not always the most appropriate option to manage risks, in terms of cost-effectiveness or affordability. For example, in some parts of Europe and Argentina that experience very high hail exposures, commercial fruit and flower farmers find it more cost-effective to invest in hail netting to prevent damage to their crops, rather than to claim on their crop hail insurance policies, which in any case are not designed to cover the full value of their lost revenue. Similar comments apply to frost where under certain conditions it is more cost-effective to use frost prevention measures (e.g. sprinkler irrigation, fire-pots, wind-fans, smoke-generators) rather than to purchase frost insurance.

Too often agricultural insurance is perceived by policy-makers as a means of providing a safety net for farmers or even increasing their revenues. Agricultural insurance cannot solve problems of low farm income and poverty by itself. Although it can sometimes help channel additional social benefits to targeted farmers, it should not be considered an instrument that can provide poor farmers with higher revenues (Mahul and Stutley, 2010).

Agricultural insurance on its own is not a solution. Agricultural insurance can contribute toward the stabilization of agricultural production and farm incomes in times of major production loss and also to the modernization of agriculture through its ability to leverage access to credit thereby enabling farmers to purchase production-enhancing technology. However, agricultural insurance

cannot be effective if it is provided in isolation. It should be promoted only when other essential agricultural services, including training and extension, the timely availability of inputs (seeds, fertilizers, pesticides) and efficient marketing channels for agricultural outputs, are in place (Mahul and Stutley, 2010).

Often agricultural insurance is misunderstood as a silver bullet for risk management and climate adaptation. However, as Warner *et al.* (2009) point out, (agricultural) insurance will fail to reduce risk and to advance adaptation unless it is implemented along with risk management and disaster risk reduction measures.

With climate change, agricultural insurance tools will be challenged to cover increasingly frequent and intense events. Furthermore, traditional insurance may not be the appropriate tool for longer term foreseeable risks such as sea-level rise and desertification. In such cases, other measures including basic investments in risk reduction make more sense (Warner *et al.,* 2009).

Traditional crop insurance cannot provide solutions for subsistence farmers. There is much evidence today that traditional individual farmer multiple peril crop insurance does not work for small and marginal farmers and usually ends up being heavily subsidized by governments. Individual farmer crop insurance is a tool that is most effective when the farmer produces a crop for sale and where he or she invests in purchased inputs and services often using formal credit – in such cases the farmer faces a financial risk in the event of crop failure and risk transfer through purchasing crop insurance is often justified. For small subsistence farmers producing food crops for on-farm family consumption, crop insurance is a luxury few of them can afford, hence governments' intervention to make crop insurance more affordable through premium subsidies. For subsistence farmers it may be much more cost-effective for governments to examine alternative food security mechanisms and social safety nets or, where they elect to use insurance, to consider some form of macro level weather index programme to permit early payments to be made in the event of a major natural disaster. It is recognized that marketing voluntary micro level CWII to small resource poor farmers is often extremely difficult on account of farmers' low levels of knowledge and awareness of index insurance, their often low demand for crop insurance/low ability to afford premiums and the need to develop delivery channels to administer policy sales, premium collection and claims settlements to individual farmers. In some cases, CWII may often be better suited to being offered as a meso level insurance product to rural-based risk aggregators, including agricultural banks, microfinance institutions, cooperatives or possibly input suppliers or commodity processors and marketing associations.

Chapter 3

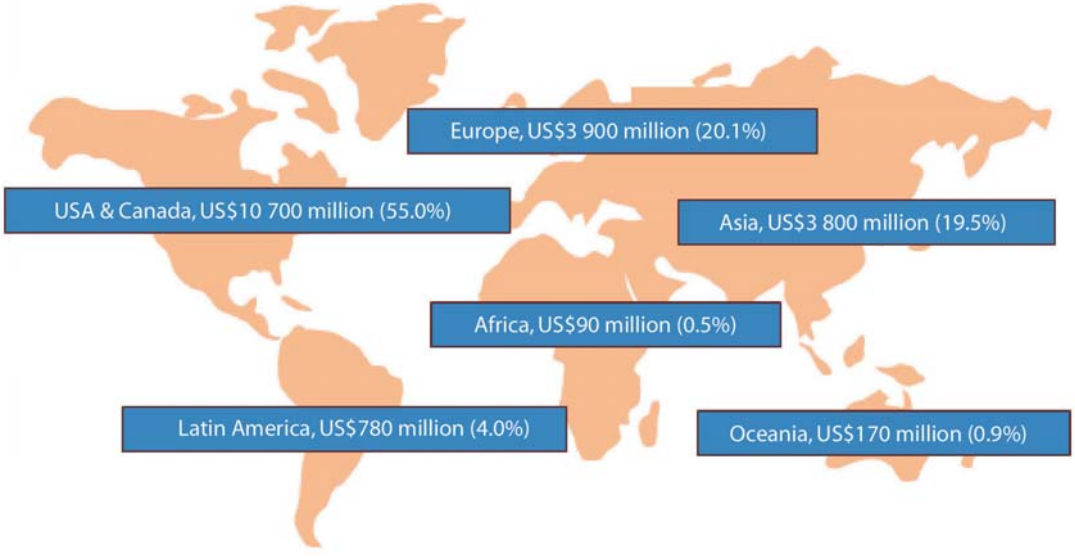
Agricultural insurance provision in Asia and the Pacific region

Trends in global agricultural insurance

It is estimated that about 50 percent (104 nations) of all countries have some form of agricultural insurance: of these 86 countries have mature programmes and 18 countries are piloting new crop or livestock insurance schemes (Mahul and Stutley, 2010). The growth in interest in agricultural insurance both by governments and private commercial insurers is evidenced by the fact that 20 years ago only about 50 countries were identified with some form of agricultural insurance (FAO, 1991b).

In 2009 the global agricultural insurance premium volume was estimated at about US$19.4 billion. The map in Figure 3.1 shows that in 2009, North America was the largest agricultural insurance market accounting for US$10.7 billion of agricultural premium (55 percent of the total), followed by Asia and the Pacific region (combined premiums for Asia and Oceania of nearly US$4.0 billion or 20.4 percent of the total), then Europe (20.1 percent of the total premium), Latin America (4.0 percent) and finally Africa with a very small share of only US$90 million (0.5 percent of the total).

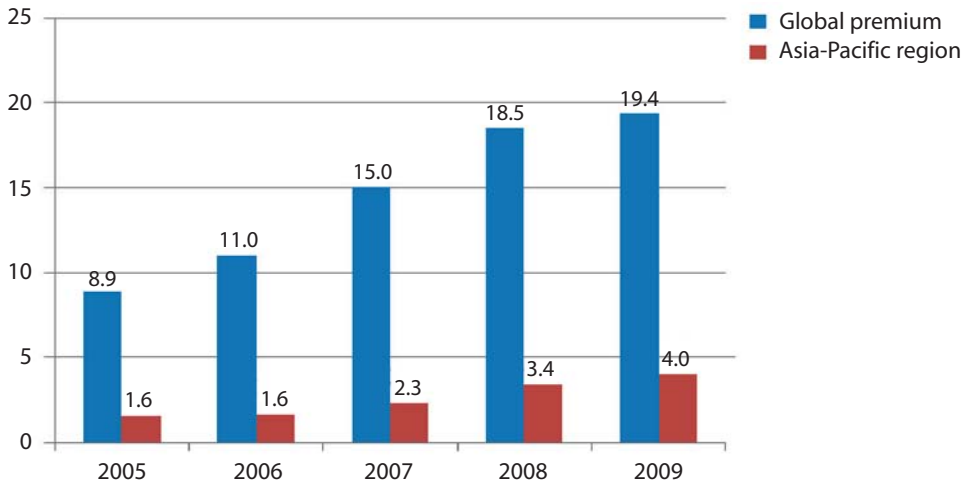
Figure 3.1: Global distribution of agricultural insurance premiums (2009)



Source: Iturrioz, 2010; Mahul and Stutley, 2010

The global agricultural insurance market has grown very rapidly over the past five years: in 2005 the total global premium was estimated at about US$9 billion, but in 2009 this had grown to US$19.4 billion or an average annual increase of 22 percent. Over this period agricultural insurance premiums in Asia and the Pacific region increased even more rapidly from US$1.6 billion to nearly US$4.0 billion or an average annual increase of 28 percent (Figure 3.2). Several factors accounted for this major increase in global premium, including: (a) the increases in global demand for and prices of commodities such as soybean, wheat, maize and thus insured crop values and generated premiums; and (b) government policy towards the promotion of agricultural insurance as a risk management tool and thus the growth of public sector subsidized agricultural insurance particularly in Brazil, China and South Asia.

Figure 3.2: Growth in agricultural insurance premiums 2005 to 2009 (US$ billions)



Source: Global premiums, Iturrioz, 2010
Asia and the Pacific region premiums based on author's estimates

Agricultural insurance provision in Asia and the Pacific region

In 2010 it was estimated that agricultural insurance was being implemented either on a pilot basis or under a fully commercial programme in 20 (45 percent of total) of the 44 countries, territories and areas that comprise Asia and the Pacific region as shown in Tables 3.1 and 3.2. Full details are presented by country in Annex 2.1. There are 14 (32 percent) countries, territories and areas where there is currently no agricultural insurance. Finally, in ten (23 percent) countries, territories and areas mainly small Pacific Island countries, details are not known, but it is believed that there is no formal agricultural insurance provision.

In 2010 agricultural insurance was available in five (63 percent) of the eight South Asian region low income (LI) and lower middle income (LMI) countries, namely Bangladesh, Nepal, India, Pakistan and Sri Lanka, but was not available in Afghanistan, Bhutan and the Maldives.

Table 3.1: Number of countries, territories and areas with agricultural insurance in 2010 by region

Region	Yes	No	Unknown	Total	% of total
South Asia	5	3	0	8	18
East Asia and the Pacific	15	11	10	36	82
Total	20	14	10	44	100
% of total	45	32	23	100	

Source: Author, based on FAO Asia-Pacific Survey 2010

Table 3.2: Number of countries, territories and areas with agricultural insurance in 2010 by income classification

Income group	Yes	No	Unknown	Total	% of total
Lower income	4	4	0	8	18
Lower middle income	8	8	3	19	43
Upper middle income	1	1	2	4	9
High income	7	1	5	13	30
Total	20	14	10	44	100
% of total	45	32	23	100	

Source: Author, based on FAO Asia-Pacific Survey 2010

In the East Asia and the Pacific region, agricultural insurance was available in 15 (42 percent) countries: two LI countries, namely Democratic People's Republic of Korea and Viet Nam; five LMI countries, China, Indonesia, Mongolia, the Philippines and Thailand; one Upper Middle Income (UMI) country, Malaysia; and seven High Income Countries (HIC), territories and areas, Australia, French Polynesia, Guam, Hong Kong SAR (China), Japan, the Republic of Korea and New Zealand.

The status of agricultural insurance market development varies enormously across the 20 countries, territories and areas in Asia and the Pacific region. In Japan, agricultural insurance dates back to 1929 and there is a national cooperative agricultural insurance system which receives major financial support (subsidies) from the government: in Japan about nine million crop and livestock insurance policies are sold each year and in 2009 the agricultural insurance premium volume was in the order of US$1.2 billion. In contrast, countries such as, Bangladesh, Indonesia, Nepal and Malaysia, either do not have any commercial crop insurance programmes or were only just beginning to pilot such products in 2010.

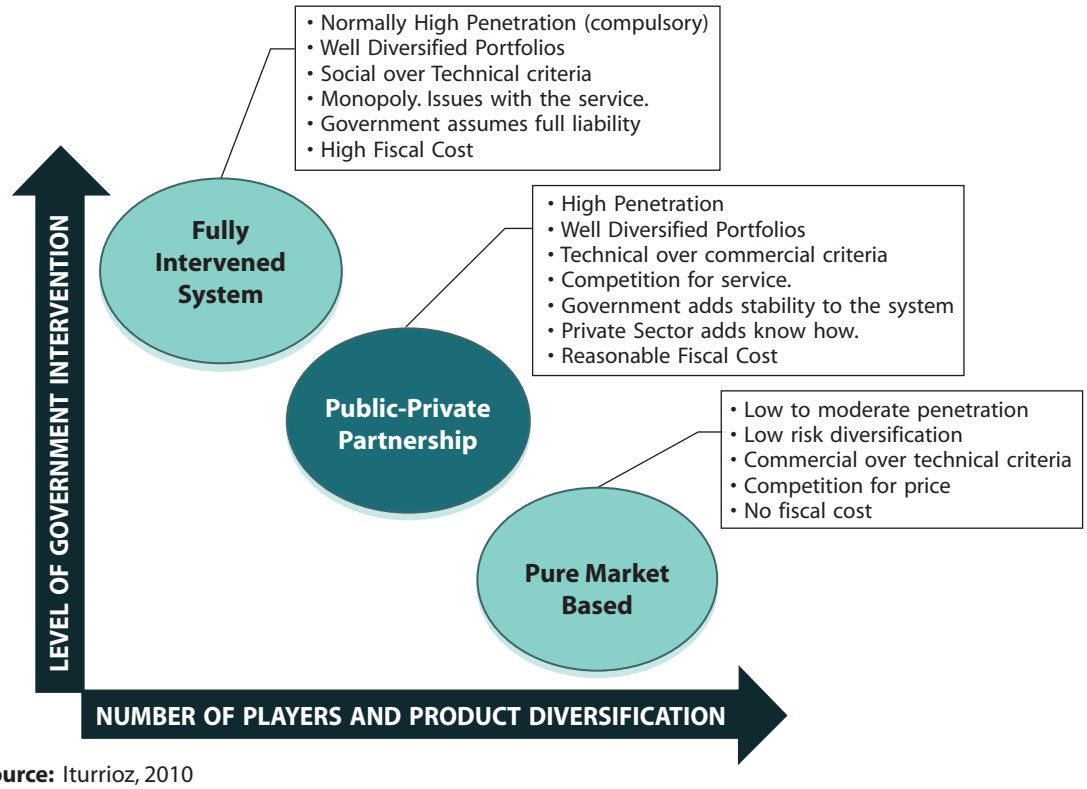
Although South Asia and East Asia are fairly well served by agricultural insurance, the Pacific Island nations are not well served. Very few of them currently have any form of agricultural insurance in spite of their very high exposure to natural hazards (typhoons, flooding, tsunami and El Niño/ENSO related droughts). Addressing this imbalance in catastrophe risk management mechanisms for farmers in these small Pacific Island nations is a major challenge.

Types of market (private, public, public-private partnerships)

Agricultural insurance is almost unique as a class of insurance business in that it is often implemented by public sector insurance companies or is heavily subsidized by governments. Few other classes of insurance are subject to such high levels of government intervention.

There are three basic institutional frameworks for agricultural insurance: (1) public sector models where government intervenes to establish a monopoly public-sector agricultural insurer and then often provides heavily subsidized agricultural crop and livestock insurance and/or assumes the role of reinsurer; (2) purely private commercial agricultural insurance markets; and (3) public-private partnerships (Figure 3.3).

Figure 3.3: Public and private sector agricultural insurance models



Source: Iturrioz, 2010

Table 3.3 provides a classification of the main agricultural insurance institutional models for the 17 countries in Asia and the Pacific region where detailed information is available. It is noted that very few countries today have a single model save for Democratic People's Republic of Korea where the Korea National Insurance Corporation (KNIC) is a monopoly public sector insurer responsible for all insurance including a national rice and maize multiple peril crop insurance (MPCI) scheme. This scheme has operated since the early 1990s and has traditionally purchased either quota share or stop loss treaty reinsurance protection from international reinsurers. In most other countries in 2010 more than one agricultural insurance model operates. (See further details in Annex 2.1).

Table 3.3: Types of agricultural insurance markets in countries in Asia and the Pacific region

Public sector model	Public-private partnership	Pure market based
		Australia
Bangladesh (Sadhurin Beema Corporation)		Bangladesh (NGO/MFI Livestock credit insurance)
	China	
Democratic People's Republic of Korea (Korea National Insurance Corporation)		
India (Agriculture Insurance Company Ltd. – National Agricultural Insurance Scheme)	India (PPPs for livestock insurance)	India (Private weather index insurance and community-based livestock)
	Indonesia	
	Japan	
		Malaysia
	Mongolia	
Nepal (DICGC subsidies livestock-credit guarantee protection)	Nepal (SFCL subsidized livestock-credit insurance)	Nepal (Community-based livestock insurance)
		New Zealand
	Pakistan PPPs for Crop Insurance since 2008	Pakistan livestock insurance
Philippines (Philippines Crop Insurance Corporation)		Philippines (private weather index insurance)
	Republic of Korea	
Sri Lanka (Agricultural and Agrarian Insurance Board)		Sri Lanka
		Thailand
	Viet Nam*	Viet Nam

Source: Author

Notes: *Viet Nam Planned for 2011.

Fully intervened system (public sector insurance)

In the 1970s and 1980s governments in many countries in Asia and the Pacific region introduced national agricultural crop insurance schemes, underwritten by public sector insurance companies to provide multiple peril crop insurance (MPCI) for their small-scale farmers. Countries that introduced national MPCI crop insurance schemes included:

- Bangladesh: Sadharin Bima Corporation (SBC), a national general insurance and reinsurance company, launched a pilot MPCI crop insurance scheme in 1977, and then livestock insurance in 1981.
- China: People's Insurance Company of China (PICC), formerly the monopoly government non-life insurer, commenced underwriting agricultural insurance in 1982.

- India: Comprehensive Crop Insurance Scheme (CCIS) underwritten by the General Insurance Corporation of India (GIC) introduced in 1985. The CCIS was replaced by the National Agricultural Insurance Scheme (NAIS) in 1999 and then in 2002 responsibility for implementation of NAIS was transferred from GIC to a newly formed national crop insurance company, the Agriculture Insurance Company of India Ltd. (AIC).
- Democratic People's Republic of Korea: Korea National Insurance Corporation's (KNIC) national rice and maize insurance scheme since the mid-1980s.
- The Philippines: the Philippines Crop Insurance Corporation (PCIC), a national specialist crop insurance company formed in 1978, and which commenced underwriting crop MPCI business in 1981 and livestock insurance in 1998.
- Sri Lanka: creation of the Agricultural Insurance Board (AIB) in 1973, a public sector insurer, subsequently renamed in 1999 as the Agricultural and Agrarian Insurance Board (AAIB) an insurance division of the Ministry of Agricultural Development and Agrarian Services (MADAS).

The international experience of public-sector subsidized MPCI crop insurance (and in some cases livestock insurance) has historically been very poor. Table 3.4 presents an analysis of the financial performance in the 1970s and 1980s of selected major public sector MPCI programmes, conducted by Hazell (1992), which included the national MPCI programmes in India and the Philippines and the national cooperative MPCI scheme in Japan. The results show Hazell Ratios[8] of between 2.42 for the United States of America and 5.74 in the Philippines, or in other words for every US$1 in collected producer premium (the non-subsidized share of premium paid by the producer) the paid claims and administrative costs on these programmes amounted to between US$2.42 and US$5.74. A Hazell Ratio of greater than 1.0 indicates that a programme is operating at a financial loss. The reasons cited for the poor performance of these programmes included the capping of premium rates below actuarially required levels, poor management and lack of control over risk selection and loss assessment, excessively high administrative and operational expenses and mixing of commercial insurance objectives with social objectives, namely the provision of cheap crop insurance to small and marginal farmers.[9]

Other Asian countries with public sector programmes also experienced poor underwriting results in the 1980s and 1990s. In China, PICC experienced poor agricultural insurance results between 1982 and 2002 that led it to almost cease underwriting this class of business by 2002. In Bangladesh the SBC pilot MPCI crop insurance programme incurred a long-term producer loss ratio of 499 percent between 1977 and 1995 when the company ceased to underwrite this programme. SBC's problems centred on the inability to charge actuarially determined and high premium rates for paddy and other crops, severe adverse selection and lack of scale during the 18 years the pilot operated without any financial support from government.[10] Finally, in Sri Lanka

[8] A Hazell Ratio is similar to a conventional Combined Ratio, the difference being that only the non-subsidized portion of the premium paid by the farmer is taken into consideration.

[9] See Hazell *et al.*, 1986 and Hazell, 1992 for a comprehensive evaluation of the performance of public-sector subsidized agricultural insurance schemes and reasons for their failure.

[10] See Bangladesh country report in Annex 3 for further details of the SBC MPCI scheme.

the AIB MPCI programme for subsidiary food crops incurred underwriting losses in all years between 1987 and 1990 with seasonal loss ratios of between a low of 109 percent and a high of 285 percent (FAO, 1991b).

Governments' responses to the poor performance of these public sector programmes were to terminate the programmes in Brazil (including Proagro and Cosesp) and Mexico (Anagsa) in the 1990s and to transfer responsibility for implementation of agricultural insurance mainly to the private insurance sector. In Bangladesh, SBC suspended its pilot MPCI scheme in 1995. In China, a new phase of PPPs agricultural insurance began in 2003 with the introduction of subsidized agricultural insurance and PICC has hugely expanded its agricultural insurance operations. In India the NAIS was transferred to AIC in 2002 and the company has strengthened the scheme and introduced major improvements in scheme implementation; however, as the objectives of this national crop-credit scheme continue to provide affordable crop-credit insurance to India's predominantly small and marginal farmers, the government has continued to cap premium rates at well below the actuarially required rates and to settle the excess claims. In the Philippines PCIC has introduced substantial rate increases to its crop MPCI programme over time, but on account of the very high premium subsidies the Hazell Ratio is still well above the break-even figure of 1.0. In Japan and the United States of America the programmes continue with very little change and again do not achieve break-even underwriting results. (See last section in this Chapter for an up-to-date performance review of agricultural crop and livestock insurance schemes in Asia and the Pacific region).

Table 3.4: Financial performance of public sector MPCI in the 1970s and 1980s

Country	Period	I/P (producer loss ratio)	A/P (Administration cost ratio)	(I+A)/P (Hazell ratio)
Brazil (Proagro)	75-81	4.29	0.28	4.57
Costa Rica	70-89	2.26	0.54	2.80
India (CCIS)	85-89	5.11	n/a	n/a
Japan	47-77	1.48	1.17	2.60
	85-89	0.99	3.57	4.56
Mexico (Anagsa)	80-89	3.18	0.47	3.65
Philippines (PCIC)	81-89	3.94	1.80	5.74
United States of America (FCIC)	80-89	1.87	0.55	2.42

Source: Hazell, 1992

Notes: I = Indemnity payments; P = producer premium (the non-subsidized proportion of premium paid by the farmer); A = Insurance company A&O expenses.

Private agricultural insurance markets

Australia and New Zealand are pure market-based agricultural insurance economies. In these countries crop, livestock, forestry and aquaculture insurance is provided exclusively through non-life general insurance companies and specialist agricultural insurance companies and underwriting agencies (e.g. Agricola Underwriting Ltd., which was purchased by Axain in 2010). These programmes receive no financial or other form of support from the government and the

agricultural insurers place their reinsurance requirements with international commercial reinsurers. Currently in 2010 Thailand and Viet Nam are also insurance markets that are purely market based and their respective governments do not provide any financial subsidy support. Bangladesh, India and Nepal also have small-scale informal private livestock-credit insurance programmes that are implemented either by community-based organizations (Nepal and India) or by NGOs/MFIs (Bangladesh). In both India and the Philippines the private commercial insurers have since 2003 and 2007 respectively introduced new market-based crop weather index insurance (CWII) programmes, which originally received no premium subsidies[11] and are commercially reinsured either by international reinsurers (Philippines) or by a combination of a national local reinsurer[12] and international reinsurers (India).

Public-private partnerships

There has been a major growth in public-private partnership (PPP) models in recent years under which responsibility for agricultural insurance delivery rests with a private commercial or mutual insurer(s) and government commits support usually in the form of premium subsidies and/or reinsurance protection. China is the largest PPP agricultural insurance market today: all agricultural insurance is underwritten by private or mutual insurance companies and national and local (provincial) governments provide premium subsidies. The government also intervenes in reinsurance either through China Re, the national reinsurance company, and/or through government catastrophe co-reinsurance agreements in several provinces. In India, the national livestock insurance scheme is underwritten both by a group of public and private insurance companies with premium subsidy support. Japan has one of the oldest PPPs: over 300 cooperative insurance companies underwrite a national subsidized crop (rice, maize, and fruit crops), livestock and forestry insurance programme, which is reinsured by the government. Since 2001 the Republic of Korea has operated a pool co-insurance crop and livestock scheme that is led by the National Agricultural Cooperative Federation (NACF) and is co-insured by five local insurance companies and one reinsurance company. This programme receives major government premium subsidy support and the government also provides stop loss reinsurance protection for all losses in excess of a 180 percent loss ratio. In the Republic of Korea, the government also subsidizes the NACF's administrative and operational expenses. Mongolia introduced the world's first livestock mortality index scheme in 2005. This scheme involves a pool of local private commercial coinsurance companies and government support up to now has been in the form of catastrophe reinsurance. Pakistan has introduced a new crop MPCI scheme since the Rabi season 2008/09. This programme, termed the Mandatory Crop Loan Insurance Scheme, is being underwritten by ten insurance companies in conjunction with 20 commercial banks and attracts government premium subsidies. In Indonesia, in 2009/10 the Ministry of Agriculture in conjunction with a group of private insurers began pilot testing crop MPCI and livestock mortality cover under a PPPs arrangement. Lastly, in Viet Nam there are proposals to launch a subsidized crop (rice) livestock and aquaculture PPPs scheme in 2011 with participation by the Ministry of Finance, Vina Re, the national reinsurance company, and three private insurers.

[11] It is noted that in India since 2008 some states have been offering premium subsidies for the private commercial CWII programmes. There are still no premium subsidies on CWII in the Philippines.

[12] In India the national reinsurer, the General Insurance Corporation, is actively involved in reinsuring crop weather index insurance programmes.

Co-insurance arrangements

Several countries in Asia and the Pacific region, including China, the Republic of Korea, Malaysia, Mongolia, the Philippines and Thailand (Box 3.1) have developed agricultural co-insurance pools. The biggest co-insurance pool programme is the NACF led crop insurance pool in the Republic of Korea that underwrote 36 179 crop policies with TSI of Kwon 1 360 billion (about US$1.15 billion) and had a risk premium of Kwon 78.4 billion (US$64 million) in 2010.

Box 3.1: Countries in Asia and the Pacific region with agricultural co-insurance pools

China: 2006 – Two agricultural insurance co-insurance pool schemes led by the People's Insurance Company of China (PICC) in (a) Zeijiang Province (crops, livestock, forestry and aquaculture), and (b) in Hainan Province (crops, forestry, livestock). PICC acts as the scheme administrator and loss adjuster on behalf of the co-insurers.

Republic of Korea: 2009 – Crop insurance pool, led by the National Agricultural Cooperative Federation with 25 percent share and five domestic insurance companies and one domestic reinsurance company with 75 percent share.

Malaysia: 2008 – Tani Malaysia livestock insurance pool was formed with nine domestic insurers and reinsurers with Malaysian Re as lead co-insurer. The pool had *not* yet commenced underwriting livestock in 2010.

Mongolia: 2006 – Four private insurers offer livestock index mortality insurance through the "Livestock Indemnity Insurance Pool", a public private co-insurance pool.

Philippines: 1988 – Public-private co-insurance pool for livestock insurance underwritten by the Government Service Insurance System (GSIS) and the Philippine Livestock Management Services Corporation (PLMSC), which has 14 participating co-insurers.

Thailand: 2007 – Crop weather index insurance programme underwritten by a co-insurance pool of nine insurance companies and the Thai Reinsurance Public Company Ltd.

Source: Author

In emerging markets where there is no tradition of crop or livestock insurance or rural insurance infrastructure, a pool co-insurance programme may be a much more attractive and cost-effective proposition for commercial insurance companies than an individual company programme. Two potential benefits of an insurance pool are: (a) the ability to underwrite a much broader and larger book of business and thus the potential to achieve a much greater geographical spread of risk; and (b) economies of scale in the costs of developing new products and programmes and in underwriting risks and in adjusting claims where a single lead co-insurer is appointed (or a separate managing underwriting unit is created) to administer and underwrite the business on behalf of the pool members. There are also major potential cost savings in the purchasing of reinsurance protection for a pooled co-insurance programme. The main drawbacks of pools include reduced market competition.

Compulsory versus voluntary agricultural insurance

Governments often seek to make agricultural insurance compulsory, particularly where farmers borrow credit from national agricultural development banks. From a farmer's viewpoint, compulsory agricultural insurance may be very unattractive unless it is accompanied by premium subsidies and/or the farmer is able to gain access to bank credit that he would not otherwise have been eligible for, and where credit is sometimes provided at concessionary interest rates. From an insurer's perspective there are two potential benefits of compulsory insurance: (a) the reduction of adverse selection, which is a major problem on voluntary agricultural insurance programmes; and (b) the ability to generate a larger and more balanced agricultural insurance portfolio. The costs to the insurer of farmer awareness and promotional campaigns are also considerably lower where agricultural insurance is marketed on a compulsory basis. There are potential benefits for lending institutions of transferring the farmers' default risk as a result of adverse natural and weather events to the insurance industry, thus increasing the farmers' creditworthiness.

Agricultural insurance is compulsory in one form or another in nine of the 17 countries in Asia and the Pacific region included in this survey (Annex 2.1). In China, crop insurance is voluntary, but it is compulsory for subsidized cattle and for sow epidemic disease livestock insurance programmes. In Japan, crop insurance is compulsory for the main staple crops of rice and wheat and barley for farmers who cultivate more than 0.3 ha of land, but fruit and livestock insurance are voluntary. In the Democratic People's Republic of Korea, rice and maize insurance is compulsory for cooperative (collective) farms.

In India and the Philippines government legislation makes crop insurance compulsory for farmers who borrow seasonal crop production credit from the national and commercial and cooperative banks, but is voluntary for non-borrowers. It is also understood that in Pakistan, crop insurance is compulsory for farmers accessing loans from the private, commercial and state banks.

Some private sector MFIs or NGOs also use compulsory insurance to protect their loans to livestock producers. In Bangladesh, India and Nepal it is interesting to note that several private NGOs/MFIs and cooperative banks that are involved in providing livestock investment loans (most commonly for dairy cattle or buffalo, but also for small ruminants and poultry) have also developed informal livestock loan protection guarantee programmes and in these cases insurance is compulsory for the livestock owner until their loan has been repaid in full. (See Chapter 5 for further details of these non-regulated livestock insurance schemes).

In the other eight countries agricultural insurance is purely voluntary. The largest of these voluntary markets include Australia, the Republic of Korea and New Zealand (Annex 2.1).

Size of agricultural insurance markets and trends

Total agricultural insurance premiums

A comparison of the estimated total agricultural insurance premium volume per country and for the region is presented below for the countries in the region with agricultural insurance in 2007 and in 2009 (Table 3.5 and Figure 3.4).

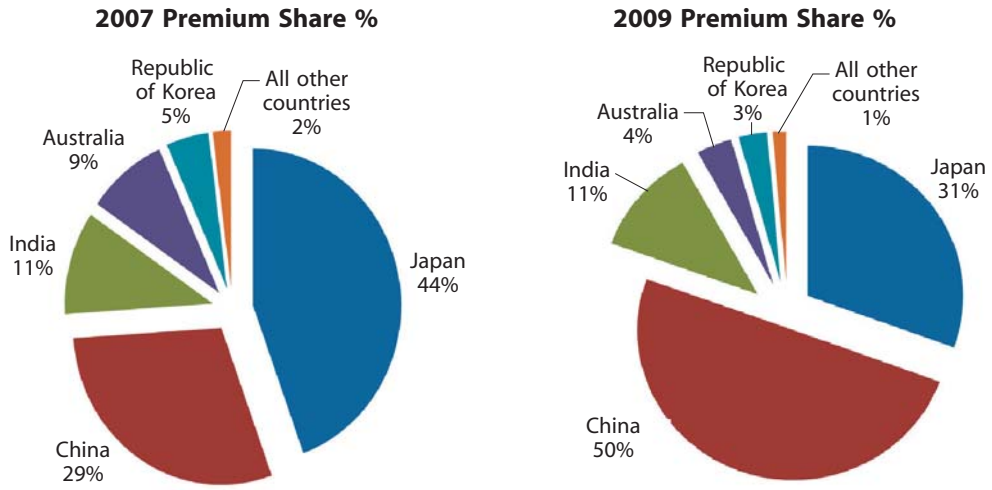
Table 3.5: Asia and the Pacific region comparison of agricultural insurance premiums 2007 and 2009 (US$ million)

Country	2007 Premium (US$ million)	% of 2007 premium	2009 Premium (US$ million)	% of 2009 premium	% change
Australia	202.900	8.8	144.000	3.7	-29
Bangladesh	0.100	0.0	0.100	0.0	0
China	681.791	29.5	1 958.678	49.9	187
Democratic People's Republic of Korea	20.000	0.9	20.000	0.5	0
India	245.687	10.6	450.000	11.5	83
Indonesia	1.000	0.0	1.000	0.0	0
Japan	1 028.607	44.5	1 200.000	30.6	17
Malaysia	0.100	0.0	1.000	0.0	900
Mongolia	0.072	0.0	0.087	0.0	21
Nepal	0.133	0.0	0.133	0.0	0
New Zealand	23.189	1.0	25.000	0.6	8
Pakistan	0.100	0.0	4.100	0.1	4 000
Philippines	2.496	0.1	3.000	0.1	20
Republic of Korea	107.300	4.6	115.809	3.0	8
Sri Lanka	0.171	0.0	0.171	0.0	0
Thailand	0.003	0.0	0.042	0.0	1 523
Viet Nam	0.100	0.0	0.100	0.0	0
Total premium	**2 313.749**	**100.0**	**3 923.221**	**100.0**	**70**

Sources: 2007 estimates based on Mahul and Stutley, 2010; 2009 estimates based on Aon-Benfield, 2010; author's updated estimates based on FAO Asia-Pacific Survey 2010

In 2007 the total regional agricultural insurance premium was estimated at about US$2.3 billion, or about 15 percent of 2007 global agricultural insurance premiums. In 2007 the largest agricultural insurance market by premium volume was Japan with an agricultural insurance premium of US$1.03 billion or 44.5 percent of the total regional premium, followed by China (29.5 percent of the regional premium), India (10.6 percent), Australia (8.8 percent) and the Republic of Korea (4.6 percent). These five countries accounted for 98.4 percent of the total regional premium in 2007 whereas the other 14 countries accounted for only 1.6 percent of regional agricultural insurance premiums. In 2007 there was very limited plantation/forestry insurance in Indonesia and Malaysia, some limited livestock insurance in Pakistan, but no crop

Figure 3.4: Agricultural insurance premium shares of top five countries in Asia and the Pacific region



Source: Table 3.5

insurance and very restricted livestock insurance in Bangladesh and Nepal, a small pilot crop weather index pilot in Thailand and some restricted livestock and forestry insurance in Viet Nam.

In the two years up to 2009 agricultural insurance grew enormously in Asia and the Pacific region and total estimated premium volume is now about US$3.9 billion or 20 percent of global premium. The biggest growth in agricultural insurance premiums has occurred in China, where the 2009 premium was nearly US$2.0 billion or 50 percent of the total regional premium. In Japan the premium volume has increased by nearly 200 million, although its share of regional premium has declined to almost 31 percent. In China and India national governments have specifically targeted the agricultural sectors under their 11th five-year plans and have significantly increased their premium subsidy support to agricultural crop and livestock insurance in recent years and this is the main factor explaining the huge growth in agricultural insurance premiums. In China, agricultural insurance premiums have increased by 187 percent since 2007, in India by 83 percent and in Japan by 17 percent: however, in Australia agricultural insurance premiums fell by 29 percent over the corresponding period on account of reduced agricultural commodity prices and economic recession.

Crop and livestock insurance markets

A breakdown of 2007 and 2009 agricultural insurance premiums into two major classes, namely crop (+forestry) insurance premiums and livestock (livestock + poultry + aquaculture) insurance premiums is shown in Table 3.6. Whereas the 2007 breakdown of premiums into crop and livestock is based on actual industry figures, in the case of the 2009 premiums and share of crop and livestock premium some of the figures (e.g. China and Japan) are based on the author's best estimates.

Table 3.6: Breakdown of 2007 and 2009 agricultural insurance premiums into crop and livestock premiums (US$ million)

Country	2007 Agricultural insurance premiums				2009 Agricultural insurance premiums			
	2007 crop + forestry premium (US$ million)	% of 2007 premium	2007 livestock + poultry + aquaculture premium (US$ million)	% of 2007 premium	2009 crop + forestry premium (US$ million)	% of 2009 premium	2009 livestock + poultry + aquaculture premium (US$ million)	% of 2009 premium
Australia	155.400	11.6	47.500	4.9	119.500	5.1	24.500	1.5
Bangladesh			0.100	0.0			0.100	0.0
China	422.832	31.6	258.960	26.6	1 214.380	52.2	744.298	46.6
Democratic People's Republic of Korea	20.000	1.5			20.000	0.9		
India	214.021	16.0	31.666	3.2	360.000	15.5	90.000	5.6
Indonesia	1.000	0.1			1.000	0.0		
Japan	452.798	33.8	575.809	59.1	528.000	22.7	672.000	42.1
Malaysia	0.100	0.0			1.000	0.0		
Mongolia			0.072	0.0			0.087	0.0
Nepal			0.133	0.0	0.000	0.0	0.133	0.0
New Zealand	11.594	0.9	11.594	1.2	12.500	0.5	12.500	0.8
Pakistan			0.100	0.0	4.000	0.2	0.100	0.0
Philippines	2.400	0.2	0.096	0.0	2.800	0.1	0.200	0.0
Republic of Korea	58.700	4.4	48.600	5.0	61.809	2.7	54.000	3.4
Sri Lanka	0.093	0.0	0.078	0.0	0.093	0.0	0.078	0.0
Thailand	0.003	0.0			0.042	0.0		
Viet Nam	0.025	0.0	0.050	0.0	0.025	0.0	0.075	0.0
Total premium	**1 337.965**	**100.0**	**974.759**	**100.0**	**2 325.149**	**100.0**	**1 598.071**	**100.0**
% of total premium	**58**		**42**		**59**		**41**	

Sources: 2007 estimates based on Mahul and Stutley, 2010; 2009 estimates based on Aon-Benfield, 2010; author's updated estimates based on FAO Asia-Pacific 2010

The analysis shows that in 2007 crop insurance accounted for US$1.34 billion or 58 percent of the total agricultural insurance premiums in Asia and the Pacific region and livestock insurance accounted for US$0.97 billion or 42 percent of the total premium. The largest crop insurance markets by premium volume were Japan, followed by China, India, Australia and the Republic of Korea and overall these five markets accounted for over 97 percent of the total regional crop insurance premium. In comparison, the other crop insurance markets are very small in other countries in the region. In 2007 there was no crop insurance in Bangladesh, Mongolia and Pakistan. In 2007 the largest livestock insurance market was again Japan, with a premium volume of US$576 million (59 percent of livestock premiums), followed by China, Australia, India and the Republic of Korea.

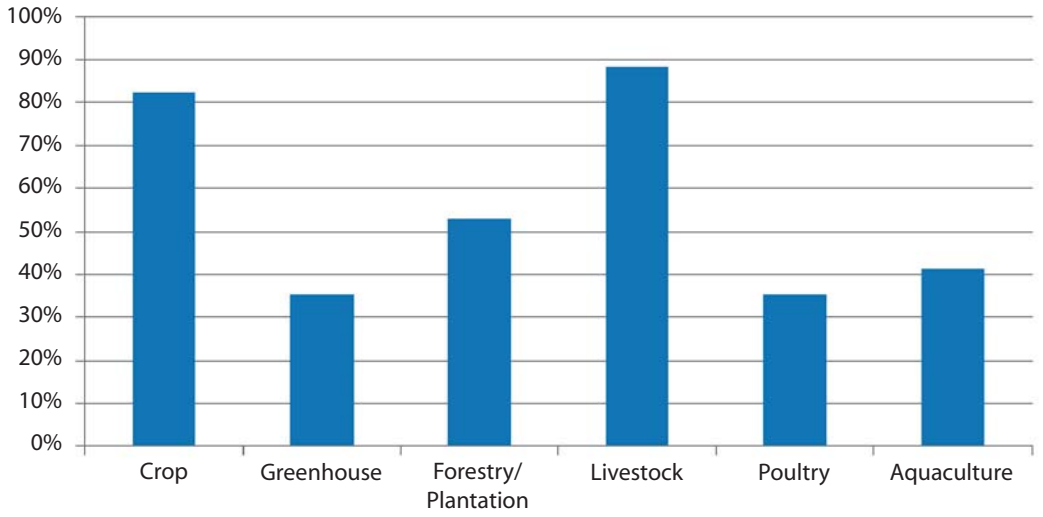
By 2009, China had taken over as the largest crop and livestock insurance market in Asia and the Pacific region accounting for 52 percent and 47 percent respectively of total 2009 crop and livestock premium. Japan is now the second largest market for both crop and livestock insurance. Crop insurance premiums have also increased by about two thirds in India largely on account of the growth in crop weather index insurance. According to AIC estimates, in 2009 this product generated a total premium of about US$105 million. In contrast, both crop and livestock insurance premiums declined significantly in Australia.

Agricultural insurance provision in Asia and the Pacific region by country

Detailed information is available for 17 countries only. Of these, 14 (82 percent of the total) provide traditional indemnity-based and/or index-based crop insurance either on a pilot or fully commercial basis and there was no crop insurance provision in Bangladesh, Malaysia and Mongolia in 2010. Livestock insurance was available in 15 of the countries (88 percent of the total). Of the 17 countries, the only countries that do not currently provide livestock insurance are Democratic People's Republic of Korea and Thailand. A livestock insurance scheme is being implemented in Indonesia on a very small pilot scale and in Malaysia a livestock scheme is currently awaiting implementation. Forestry and plantation insurance is also very popular in Asia and the Pacific region and is provided in nine countries (53 percent of the total), followed by aquaculture insurance (seven countries, 41 percent of the total) and finally poultry insurance (35 percent of countries; Figure 3.5).

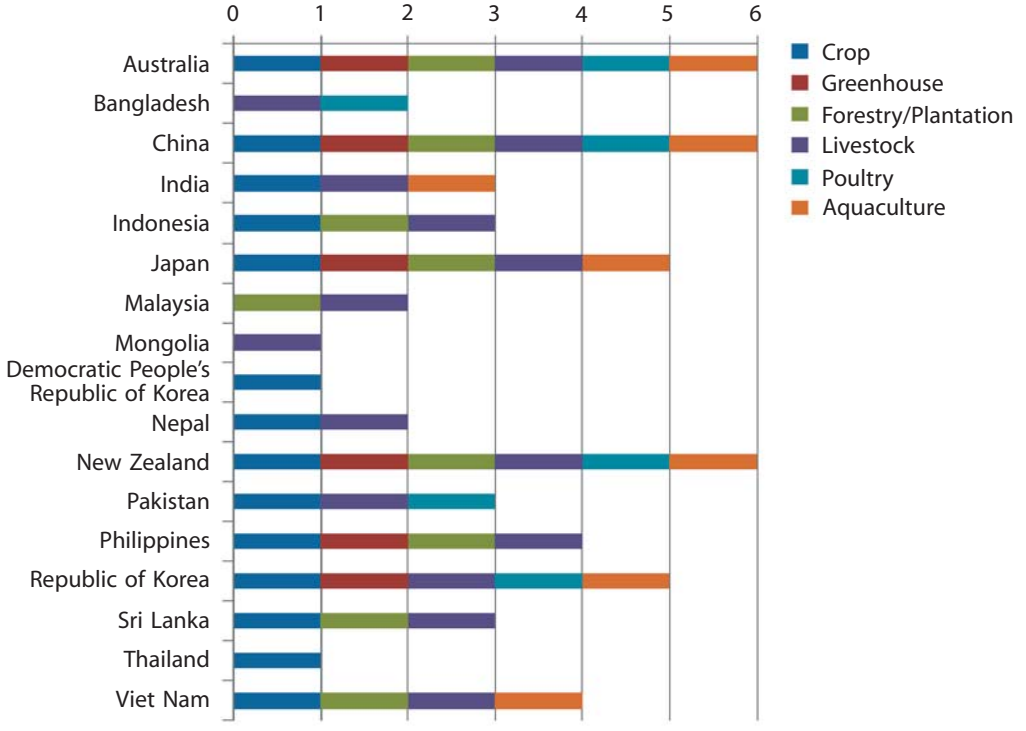
As of 2010 Australia, China and New Zealand are the most diversified agricultural insurance markets and provide the full range of six classes of agricultural crop, greenhouse, forestry, livestock, poultry and aquaculture insurance. This is followed by Japan and the Republic of Korea, both of which currently offer five product lines, and then the Philippines and Viet Nam with four classes of agricultural insurance (in Viet Nam, in spite of the presence of several product lines, the supply of agricultural insurance is extremely restricted and penetration levels are correspondingly low). At the other extreme, Mongolia currently only offers livestock insurance and in Thailand and Indonesia there are small crop weather index insurance pilot programmes only (Figure 3.6).

Figure 3.5: Agricultural insurance availability by class of business in 2010 (% of countries)



Source: Author

Figure 3.6: Agricultural insurance availability by country and by class of business



Source: Author

Crop insurance provision in Asia and the Pacific region

Crop insurance products (including greenhouse and forestry insurance)

A summary of the key traditional indemnity-based and new index-based crop insurance products is presented in Box 3.2.

Box 3.2: Crop insurance products: Indemnity-based and index-based covers

Traditional crop insurance

Damage-based indemnity insurance (named peril crop insurance) – In this type of crop insurance 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 pre-agreed sum insured. The sum insured may be based on production costs, or on the 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 peril insurance products (e.g. frost, excessive rainfall, wind).

Yield-based crop insurance (multiple peril crop insurance, MPCI) – In this case, an insured yield (e.g. tons/hectare) is established, as a percentage of the historical average yield of the insured farmer. The insured yield is typically between 50 percent 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 a pre-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. This is because it is generally difficult to determine the exact cause of the loss.

Crop revenue insurance – This product combines conventional loss crop yield based MPCI insurance with protection against loss of market price at the time of sale of the crop. Currently, this product is only marketed on a commercial basis in the USA for grains and oilseeds that are quoted on commodity markets (Chicago Board of Trade) and where future price contracts can be combined into the revenue policy.

Greenhouse insurance – A specialist type of agricultural insurance cover combining material damage cover to greenhouse structures and equipment and also conventional crop insurance cover (usually restricted to named perils) to the covered greenhouse crop.

Forestry insurance – Traditional damage-based indemnity insurance against fire and allied peril losses in standing timber. The valuation for insurance and indemnity 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.

Index-based crop insurance

Area-yield index insurance – Area-yield index insurance is insurance where 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 area average yield. 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 area yield data on which basis one can establish the normal average yield and insured yield.

Weather index insurance – This is insurance where the indemnity is based on realizations of a specific weather parameter measured over a pre-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

Box 3.2: *(continued)*

are expected to cause crop losses. For example, the insurance can be structured to protect against either too much rainfall or too little. An indemnity is paid whenever the realized value of the index exceeds a pre-specified threshold (e.g. when protecting against too much rainfall) or when the index is less than the threshold (e.g. when protecting against too little rainfall). The indemnity is calculated based on a pre-agreed sum insured per unit of the index (e.g. US$/millimetre of rainfall).

NDVI/satellite insurance – This refers to indexes constructed using time-series remote sensing imagery, for example applications of false colour infrared waveband to pasture index insurance where the payout is based on a NDVI (normalized dry vegetative index), which relates moisture deficit to pasture degradation. Research is currently being conducted into applications of SAR (synthetic aperture radar) to crop flood insurance.

Source: Mahul and Stutley, 2010

Traditional crop (and forestry) insurance products

(a) Individual grower multiple peril crop insurance

This review of countries in Asia and the Pacific region shows that individual grower MPCI is the most common form of traditional indemnity based crop insurance product offered by crop insurers in nine countries (53 percent of sample) (Table 3.7). Farmers favour this product because it provides loss of yield protection against a wide range of climatic, natural and usually biological perils. Countries with major and mature MPCI programmes include Japan (rice, maize, wheat and other crops) and the Philippines where PCIC underwrites MPCI for rice and maize. China has the largest crop insurance market in Asia today with 2009 crop premiums estimated by the author at about US$1.2 billion, most of which is subsidized MPCI for wheat, maize, soybean, sunflower and cotton. The Republic of Korea underwrites an MPCI portfolio for crops such as soybean, rice, fruit and vegetables. Sri Lanka has also underwritten MPCI cover for rice and maize for many years although the portfolio is currently relatively small. Countries that have started underwriting crop MPCI in recent years include Pakistan (since 2008), Indonesia (pilot MPCI in 2010) and Viet Nam (new MPCI programme for rice planned for launch in 2011).

The international experience with individual farmer MPCI is with few exceptions extremely poor. There are problems of low uptake, high levels of anti-selection and moral hazard, high administrative and operational costs and the underwriting results are usually negative. Most individual grower MPCI programmes that are voluntary suffer from very high levels of anti-selection and moral hazard; the programmes are usually very exposed to systemic drought, flood and windstorm losses, which correlate at regional and national level, and the premium rates that have to be charged in order to cover the combination of high losses and high administrative costs are often in excess of 10 percent to 15 percent. Nearly all individual grower MPCI programmes operate at a financial loss (negative underwriting results) and are dependent on government premium subsidies to make the cover more affordable and acceptable to farmers and/or government subsidies on excess claims.[13] As previously noted at the start of this chapter,

[13] For a comprehensive review of the performance of public-sector crop insurance refer to Hazell *et al.*, 1986 and Mahul and Stutley, 2010.

Table 3.7: Traditional indemnity-based crop and forestry insurance provision by country in 2010

Country	Traditional indemnity-based					Index-based		
	Named peril	MPCI	Crop revenue	Crop green-house	Forestry	Area yield	Weather	Remote sensing
Australia	✓	▪	▪	✓	✓		▪	▪
Bangladesh	▪	▪	▪	▪	▪	▪		▪
China	✓	✓	▪	✓	✓		✓☒	▪
Democratic People's Republic of Korea	▪	✓	▪			▪	▪	▪
India	✓		▪	▪	▪	✓	✓	✓
Indonesia		✓☒	▪	▪	✓	▪	✓☒	▪
Japan	✓	✓	▪	✓	✓	▪	▪	▪
Malaysia			▪	▪	✓	▪	▪	▪
Mongolia	▪	▪	▪	▪	▪	▪	▪	▪
Nepal	✓☒	▪	▪	▪	▪	▪	▪	▪
New Zealand	✓	▪	▪	✓	✓	▪	✓◆	▪
Pakistan		✓	▪			▪	▪	▪
Philippines	▪	✓	▪	✓	✓	▪	✓	✓
Republic of Korea	✓	✓☒	▪	✓	▪	▪	▪	▪
Sri Lanka	▪	✓	▪		✓	▪	✓☒	▪
Thailand	▪	▪	▪	▪	▪		✓	▪
Viet Nam	▪	✓☒	▪	▪	✓		✓☒	▪
TOTAL	**7**	**9**	**0**	**6**	**9**	**1**	**8**	**2**
Percentage	**41**	**53**	**0**	**35**	**53**	**6**	**47**	**12**

Source: Mahul and Stutley, 2010 and FAO Asia-Pacific Survey 2010

Notes: ✓✓ Insurance product available on a commercial basis.
✓☒ Insurance product is either being implemented on a pilot basis or is still awaiting launch.
✓◆ Insurance product designed but is not being actively marketed.

the problems listed above apply to a greater or lesser extent on nearly all the public sector MPCI programmes in Asia and the Pacific region and these programmes have performed poorly in financial terms.

(b) Named peril crop insurance

Named peril crop insurance products are usually designed as damage-based covers and insure a limited number of named perils. Drought is excluded from named-peril policies. Named peril insurance is the second most popular form of crop insurance product in eight (47 percent of countries). Australia and New Zealand are among the largest named peril crop insurance markets in the region and in these more temperate climates, crop hail and allied perils (e.g. frost) are marketed for a wide range of cereals, cotton, fruit and vines (grapes and kiwi fruit) and vegetables.

The Republic of Korea also has a very large named peril programme providing typhoon, hail, frost and excess rain cover in a wide range of commercial fruit crops (apples, pears, grapes, persimmon and tangerines). China has underwritten named peril crop insurance for many years, particularly through PICC (Table 3.7).

(c) Other traditional crop insurance products

Crop revenue insurance, which provides both loss of yield and loss of price protection, was not available in any of the countries in 2010.[14] However, several countries in the region including Japan and Thailand offer minimum price support or price guarantee programmes to producers of rice and other strategic crops.[15]

Greenhouse insurance is available in about one third of the countries reviewed, and the largest markets include Australia, New Zealand and Japan.

(d) Forestry insurance

Forestry insurance has a lengthy tradition in Asia and the Pacific region and is currently available in nine markets or 53 percent of countries (Table 3.7). Most forestry insurance is based on a damage-based indemnity product that insures against fire and occasionally additional perils such as wind and frost. Demand for forestry insurance is mainly from commercial forestry companies and or pulp/paper manufacturers and the largest forestry insurance market is Japan (estimated premium income not known) followed by Australia with a 2009 premium of about US$23 million (mainly pine and eucalyptus), then China and New Zealand. Forestry insurance also includes commercial plantation crops such as rubber and in China, Malaysia and Viet Nam this crop has traditionally been insured against fire, wind and in the case of Malaysia also against flood and animal damage (e.g. elephants). In Malaysia other insured plantation crops include oil palm, coconut, fruit trees and cocoa. In Indonesia there is a demand for fire insurance in oil palm and standing timber. Overall the forestry insurance market in Asia is very small compared to crop insurance and is estimated at no more than about US$75 million in total in 2009.

Crop index insurance

Three main classes of crop index insurance are identified in Box 3.2, namely area-yield index insurance, weather index insurance and remote sensing indexes.

(a) Area yield index insurance

Area-yield index insurance represents an alternative approach to MPCI insurance that aims to overcome many of the drawbacks of traditional individual farmer MPCI crop insurance. The key feature of this product is that it does not indemnify crop yield losses at the individual farmer or

[14] Currently, crop revenue insurance is only offered on a wide-scale commercial basis under the US Federal Crop Insurance Programme (FCIP), in this case for major commodities such as soybean and maize, which are quoted on the Chicago Board of Trade, and for which derivative options can be used to provide price protection.

[15] See Thailand Country Report in Annex 5 for further details of the government's minimum price guarantee programme for rice, maize and tapioca (cassava) producers.

field level. Rather, an area-yield-index product makes indemnity payments to farmers according to yield loss or shortfall against an *average area yield* (the index) in a defined geographical area (e.g. a district or country or other local administrative unit). The key advantages of the area-yield approach are that moral hazard and anti-selection are minimized and the costs of administering such a policy are much reduced; this applies especially to the reduced costs of in-field crop loss assessment and offers the potential to market this product at lower premium costs to growers. The main disadvantage of an area-yield index insurance policy is "basis risk", namely the difference in the actual yield outcome achieved by individual farmers on their own fields and the average area-yield. For example, an individual farmer may incur severe crop production and yield losses because of localized perils e.g. hail, or flooding by a nearby river, but because these localized losses do not impact the country or departmental average yield, the grower does not receive any indemnity. Further information on the features and advantages and disadvantages of area yield index insurance are contained in Annex 2.2.

In Asia only India is currently implementing area-yield index insurance. In India area-yield crop insurance has operated for over 20 years and it is currently the world's largest single crop insurance programme insuring about 22.5 million farmers in 2009/10. The Agricultural Insurance Company of India (AICI) is responsible for implementing area-yield crop insurance under the National Agricultural Insurance Scheme (NAIS). The programme targets small and marginal farmers (with less than two hectares) who are highly dependent on access to seasonal crop credit. Crop insurance is compulsory for borrowing farmers and voluntary for non-borrowing farmers. The insured unit is normally the block or *panchayet*, which comprises a group of nearby villages and which may include up to 27 000 acres or more of a single crop and several thousands of small and marginal farmers. Farmers may select coverage levels of 60 percent, 80 percent or a maximum of 90 percent of the five-year average area-yield. The programme is administered through the rural agricultural bank branch network in each state and department and block (group of villages). Actual area-yields are established through sample crop-cutting. This is a major and costly exercise and suffers from delays in processing the results. Indemnity payments are therefore often delayed for six months or more. Further details of the India area-yield index programme are contained in Box 3.3.

Although area-yield index insurance is currently only being implemented in India, this product is currently being studied as an alternative to individual grower crop MPCI cover by several countries including China, Bangladesh, Nepal and Philippines.[16]

(b) Crop weather index insurance (CWII)

Crop weather index insurance (CWII) represents an alternative approach to crop insurance that aims to overcome many of the drawbacks of traditional individual grower indemnity-based crop insurance. The key feature of CWII products is that they do not indemnify crop yield losses at the individual field or grower level, but rather use a proxy variable (the index) such as the amount of rainfall, or temperature, or wind speed to trigger indemnity pay out to farmers.

[16] The World Bank has conducted technical studies for the introduction of area-yield index insurance into China, Nepal and Bangladesh between 2008 and 2010 and in 2010 GTZ has been researching options to introduce area-yield index insurance into the Philippines.

Box 3.3: Area-index insurance in India (National Agricultural Insurance Scheme (NAIS))

- The programme is underwritten by the Agricultural Insurance Company of India Limited (AICI), which is a public sector insurance company specializing in crop area-yield index insurance and, since 2005, crop weather index insurance. The main programme is the NAIS area-yield index scheme.
- By virtue of being a mainly compulsory programme, the NAIS scheme is the world's largest crop insurance programme currently insuring about 20 million Indian farmers (representing an insurance uptake rate of about 18 percent of all farmers). The programme is however, highly dependent on government subsidies and operates at a major financial loss.
- Government support through national and state governments (50:50 basis) to the NAIS takes the following forms: premium subsidies through the setting of capped premium rates that are about 30 percent of the actuarially required rates, additional premium subsidies for S&M farmers, subsidies on the A&O expenses, free access to crop-cutting results, excess of loss reinsurance.

Source: Author (See also AICI Web site at http://www.aicofindia.org)

CWII is a simplified form of insurance where payments are made based on a weather index, rather than a measurement of crop loss in the field. The index is selected to represent as closely as possible the crop yield loss likely to be experienced by the farmer. The most common application of CWII is against rainfall deficit or drought, where rainfall measurements are made at a reference weather station or stations, during a defined period or defined periods, and insurance payouts are made based on a pre-established indemnity scale set out in the insurance policy. The sum insured is normally based on the production costs for the selected crop and indemnity payment are made when actual rainfall in the current cropping season, as measured at the selected weather station, falls below pre-defined threshold levels.

The main advantage of CWII is the elimination of adverse selection and moral hazard problems that are common to MPCI. Since payouts are made based on an objective measurement at the reference weather station, there are few information asymmetries to be exploited, and the behaviour of the insured cannot influence the extent of payouts. In addition, CWII reduces administration costs (particularly because it does not require in-field inspections or loss adjustment) for the insurer and thus can make premiums more affordable. Indexed products are also likely to facilitate risk transfer to the international reinsurance markets. However, although CWII offers opportunities for reduced A&O costs, the development phase requires intensive technical inputs, and ongoing technical inputs are required to refine products over time.

The most important challenge for CWII is basis risk, which significantly limits the applicability of index instruments. Basis risk is the difference between the payout as measured by the index and the actual loss incurred by the insured farmer(s). Because no field loss assessment is made under index insurance, the payout may be higher or lower than the actual loss of crop suffered by the farmer(s). Basis risk is lower when the risk is highly correlated, i.e. affecting a relatively large geographical area to the same extent and simultaneously. The extent of basis risk can to a certain extent be mitigated by careful index design and by the installation of new weather stations, thereby providing more localized precision in the measured climatic peril. Other challenges for

weather index insurance include the need for high quality weather data and infrastructure and the currently limited product options, with most applications in developing countries so far concentrated on rainfall indexes.

CWII is being developed at different levels of aggregation, starting with individual farmers (microindexes) and then at a regional level (examples include input suppliers or banks providing lending credit in a specified area (meso level indexes)) and then at a national level as a food security instrument (macro level weather indexes). India was the first country to introduce micro level CWII in 2003 and since then many programmes have been launched. Mexico was the first country to develop meso level CWII index cover that offers the state governments catastrophe drought, rainfall and wind storm index protection for food crops (Agroasemex, 2008). Ethiopia and Malawi have experimented with macro level food security drought indexes. In the Caribbean, a group of 16 island governments joined the Caribbean Catastrophe Risk Insurance Facility, which provides catastrophe (earthquake and hurricane) protection to the national governments. (This is not, however, a crop index cover).

The first micro level CWII programme was introduced as recently as 2003 in India by ICICI Lombard Insurance Company in conjunction with BASIX, a Hyderabad-based MFI, for rainfed castor and groundnuts and with technical assistance from the World Bank. See Box 3.4 for further details of the ICICI-BASIX programme.

Since its origin seven years ago in India, CWII has received major interest in development circles as a weather risk transfer product that is better suited to the needs of small farmers in developing countries than traditional indemnity-based MPCI. The product has been widely promoted in Asia and Africa by international development organizations including the World Bank through its Commodity Risk Management Group (CRMG), IFAD and WFP (who are working jointly to increase the access of resource poor farmers to WII through the IFASD-WFP Weather Risk Management Facility, WRMF), ILO, the Gates Foundation, and GTZ/GIZ, various NGOs including Oxfam, microfinance/intermediary organizations such as MicroEnsure, and academic institutions such as IRI Colombia State University etc. Several reinsurers are also actively involved in the design and rating of CWII, most notably Swiss Re and Partner Re (which in 2010 acquired Paris Re and their CWII team). The proliferation of WII is evidenced by the fact that in 2009 there were at least 30 micro level "developmental" weather index insurance programmes in 18, mainly developing, countries and a further six meso level or macro level "disaster-relief" programmes in 20 countries either under pilot implementation or commercial scale-up (IFAD and WFP, 2010).

Micro level (individual grower) CWII is being researched and piloted or commercially scaled-up in eight countries in Asia and the Pacific region (47 percent of the total) as shown in Table 3.7. CWII is being commercially implemented in India where there are now at least eight different programmes and both private and public sectors are involved in the massive scaling up of this product, and in Thailand, which is now in the fourth year of implementation and scaling-up of a CWII programme for rainfall-deficit in maize and in its second year of implementation of a pilot rice cumulative rainfall deficit CWII programme.[17] CWII is in its second year of implementation in

[17] Further details of the two CWII programmes for maize and rice are contained in the Thailand Country Report in Annex 5.

Box 3.4: The BASIX-ICICI Lombard CWII scheme in India

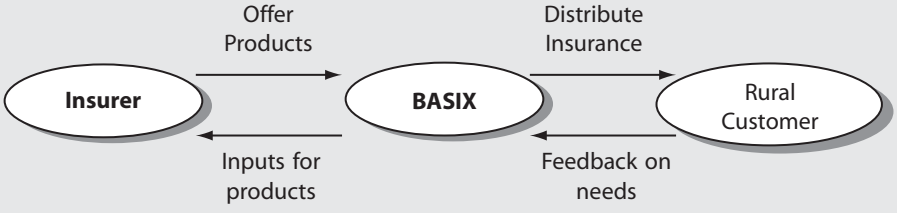
In 2003, BASIX, (a microfinance institution), ICICI Lombard (a leading private commercial insurance company in India) with technical assistance from the CRMG of the World Bank designed the first micro level individual farmer CWII policy. The product was a rainfall deficit index which was pilot tested in the *kharif* season in 2003 for small and marginal farmers growing groundnuts and castor crops in Mahabubnagar district in Andhra Pradesh State, India. In 2003 the WII product was marketed by BASIX on a voluntary basis to 154 groundnut farmers and 76 castor farmers and was linked to seasonal crop loans provided by BASIX. In 2003 the programme was based on one trigger weather station with a premium of Rs 88 685 (about US$1 941). Rainfall deficit payments were triggered with payouts of Rs 41 860 (US$916) with a corresponding loss ratio of 47 percent.

Over the past six years (2003/04 to 2008/09) BASIX/ICICI Lombard have extended the CWII programme to eight states and more than 40 weather stations and to new crops. A total of 34 186 farmers have been insured over this period with accumulated premium of Rs 7.7 million (US$172 126) and claims of Rs 4.3 million (US$96 572) with a long-term loss ratio of 56 percent.

A key feature of the BASIX-ICICI CWII scheme is the way in which the product is distributed to farmers under what is termed a partner-agent model from the outset ICICI contracted BASIX to act as its agent and to be responsible for the marketing and sales of the CWII product to their clients. BASIX therefore promotes and distributes the CWII products to its clients through its existing organizational and administrative network thereby minimizing the additional costs of delivering insurance and is also responsible for: a) farmer awareness creation and education and training programmes; b) premium collection; c) claims payments; and d) policy administration during the coverage period. It is usual for the insurance company to reimburse the agent for its services through a commission fee that is paid out of the weather index premiums.

The partner-agent model is being promoted in many countries today as a cost-effective method for delivering microinsurance including agricultural insurance products and services to small farmers.

BASIX-ICICI Lombard partner-agent insurance delivery model



Source: Author, based on BASIX (www.basixindia.com) and IFAD and WFP, 2010

the Philippines where MicroEnsure in conjunction with Malayan Insurance Company are offering an individual farmer (micro level) rainfall deficit insurance contract to rice producers in selected regions of the country. China is also actively conducting research into crop weather index insurance. In 2008 Anxin Insurance Company pilot tested an excess rain/relative humidity index programme for watermelons in Shanghai Municipality and in 2009 Guoyuan Agricultural Insurance Company with assistance from WFP and IFAD launched a pilot excess rain and drought index cover for farmers in selected districts of Anhui Province. Most recently GTZ/GIZ has been conducting research into WII opportunities for selected crops in selected provinces of China. To date none of

the pilot WII initiatives in China have reached the point of scale up and commercial sustainability. In Viet Nam WII programmes have been designed over the past two years for flood cover for rice grown in the Mekong Delta and drought index cover for coffee producers in Dak Lak Province in the Central Highlands of Viet Nam and these programmes are currently awaiting implementation.[18] Other countries that were, in 2010, about to launch pilot crop WII programmes include Indonesia and Sri Lanka.

(c) Remote sensing (satellite) indexes

Two countries, India and the Philippines, are working with remote sensing indexes for agriculture. In India the AIC has designed combined WII indexes with normalized difference vegetative indexes (NDVI) for several crops including wheat, tea and rubber.

In the Philippines MicroEnsure, in conjunction with the Malayan Insurance Company, has designed the world's first microinsurance typhoon product using a satellite tracking index that combines distance of the track from the insured location and maximum sustained wind speed at the closest point of track. This typhoon index was launched in 2009 for rice growers in selected regions of the Philippines. Further details of this programme are shown in Box 3.5 and in the Philippines Country Report in Annex 4.

Other work is being conducted on applications of satellite indexes to flood insurance and in this case SAR (synthetic aperture radar) appears to show great promise because of its high resolution and ability to penetrate cloud cover. Countries where flood satellite index research and development is currently being conducted include Thailand, Bangladesh and Viet Nam (see Lotsch *et al.,* 2010).

To conclude this section, weather index insurance (WII) is receiving major attention in Asia and the Pacific region as an alternative and potentially more cost-effective product to individual grower MPCI. Currently this product has only been commercially scaled up in India: AIC estimate the crop weather index insurance market in India to be in the order of US$90 million in 2009/2010. With the exception of Thailand, the programmes in other countries in the region are still at a pilot research and development stage and therefore total premium income for CWII in the region is no more than about US$92 million in 2009/10.

[18] These two products were designed by Global Agrisk with funding from the Asian Development Bank (for meso level flood protection for rice in the Mekong Delta) and from Ford Foundation (for the micro level coffee-drought index cover).

Box 3.5: the Philippines: Micro level typhoon index insurance for rice producers

The **Typhoon Weather Index** is the world's first micro level typhoon (tropical cyclone) index insurance product for small rice farmers in the Philippines. The programme is the result of collaboration between MicroEnsure and the Malayan Insurance Company Ltd.

The Typhoon Weather Index is a remote sensing or satellite based insurance product that was designed by MicroEnsure using typhoon data supplied by the Japanese Meteorological Authority (JMA). MicroEnsure employed the services of an international actuary to conduct a Typhoon risk modelling and mapping exercise for all of the Philippines and to define homogeneous risk-rating zones (28 km grid squares) for the entire country – typhoon premium rates have been calculated for each grid according to the frequency and severity of the tropical cyclone/typhoon hazard.

The product is operated by the JMA satellite tracking system for typhoons and an indemnity payment is triggered if the typhoon tracks within a defined distance (maximum of 140 kilometres) from the insured farm location(s) and according to the maximum sustained wind speed at the closest point of track: at "strong tropical storm" wind speeds the policy pays out 15 percent of the maximum sum insured and at "hurricane 4 wind speed, the payout is 100 percent of the sum insured. The location of each insured farm is plotted using GPS and the actual payouts are automatically calculated according to how close the farm is to the centre of the typhoon's path and the calculated wind speed at the location.

The typhoon index was approved in 2009 by the Insurance Commission.

In 2009 the Micro level Typhoon Index Insurance Cover was launched for rice farmers in Panay Island, Region VI of the Philippines. A total of 446 farmers purchased voluntary cover in 2009.

The typhoon index is underwritten by the Malayan Insurance Company with reinsurance protection from Partner Re (formerly Paris Re prior to 2010). Taytay Sa Kauswagan, Inc., TSK, the largest microfinance lending institution in the Philippines with a current outreach of over 250 000 borrowers is providing seasonal credit to the rice producers under this pilot micro level individual farmer crop-typhoon index scheme.

Key issues which will be faced in developing the typhoon index product in future include: (a) trying to minimize basis risk arising out of excess rain/flood and which is often associated with typhoons and which is not currently included in the typhoon index; and (b) trying to ensure the pilot programme achieves scale-up and sustainability.

Source: MICROENSURE, 2009; Martirez, H.W., 2009

Livestock, poultry and aquaculture insurance in Asia and the Pacific region

Livestock insurance (including poultry and aquaculture)

Livestock insurance covers a wide range of animals: horses, cattle (dairy and beef), swine, sheep, goats, and domestic pets (cats and dogs). It also includes poultry insurance, aquaculture insurance (freshwater and marine) and specialist bloodstock insurance for high value reproductive or show animals, and even honey bees can be insured in some countries. There are four types of livestock insurance product: (i) traditional animal accident and mortality cover; (ii) epidemic disease cover; (iii) all risk mortality cover; and (iv) livestock index mortality insurance. Livestock index mortality insurance is currently restricted to one commercial programme in Mongolia. (see Box 3.6).

Box 3.6: Types of traditional and index 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, 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, as mortality is to a considerable extent influenced by management, 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 animals must be lost before an indemnity is paid.

All risk mortality insurance including diseases. In some countries, all risk accident and mortality insurance including diseases is provided 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 insurances.

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

Index livestock insurance:

Index insurance for livestock has been applied for mortality risk in Mongolia where there is a high correlation of livestock losses with an indexable extreme weather parameter (i.e. low temperature), and applications of satellite imagery/NDVI indexes for some pasture and rangeland products in Canada, the United States of America and Spain.

Source: Mahul and Stutley, 2010

Livestock insurance is very important in Asia and the Pacific region and in 2009 was available in 15 (88 percent) of the 17 countries studied that have some form of agricultural insurance. As noted previously, the largest livestock insurance markets in the world by premium volume are found in China (2009 premium US$744 million), Japan (US$672 million), the Republic of Korea (US$54 million) and India (US$90 million). The most common form of livestock insurance product is named peril accident and mortality cover found in 13 (76 percent) countries with livestock insurance, followed by epidemic disease cover in five (29 percent) countries (Table 3.8).

China has the largest market for cattle and swine epidemic disease cover in the world. In 2007 five of the leading insurance companies (PICC, CUPIC, Anxin, Anhua and Sunlight) were authorized by the insurance supervisor, CIRC, to underwrite a new national livestock insurance scheme for reproductive sows against epidemic diseases including blue ear (otherwise known as porcine reproductive and respiratory disease) and natural hazards including flood, fire and typhoon). In order to make this compulsory programme attractive to pig producers, the government offered high premium subsidies of 75 percent of the full cost of the product. The programme was

Table 3.8 Livestock, poultry and aquaculture insurance provision by country in 2010

Country	Traditional indemnity insurance					Index based
	Livestock accident & mortality	Livestock epidemic disease	Livestock credit guarantee insurance	Poultry	Aquaculture	Livestock mortality index
Australia	✓			✓	✓	
Bangladesh			✓	✓		
China	✓	✓		✓	✓	
Democratic People's Republic of Korea						
India	✓	✓	✓		✓	
Indonesia	✓☒					
Japan	✓	✓			✓	
Malaysia	✓☒					
Mongolia						✓
Nepal	✓		✓			
New Zealand	✓	✓		✓	✓	
Pakistan	✓					
Philippines	✓	✓				
Republic of Korea	✓			✓	✓	
Sri Lanka	✓					
Thailand						
Viet Nam	✓				✓☒	
Total	**13**	**5**	**3**	**5**	**7**	**1**
% of total	76	29	18	29	41	6

Source: Mahul and Stutley, 2010 and FAO Asia–Pacific Survey 2010

Notes: ✓ Insurance product available on a commercial basis.

✓☒ Insurance product is either being implemented on a pilot basis or is still awaiting launch.

introduced into 22 provinces and achieved a coverage level of about 80 percent of the national swine herd. In 2008 the government increased the premium subsidy level on the swine epidemic disease programme to 80 percent of premium and also introduced a similar national epidemic disease programme for dairy livestock, attracting premium subsidies of 60 percent. In 2010 it seems that most of the reproductive sow and dairy cattle herd in China was insured under these epidemic disease programmes. Japan also offers epidemic disease cover in livestock.

In the Republic of Korea, the National Agricultural Cooperative Federation (NACF) is also responsible for underwriting livestock insurance for cattle, poultry and pigs. The coverage includes accidental death (including non-epidemic diseases), emergency slaughter and natural catastrophes. Epidemic diseases are specifically excluded and in the event of an epidemic disease in livestock, the government compensation programme is the only source of indemnity for the livestock owner.

A feature of several Asian countries is the mutual or community-based microinsurance livestock credit guarantee protection schemes in Bangladesh, Nepal and India. In Bangladesh, several leading NGOs/MFIs, including the Grameen Bank and Proshika have implemented small-scale livestock microinsurance programmes for many years to protect their investment loans to dairy cattle and water buffalo livestock producers. Typically the insurance provides all risk mortality cover during the two to three year loan repayment period and the sum insured is fixed in accordance with the loan amount. The NGOs operate their own internal livestock indemnity funds without any form of catastrophe reinsurance protection. In Nepal, the Community Livestock Development Programme (CLDP) for dairy cattle and goats is funded by ADB with technical assistance from FAO and provides all risk mortality and loss of use cover for livestock that are purchased on credit. This non-regulated livestock credit insurance programme does not carry any form of reinsurance protection. India also has various state-level community-based livestock insurance schemes that have operated successfully, including a programme in Andhra Pradesh that has recently attracted insurance protection from Tata Insurance India. Features of these innovative microscale livestock insurance schemes are reviewed in more detail in Chapter 5.

Aquaculture insurance

Aquaculture insurance is a relatively small and highly specialist class of livestock insurance that includes onshore freshwater fish insurance (for example, trout, tilapia, carp that are raised in ponds or tanks); brackish water or estuarine insurance for shrimps and shellfish, through to offshore deep seawater insurance for fish (most commonly salmon and sea bass in floating cages).

Aquaculture insurance policies typically cover mortality of the fish stock as well as protection against physical loss or damage to the insured ponds, cages, installations and equipment. There are two types of policy coverage, namely named peril and all risks insurance. Insured perils typically include natural meteorological events, such as storm, tsunami and flood damage. However, aquaculture breeders may elect on a case-by-case basis to request insurance against diseases in their fish stock, pollution, predator attacks, collision, oxygen depletion, changes in pH and salinity, theft and escape. Underwriters will only grant these additional perils if the owner has high management and loss prevention and control systems in place. The sum insured is usually set in accordance with the value of the fish stock each month and it is customary to set a maximum aggregate limit per site. In the largest commercial aquaculture insurance markets such as Chile, Norway, Scotland and Canada the size of insured farms may run from tens to hundreds of millions of dollars including fish stock and installations. In these markets, premium rates typically range between 3 percent and 10 percent of the sum insured and deductibles range between 15 percent and 30 percent each and every loss, depending on the species, location and the conditions in which the stocks are kept. In Asia, however, there are relatively few large-scale commercial onshore or offshore aquaculture companies and instead there are very large numbers of small-scale fish and shrimp producers often using low technology rearing systems.

The international aquaculture market is dominated by a small number of international reinsurers including Swiss Re and Munich Re, and to a lesser extent SCOR, Hannover Re, Partner Re, Sunderland Marine and various syndicates at Lloyd's. In well-established aquaculture insurance markets such as Chile, Norway, Scotland and Canada and in parts of Asia, these reinsurers are

willing to grant treaty reinsurance capacity to local insurers. However, most of the international insurance and reinsurance market for aquaculture is placed on a facultative or case-by-case basis and is subject to pre-inspections and risk surveys by international aquaculture specialists. Also, reinsurers usually insist on appointing their own independent loss adjusters to attend and assess losses.

Aquaculture production is extremely important in Asia. FAO (2007) note that Asia has 11 million aquaculturists (fish farmers) or the largest number in the world, most of whom are small and medium sized operators. In 2004, Asia accounted for 91 percent of the global production of farmed fish by volume, valued at about US$57 billion with annual average growth rates of 7.7 percent.

The same FAO report notes that in many parts of Asia underwriters are unwilling to grant aquaculture insurance cover to small-scale producers: "The stringent standards demanded by aquaculture insurance markets, the high costs of meeting them and high underwriting costs work directly against small, individual, household based, artisanal aquaculture farmers obtaining insurance; they are too small scale to generate significant premium and are viewed as likely to produce high levels of losses that are expensive to adjust and pay."(FAO, 2007a).

Whereas information is readily available for crop and, to a lesser extent, livestock insurance by country in Asia, data and statistics tend to be weak in the case of aquaculture insurance. In one of the earliest comprehensive reviews, FAO (1999) noted that no aquaculture insurance schemes existed for fish and shrimp farmers in developing countries including Nepal, the Philippines, Thailand, Viet Nam, Malaysia and Sri Lanka. In the Philippines, an act mandated PCIC, the national agricultural insurer, to provide onshore aquaculture insurance, but to date the company has never entered this class of business. In Sri Lanka, although aquaculture insurance was not available, the AAIB has provided insurance cover for fishermen since the 1980s including loss or damage to fishing vessels, personal accident cover and also pension and social security cover. In 1999, countries that had aquaculture insurance included: Bangladesh, where a pilot named peril shrimp and prawn insurance programme was introduced by SBC, but which was terminated by 2004 because of poor underwriting results; India, which has more than three decades of experience with shrimp farming, but again with very high levels of disease claims; the Republic of Korea, which had introduced a pilot aquaculture scheme for oyster cultivation, but which had failed because of very high claims; and Japan which has a lengthy history of aquaculture insurance through the local fisheries cooperative associations, backed up by heavy government premium subsidies and reinsurance (FAO, 1999).

This study shows that in 2010 aquaculture insurance was available in seven countries including large-scale intensive commercial aquaculture insurance operations in Australia, New Zealand and the Republic of Korea and then cooperative fish and shrimp insurance in Japan. Both China and India have provided onshore aquaculture insurance for small extensive and semi-intensive scale shrimp and fish farming for many decades. In Viet Nam, one insurance company has experimented with a pilot aquaculture insurance scheme for catfish (Table 3.8). However, for all countries very little information is available on the current scale of the aquaculture market or the underwriting results. It is roughly estimated that in 2009 the total aquaculture market premium volume in Asia and the Pacific region may have been US$50 to 75 million with over 90 percent of this business written in Japan followed by China.

Other insurance covers (health and farm package cover)

In several countries the agricultural insurers offer packaged farm insurance products, including accident and health insurance to the farmer and his family, machinery post-harvest storage insurance or machinery breakdown cover. In the Philippines PCIC offers a wide range of crop, livestock, farm asset and term life and accident insurance (see Box 3.7). Similarly in Sri Lanka the AAIB offers a very wide range of crop, fisheries, livestock and forestry insurance products, farm package insurances, including machinery and equipment cover, post-harvest grain storage insurance, as well as farmer's and fishermen's pension and social security benefit schemes, medical insurance cover and, most recently, life insurance products.

Box 3.7: PCIC farm package range of insurance programmes

1. **rice crop insurance** – This is a modified multiple peril crop insurance (MPCI) policy that insures against crop loss or damage as a result of natural perils (including typhoons, floods, droughts, earthquakes and volcanic eruptions), as well as against biological perils (pests and diseases). In some circumstances PCIC will only offer natural peril cover (i.e. pest and disease coverage is excluded). A unique feature of the MPCI policy of the PCIC, is that it adopts a percentage damage basis of insurance and indemnity. The sum insured is based on the costs of production plus a proportion of the expected value of production. The policy is usually marketed as a crop-credit insurance cover and the premiums are subsidized by both the lending institution (bank) and the government.
2. **maize crop insurance** – This policy is the same as the MPCI policy that is used by PCIC to underwrite rice.
3. **high-value commercial crop insurance**. This is a named-peril policy that PCIC underwrites on a strictly commercial basis (i.e. no premium subsidies apply) for a wide range of crop and peril combinations. Insured crops include high value commercial crops such as abaca, ampalaya, asparagus, banana, cabbage, carrot, cassava, coconut, coffee, commercial trees, cotton, garlic, ginger, mango, mongo (mung bean), onion, papaya, peanut, pineapple, sugar cane, sweet potato, tobacco, tomato, water melon, white potato etc. The sum insured is based on the costs of production plus an agreed proportion of the expected value of production.
4. **livestock insurance**. The PCIC policy insures cattle, water buffalo (carabao), horses, swine, sheep, goats, poultry, and game fowl and animals. A range of livestock insurance policies is offered for commercial and non-commercial livestock: cover is against accident and mortality and includes non-contagious diseases. Key exclusions include government slaughter order and natural perils such as earthquake, volcanic eruption, inundation, typhoon, tornado and cyclone. Extended cover is available for an additional premium against epidemic diseases subject to vaccination against the disease.
5. **non-crop agricultural asset insurance**: This policy provides fire and lightning cover for stored agricultural produce, farm machinery and equipment, and farm infrastructure. Machinery and equipment insurance is also covered against any external cause of physical loss or damage and farmers can insure commercial motor vehicles under this insurance plan.
6. **term insurance covers including**: (a) agricultural producers' protection plan, which is a life insurance product open to agricultural producers/farmers and fishermen, their family members and farm workers from the ages of 15 to 65; (b) loan repayment protection plan, which is designed to guarantee the amount of agricultural loan in the event of death or permanent disability of the lender; and (c) accident and dismemberment security scheme covering death and dismemberment.

Source: Author, based on information provided by PCIC (2010)

Agricultural reinsurance in Asia and the Pacific region

Agricultural reinsurance in Asia and the Pacific region takes various forms including: (i) in three countries (18 percent of the total countries with some form of agricultural insurance) the agricultural insurance programmes do not carry any form of reinsurance protection including the informal livestock credit protection schemes in Bangladesh and Nepal, and new pilot crop insurance programmes in Indonesia; (ii) government financial involvement as an agricultural reinsurer, which is found in seven countries (41 percent); (iii) support from national reinsurance companies, three countries (18 percent of total); and finally (iv) the most important type of reinsurance support that is from private international reinsurers and occasionally local reinsurers and applies in 11 countries (65 percent of total) as shown in Table 3.9.

The international agricultural reinsurance market is dominated by a small group of mainly European reinsurers that have specialist agricultural reinsurance departments including Munich Re, Swiss Re, Hannover Re, SCOR, Partner Re, Novae Re, Mapfre Re and Allianz Re, various syndicates at Lloyd's of London (e.g. Catlin, QBE-Re Europe) and finally several Bermudan reinsurers including Aspen Re and XL Re. In Asia, some of the reinsurance companies such as GIC, India, and Korea Re, the Republic of Korea, also provide support to the agricultural reinsurance programmes in neighbouring countries.

The degree of reinsurance penetration and competition varies considerably by market. In Australia and New Zealand, which are completely private agricultural insurance markets and which have a lengthy history of agricultural insurance and reinsurance, the agricultural reinsurance markets are well established and very competitive, reinsurance brokers are active. Most of the international reinsurers support these markets, commonly through quota share and/or stop loss reinsurance treaties that are renewed on an annual basis. Australia and New Zealand are mainly crop hail or named peril crop insurance markets; no crop underwriters offer drought cover or MPCI insurance and given the fact that hail is not a catastrophe peril, reinsurance capacity is readily available. Aquaculture and forestry risks may be placed either under the automatic treaties or under special facilities or on a facultative case-by-case basis.

In India there was a near total public sector monopoly on crop insurance and reinsurance between the mid 1970s and early 2000s. GIC, the national insurer and reinsurer, formerly underwrote the national area-based crop insurance scheme with government stop loss support and apart from some specialist crop covers, e.g. greenhouse and/or floriculture that were insured locally with private commercial insurers and placed with international reinsurers on a facultative basis; there was no local crop insurance market or demand for international reinsurance. With the introduction of private and public sector CWII since 2003 there has, however, been an increasing requirement for international reinsurance capacity and Paris Re (now part of Partner Re) and Swiss Re were early entrants into the Indian CWII market.

In China the market was closed to competition by foreign reinsurers up to 2002 and was controlled by the state-owned monopoly reinsurer China Reinsurance Company, which was renamed the China Reinsurance (Group) Corporation (China Re) in 2003. China joined the World Trade Organization in 2002 and since then the market has gradually been opened up to competition by

Table 3.9: Public and private agricultural reinsurance provision

Reinsurance type of organization	Number and % of countries	Countries and details of reinsurance programmes
No reinsurance	3 (18%)	Bangladesh – none of the NGO/MFI livestock credit protection schemes are reinsured; Nepal – none of the public or private community-based livestock credit protection schemes are reinsured; it is not known if the Indonesian traditional and WII crop pilot programmes are reinsured.
Government	7 (41%)	In Japan, Mongolia and Sri Lanka it is understood that the only form of reinsurance is through their governments. In Mongolia the livestock index scheme is currently reinsured by the government on an excess of loss basis. In other countries including China, India, Democratic People's Republic of Korea and Republic of Korea, the government acts as a catastrophe reinsurer, but the market is also open to competition from national reinsurers and or international reinsurers. In India, the federal and state governments provide stop loss reinsurance protection on a 50:50 basis for the national agricultural insurance scheme (NAIS). In Democratic People's Republic of Korea, the government acts as a catastrophe reinsurer of last resort for the Korea National Insurance Corporation's rice and maize insurance scheme. In Republic of Korea, the government provides stop loss reinsurance protection to the NACF Crop insurance pool for losses in excess of 180 percent loss ratio.
National reinsurance companies	3 (18%)	In China, the national reinsurer China Re, provides reinsurance protection for most of the national crop and livestock insurance programmes led by PICC and CUPIC and also supports the regional agricultural insurance programmes. Much of the business is ceded to international markets on a stop loss reinsurance basis. In India the General Insurance Corporation of India (GIC) provides reinsurance support for the crop weather index insurance programmes and also for the national livestock insurance schemes. In Viet Nam, Vina Re the national reinsurer is planning to support the government's subsidized crop, livestock and aquaculture programmes in 2011.
Private international reinsurers (and private local reinsurers)	11 (65%)	Countries that were accessing international agricultural reinsurance capacity in 2010 include Australia, China, India, Malaysia, New Zealand, Democratic People's Republic of Korea, Pakistan, the Philippines, Republic of Korea, Thailand and Viet Nam. Private local reinsurers also provide support in several countries including Malaysia, Republic of Korea and Thailand. Private international reinsurance only markets include: Australia, Malaysia, Pakistan, Philippines, New Zealand and Thailand

Source: Author

Note: There is some uncertainty over reinsurance arrangements in Indonesia (currently understood to have no agricultural reinsurance in place). In Japan, international reinsurers may be providing agricultural reinsurance protection and in Sri Lanka it is believed that in 2010 the only reinsurance protection was through the government, although the AAIB was seeking support from international reinsurers.

foreign reinsurers, most of which are now locally licensed with the China Insurance Regulatory Commission (CIRC) to operate in the Chinese reinsurance market. In 2005, Chinese insurance companies started to reinsure their agricultural treaties for the first time with international reinsurers: two regional companies, Sunlight Agricultural Insurance Company (SAIC), Heilongjiang Province and Anxin Insurance Company, Shanghai Municipality, placed small crop stop loss treaties with international reinsurers. Since 2007 the local agricultural insurance market has expanded enormously as has the demand for agricultural reinsurance and in addition to the major capacity support provided by China Re and international reinsurers, local state governments have also entered into catastrophe co-reinsurance agreements with PCIC-led crop and livestock insurance pools in several states including Zhejiang and Hainan (World Bank, 2008).

As of 2010 agricultural reinsurance capacity is generally available in Asia and the Pacific region where the agricultural insurance product/programme is technically sound and commercially rated and where the local cedant can demonstrate that its underwriting and claims adjusting systems and procedures are professionally managed. In the case of crop hail and or named peril crop insurance, reinsurance capacity is readily available and this also applies to simple accident and mortality livestock insurance. Reinsurance capacity up to now has also been readily available for the new CWII programmes in India, the Philippines and other territories. Reinsurance capacity tends however to be much more restricted for individual grower MPCI programmes because of reinsurers' concerns about catastrophe exposure (droughts, floods and typhoons) on these programmes. The international reinsurance capacity for livestock epidemic disease cover, forestry fire and wind cover and all risks aquaculture insurance is also much more restricted because of reinsurers concerns over the catastrophe nature of these products and the associated problems of adverse selection and moral hazard.

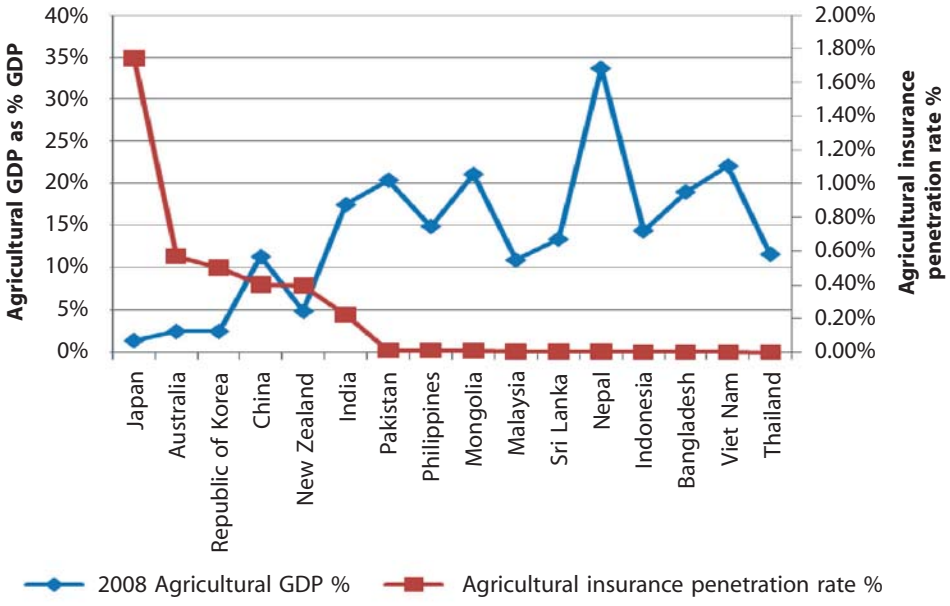
Scale and penetration of agricultural insurance in Asia and the Pacific region

There are huge differences in the agricultural insurance penetration rates between countries in Asia and the Pacific region. These differences are related to many factors including the following: (1) the age of the insurance programme – the oldest programmes, which are by now very well known and understood by farmers, tend to exhibit the highest penetration rates; (ii) insurance market development; (iii) government policy and support towards agricultural insurance and the scale of premium subsidies; and (iv) whether cover is voluntary or compulsory.

Agricultural insurance premium as a percentage of agricultural GDP

Figure 3.7 compares the ratio of 2008 Agricultural GDP to total GDP by country with the agricultural insurance penetration rate as measured by the ratio of 2009 agricultural insurance premium to 2008 agricultural GDP. (See Annex 2.3. for full details). The highest agricultural insurance penetration rates are found in the group of HICs including Japan (1.75 percent), followed by Australia (0.57 percent) and the Republic of Korea (0.50 percent), and then China (0.40 percent), New Zealand (0.39 percent) and India (0.22 percent). For the remaining developing countries, agricultural insurance has not yet achieved any significant scale and penetration rates are in all cases less than 0.01 percent of agricultural GDP.

Figure 3.7: Asia and the Pacific region: Agricultural insurance penetration rates



Source: Author

Insured farmers, acreage and number of livestock

Further useful insights into agricultural insurance penetration rates can be gained from comparing the ratios of insured crop area to total cultivated area and the number of insured livestock to total national herd numbers. Table 3.10 presents a summary by country of the current insurance penetration rates for crop and livestock insurance and where information is available for other classes (e.g. forestry or aquaculture) this information is also given. Further detailed information on penetration rates is contained in the individual country profiles in Annex 4 of this report.

Following the Chinese government's decision in 2007 under the 11th five-year plan to promote agricultural crop and livestock risk transfer through a massive injection of premium subsidies, the number of insured policies has risen dramatically from 52 million in 2007 to 134 million policies in 2009 and an estimated 150 million policies in 2010 – this compares with a total rural population of close to 1 billion people. In 2007 it was estimated that about 10 percent of total cropped area was insured, but it is not possible to provide an updated estimate for 2010. In China there are approximately 500 million head of swine, 160 million head of cattle and 370 million head of sheep and goats (Agra-CEAS Consulting, 2008). In 2007, the first year of implementation of the subsidized (60 percent of premium) epidemic disease programme for reproductive swine, the uptake rate was about 80 percent. Following the subsequent increase in premium subsidy rate to 80 percent it is understood today that effectively 100 percent of the reproductive swine heard is insured in China and that the similarly subsidized dairy cattle epidemic disease programme also has penetration rates in excess of 50 percent of the national herd.

In India the AIC implemented NAIS is marketed in 25 states and two union territories and in 2009/10 insured a total of about 25 million farmers and an insured area of about 27 million

Table 3.10: Crop and livestock insurance penetration rates

Country	Crop insurance in 2010	Latest year	Crop penetration as % of potential insured crop area or insured values	Livestock insurance in 2010	Latest year	Livestock penetration % of national herd insured
Australia	Yes	2009	All crops 26; Broad acre 75; Industrial crops 23; Viticulture 40; Horticulture <1; forestry 23	Yes	2009	19
Bangladesh	No			Yes	2009	<1
China	Yes	2007	10	Yes	2007	80 sows
Democratic People's Republic of Korea	Yes		*Unknown*	No		
India	Yes	2009	20 (includes NAIS & CWII)	Yes	2007	6.58 cattle
Indonesia	Yes (Pilot)	2010	<1	No		
Japan	Yes	2007	45 All crop area; 90 for cereals	Yes		*Unknown*
Malaysia	No			No		
Mongolia	No			Yes	2009	14
Nepal	Yes (Pilot)	2009	<0.01	Yes		<1
New Zealand	Yes	2007	50	Yes	2007	50
Pakistan	Yes	2010	<2	Yes		*Unknown*
Philippines	Yes	2009	<2	Yes		<1
Republic of Korea	Yes	2009	31.4 (all fruit); Apple 68.3; Pear 58.5; Grape 5.1	Yes	2006	7.1 cattle; 67 swine; 39 poultry
Sri Lanka	Yes	2009	<2 of paddy area	Yes		*Unknown*
Thailand	Yes	2010	1.0	No		
Viet Nam	(Forestry only)		*Unknown*	Yes	2009	<.01

Source: Mahul and Stutley, 2010 for 2007 figures; 2009 and 2010 figures author as per country reports (Annex 4)

hectares with TSI of US$9.55 billion (Rao, 2010a). In addition, in 2009/10 AIC also underwrote its Weather Based Crop Insurance Scheme (WBCIS) in 139 districts in 13 states with an additional two million farmers, with an insured area of approximately 2.7 million ha, TSI of US$900 million and a premium of about US$80 million. It is noted that the AIC crop insurance programmes are mainly

linked on a compulsory basis to seasonal crop credit. With the addition of the private CWII programmes of ICICI Lombard, IFFCO Tokyo and other insurers, it is estimated that approximately 20 percent of India's potential cropped area was insured in the *kharif* and rabi seasons in 2009/10. In India the total cattle population is about 823 million head of animals and in 2007 a total of about 7.9 million cattle were insured on a voluntary basis under the national livestock insurance scheme, representing a livestock penetration rate of about 6.58 percent of the *insurable* number of cattle (GOI, 2007). Under the five-year plan, GOI has ambitious plans to increase the livestock insurance penetration rate by 5 percent per annum to a level of 31.5 percent by 2011/12.

In Japan the highly subsidized cooperative crop insurance programme covers approximately 45 percent of all cultivated cropped area and possibly as high as 90 percent of the cultivated area of paddy rice, wheat and other cereals, which are insured on a compulsory basis. It is not possible to report livestock penetration rates for Japan.

In the Republic of Korea, where the NACF subsidized crop insurance scheme has now operated for nine years, the penetration rate is high for fruit tree insurance with an overall penetration rate of 31 percent and was as high as 68 percent for apples and 58 percent for pears in 2009. Rice insurance was introduced as a pilot scheme in 2009 and currently this is a very small programme and less than 1 percent of the national rice area was insured in 2009.

In Australia, there are no premium subsidies, but crop insurance has been available for many years and the demand for agricultural insurance is very high. In Australia market penetration rates are expressed as the actual gross written premium as a percentage of the potential market gross written premium for each product line/class of business. Named-peril broad acre crop insurance is extremely popular with farmers and in 2009 it is estimated that 75 percent of the potential market for this class of business was underwritten. The next most popular type of crop insurance is viticulture insurance (hail and frost cover) with 40 percent of the potential market currently underwritten in 2009. In contrast, horticultural insurance has not yet achieved any market penetration. Overall it is estimated in 2009 that US$98 million of crop premium was underwritten in Australia representing 26 percent of potential GWP. Australia has one of the largest forestry insurance markets in Asia and the Pacific region with 2009 GWP of US$23 million or 23 percent penetration rate. Livestock penetration rates vary from 19 percent for extensive cattle and sheep rearing to a high of 22 percent for intensive pigs and poultry, but in the case of aquaculture less than 1 percent of potential GWP is currently insured (Meyers, 2010).[19] The Australian agricultural insurance penetration rates representing about a quarter of total potential values provide a very good picture of the pattern of demand for insurance in a voluntary, competitive and mature market where there are no premium subsidies and where the majority of farmers are medium to large commercial producers. For New Zealand, which is also a completely voluntary and private commercial insurance market with no premium subsidies, it is estimated that crop and livestock insurance penetration rates were as high as 50 percent in 2007 (Mahul and Stutley, 2008).

Although livestock insurance is a major sector in China, Japan, the Republic of Korea and India, in other countries in Asia and the Pacific region livestock insurance programmes are very small and

[19] See country report in Annex 5 for further details of penetration rates.

penetration rates are insignificant. In Bangladesh and Nepal the livestock credit-guarantee products that are offered by the informal insurance sectors currently have very low uptake and penetration rates of <0.01 percent of the national cattle herds and the very low penetration rates also apply to the Philippines. In contrast, the Mongolia Livestock Mortality Index cover has proved very popular with herders and in 2009, its third year of full operations, the penetration rate was 14 percent of the national livestock herd.

In the Philippines, PCIC, the national crop and livestock insurer, has for a number of years faced major premium subsidy funding constraints through the government and this in turn has severely restricted the amount of subsidized rice and maize MPCI business it can underwrite. At its peak in 1991, PCIC insured about 336 000 farmers under the rice and maize programmes, but this number has declined considerably since 1992 because of the reduction in directional rural credit programmes and because of the central government's budgetary constraints on premium subsidies. In 2007 the company only underwrote 37 810 crop insurance policies with an estimated penetration rate of 2 percent of rice farmers and 70 036 ha of irrigated rice and yellow maize or 1.76 percent of the national cropped area of these two crops. It is noted that in 2009 PCIC's budget for crop insurance premium subsidies was increased by the government to PHP 183 million (about US$4 million) and this has enabled it to expand its MPCI coverage in 2009/10. (See Philippines' country report in Annexe 4 for further details). PCIC also insures a small livestock portfolio: between 2003 and 2007 the annual average number of insured animals was about 3 500 cattle, 6 000 swine and 1 000 sheep and goats. Livestock insurance penetration rates are not available for the separate the Philippines Livestock Management Services Corporation pool scheme.

To conclude this section, it is not unexpected to see high agricultural insurance penetration rates in countries that have large national subsidized schemes and where crop and or livestock insurance is either compulsory (e.g. Japan for cereals, China for livestock epidemic disease cover) or compulsory for crop-credit recipients (e.g. India under the NAIS scheme). Similarly, adoption rates tend to be high in the richest countries such as Australia and New Zealand, and these two markets also demonstrate clearly that subsidies are not necessarily the only driver of agricultural insurance uptake, and that where a competitive market exists with a comprehensive range of products, voluntary demand may also be very high.

The analysis also shows that in many of the LIC or LMI countries where there is little or no tradition of crop and livestock insurance and where the supply of products and services is very restricted, current penetration levels are correspondingly low (e.g. Bangladesh, Indonesia, Nepal, Malaysia, Pakistan, Thailand and Viet Nam). The challenge for policy-makers in these countries is to find ways to support and encourage private commercial insurers to develop and implement and scale-up the range of products and services they offer to farmers in their countries.

Performance of agricultural crop and livestock insurance

The financial performance of public and private sector crop and livestock insurance schemes and public-private partnership (PPP) crop and livestock insurance schemes is reviewed below using a combination of the World Bank 2008 survey results reported in Mahul and Stutley (2010) and

wherever possible these results have been updated on the basis of this present FAO study. The full results are presented in the country reports in Annex 4. Two performance indicators are compared in this section:

- The **long-term loss ratio** (claims divided by premium and expressed as a percentage) for as many years as possible and usually from 2003 to 2007 or from 2003 up to 2009; and
- the **long-term producer loss ratio** (for schemes that carry premium subsidies, the claims divided by the non-subsidized share of premium paid by the farmer, and expressed as a percentage), again for as many years as possible.

The long-term loss ratio is a useful concept as it enables an insurer to judge whether it is covering its claims costs over time. The loss ratio shows the insurer how much it is paying back to the insured in claims for every dollar of premium it receives – where the loss ratio is >1 or >100 percent the insurer is not collecting adequate premium to cover claims let alone contribute toward the administration and operations costs of underwriting the business. Under this study it has not been possible to conduct a detailed assessment of the administration and operation costs of each insurance programme, including business acquisition costs (brokerage) the insurer usually has to pay to a third party (broker) to place insurance business with the insurer. These brokerage costs typically amount to about 10 percent to 15 percent of the premium. The insurers also have their own administrative and operating expenses for administering and underwriting and adjusting claims on the programme and these may add up to a further 7.5 percent to 10 percent of the premium. Furthermore, commercial underwriters need to generate a reasonable profit on their business over time and this again needs to be priced into the calculation of expected losses and required premium levels. As a guideline, however, if the long-term loss ratio of the business exceeds 70 percent to 75 percent maximum, the insurance company will not be operating in profit – this is before taking into consideration reinsurance arrangements.

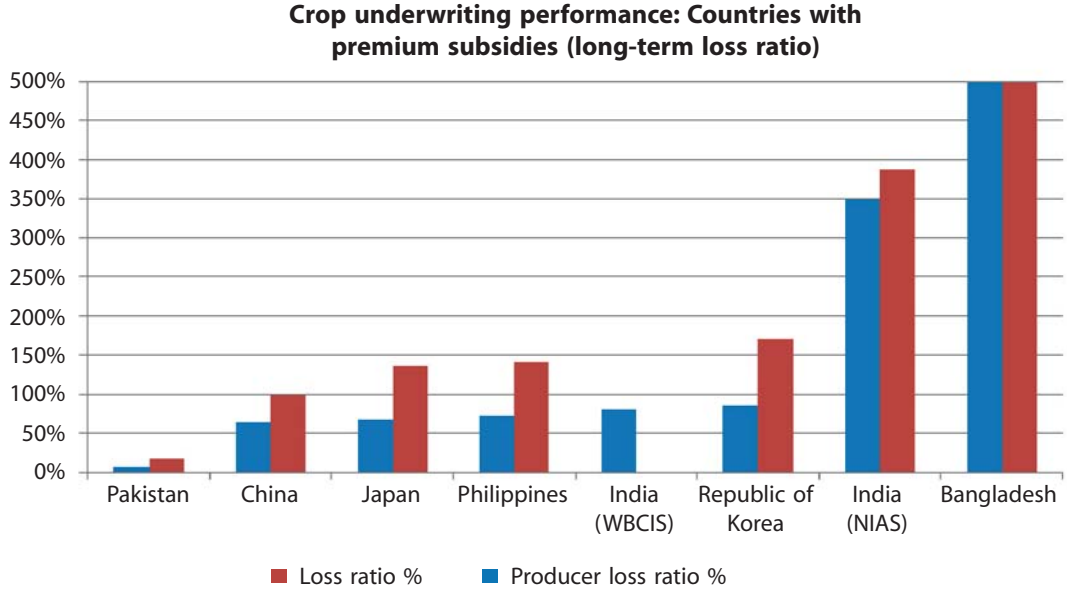
Using this criterion of a 70 percent to 75 percent or less target long-term loss ratio, the sections below review the crop and livestock underwriting results for the selected countries in Asia and the Pacific region.

Profitability of subsidized and non-subsidized crop insurance programmes

Figure 3.8 presents the long term crop "loss ratios" and "producer loss ratios" for a selection of countries with public sector crop insurance and premium subsidies under a PPPs arrangement (further details are presented in Annex 3.4). On the basis of this analysis the subsidized crop insurance schemes in Pakistan, China, Japan and the Philippines would meet the maximum 75 percent loss ratio criterion, or in other words they are financially sound. However, the AIC Weather Based Crop Insurance Scheme (WBCIS)[20] in India is marginally unprofitable (82 percent loss ratio), and the same applies to the PPPs crop insurance scheme in the Republic of Korea (loss ratio from 2001 to 2009 of 85 percent).

[20] It is not possible to present the AIC-WBCIS-India "producer loss ratio" because premium subsidy data for this scheme is not available.

Figure 3.8: Crop insurance results for countries with premium subsidies and or public sector insurers



Source: Author

In India, the public sector NAIS scheme is highly unprofitable although it continues to operate (long-term loss ratio from 1999/00 to 2008/09 is 350 percent).The SBC Bangladesh programme was terminated in 1995 on account of its very poor underwriting results (loss ratio 499 percent). If one considers the "producer loss ratios", with the exception of Pakistan all the subsidized crop insurance schemes in Asia have producer loss ratios of greater than 75 percent, or in other words they are paying out more in claims to farmers than the premiums they receive from farmers and there is a net cost to society from subsidizing the participating farmers.

In examining these crop insurance performance figures, several points should be noted. In the case of Pakistan the results cover one year 2008/09 only and in the first year of operation of the scheme and in 2010 the programme incurred huge flood losses, therefore no conclusions can be drawn on the financial viability of the programme at this stage. In China, the results include both crop and livestock because it is not possible to present a breakdown of the figures, and also the figures date back to 2003–2007. In the past three years China's agricultural insurance programmes have expanded enormously as well as incurring several major natural disasters (floods, freeze, typhoons and droughts) and when the updated results are available these may look very different. The crop insurance results in the Republic of Korea include two major typhoon loss event years and in normal years the loss ratios have been below 50 percent.

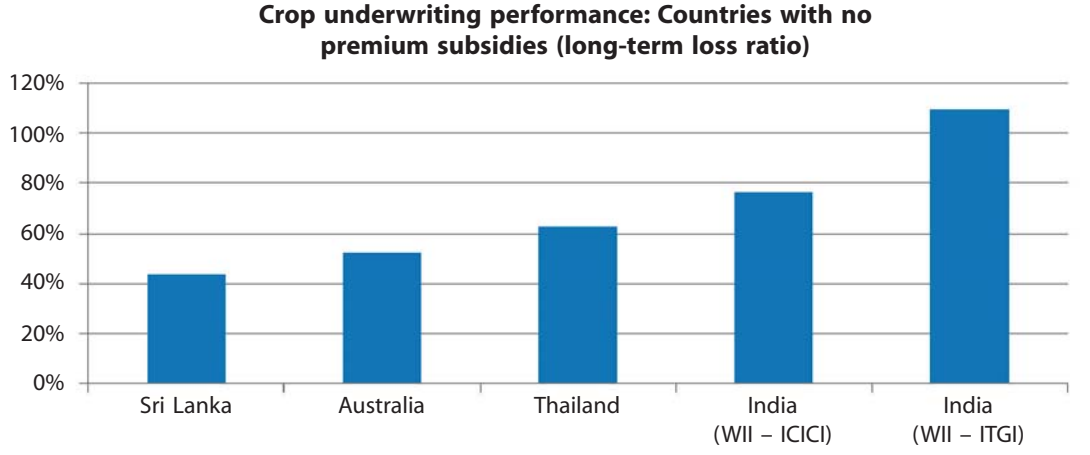
The main reason that the Indian NAIS scheme has such a high long-term loss ratio is the government's decision to cap rates at between 25 percent and 33 percent of the actuarially required rates for social reasons. However, this has been accompanied by huge costs to government in compensating excess losses of several hundreds of millions of dollars each year. It

is noted, however, that beginning in the *rabi* season 2010/11, GOI is planning to introduce a pilot modified NAIS scheme in selected districts and it will operate on purely commercial principles with actuarially determined premium rates and backed up by commercial reinsurance. (see next chapter for further discussion).

Figure 3.9 presents the long-term loss ratios for countries and schemes that are private commercial schemes and that carry no premium subsidies. In this case the traditional indemnity-based crop insurance schemes in Sri Lanka and Australia are operating profitably over time as are the weather index programmes in Thailand and India (ICICI Bank). However, the ITGI crop WII scheme is currently unprofitable with a three-year loss ratio 2006/07 to 2008/09 of 109 percent following high losses in 2007/08 (179 percent loss ratio in that year).

The analysis in Figure 3.9 clearly shows the much greater pressure on private commercial non-subsidized crop insurance companies to operate at loss ratios of 75 percent and below in order to remain financially viable.

Figure 3.9: Crop insurance results for countries with private crop insurance and no premium subsidies

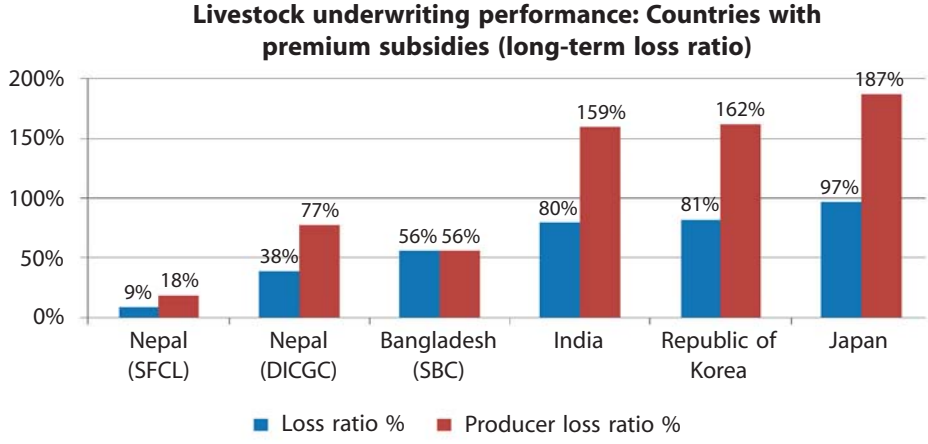


Source: Author

Livestock insurance results for subsidized and non-subsidized programmes

Long-term livestock loss ratios and producer loss ratios are presented in Figure 3.10 for the subsidized programmes in Nepal, India, the Republic of Korea and Japan, and also the SBC public sector non-subsidized livestock insurance programme. It is notable that none of the major livestock insurance programmes in India (public and private insurers) or in the Republic of Korea (PPP) or in Japan (PPP) are profitable at present with long-term loss ratios of 80 percent or above and producer loss ratios in excess of 150 percent. (Full details are presented in Annex 2.5).

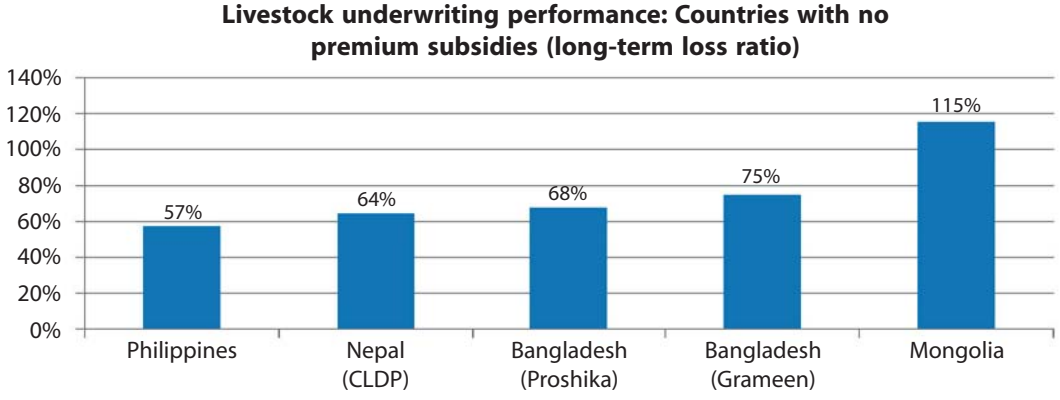
Figure 3.10: Livestock insurance results for countries with premium subsidies and or public sector insurers



Source: Author

Figure 3.11 shows that all the private commercial livestock insurance programmes that do not carry any premium subsidies meet the 75 percent loss ratio measure of financial viability except for the Mongolia Livestock Mortality Index, which has incurred exceptional freeze losses in consecutive years.

Figure 3.11: Livestock insurance results for countries with private crop insurance and no premium subsidies



Source: Author

In conclusion, the performance analysis clearly demonstrates the greater financial rigour that private commercial crop and livestock insurers need to bring to their underwriting compared to the public sector insurance schemes or those that carry heavy premium subsidies. The next Chapter examines the rationale for public support to agricultural insurance and the experience with different types of public support in Asia and the Pacific region.

Chapter 4

Public sector support for agricultural insurance in Asia and the Pacific region

This Chapter provides a more detailed review of public sector support for agricultural insurance in countries in Asia and the Pacific region.

Rationale for public-sector support to agricultural insurance

Reasons cited as to why governments should intervene in agricultural insurance markets often include:

- market failure – poorly developed insurance markets and non-availability of private-sector agricultural crop and livestock insurance;
- reluctance of commercial insurers to develop agricultural insurance programmes because of the prohibitively high start-up costs;
- financial capacity constraints faced by private commercial insurers, particularly for systemic risk (drought, flood, epidemic diseases, etc.);
- high costs of insurance administration; and
- inability of small and marginal farmers to afford agricultural crop and livestock insurance premiums.

Market failure was a commonly cited reason in the 1970s and 1980s for governments in developing countries to form monopoly public sector agricultural insurers. Often governments formed national monopoly reinsurance companies with the intention of protecting their own insurance companies from external competition in the start-up phases of their local insurance markets. The drawback of this approach is that in most cases the highly subsidized public-sector agricultural insurance companies did not foster the development of local private commercial company interest in this sector. Instead, they tended to crowd out competition by private agricultural insurers (e.g. the markets in China, India, the Philippines, Bangladesh and Sri Lanka). Furthermore, in countries with no access to international reinsurance markets there was very little transfer of technical product design and rating knowledge and expertise to these closed markets. Today it is generally accepted that wherever possible national governments should promote and support private commercial insurers to enter this difficult class of business rather than to maintain public sector agricultural insurers (Hazell *et al.,* 1986; FAO, 1991a; Mahul and Stutley, 2010).

Government intervention is also often justified on the grounds of systemic risks (as a result of droughts, floods and epidemic diseases), which often exceed the capacity of local insurers and their reinsurers to cover as they involve potentially huge financial losses. Governments therefore often act as a catastrophe reinsurer of last resort or form national reinsurance companies to assume these liabilities. This argument is used equally in high income countries with highly developed insurance markets and where governments support the reinsurance of agriculture (e.g. United States of America, Canada, Spain, Italy and Portugal, Japan and the Republic of Korea) as well as in emerging markets (e.g. India, Mongolia).

Government intervention in the form of premium subsidies is often seen as a way to make agricultural insurance more affordable to small and marginal farmers. In developing countries the evidence that small and marginal farmers usually have very low disposable income and thus are unable to afford the often high premium rates for MPCI crop and livestock insurance has led policy-makers to use premium subsidies as a means of stimulating demand for agricultural insurance. The World Bank 2008 study showed that premium subsides were the most commonly used type of government support to agricultural insurance, present in almost two-thirds of the surveyed countries. However, countries with the highest premium subsides tend to be the richest countries in the world (e.g. North America, Europe and Japan) where arguably their farmers could easily afford to buy agricultural insurance without resort to premium subsidies (Mahul and Stutley, 2010).

These themes are explored further in this Chapter with reference to the different types of government support to agricultural insurance in Asia and the Pacific region.

Types of government support to agricultural insurance in Asia and the Pacific region

Government support to crop insurance

Government support to crop insurance is very high in Asia and the Pacific region. The most popular form of support is crop insurance premium subsidies that are provided by governments in eight (62 percent) of the 13 countries with commercial and pilot crop insurance programmes. These eight comprise China, India, Indonesia, Japan, Democratic People's Republic of Korea, Pakistan, the Philippines and the Republic of Korea (Table 4.1 and Figure 4.1). China and Japan have very heavily subsidized crop insurance markets and the costs to government ran into many hundreds of millions of dollars in 2010.

Governments also subsidize the costs of crop insurance administrative and operating expenses in 38 percent of countries and in India, Japan and the Democratic People's Republic of Korea governments also subsidize the costs of in-field crop loss assessment. Governments also support public sector reinsurance for crop insurance in five (38 percent of the countries). In Japan, the Philippines and the Republic of Korea the respective governments have enacted specific crop insurance legislation and in six countries (46 percent), governments have provided support to research and development/other start-up costs (Table 4.1).

Table 4.1: Types of public sector support to crop insurance by country, 2010

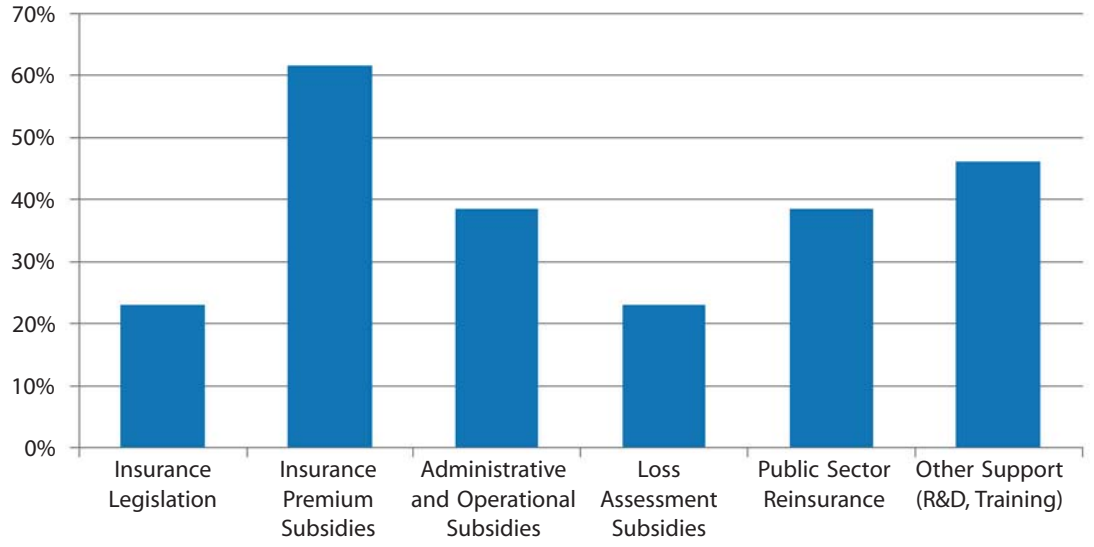
Country	Crop insurance in 2010	Insurance legislation	Insurance premium subsidies	A&O subsidies	Loss assessment subsidies	Public sector reinsurance	Other support (R&D, training)
Australia	Yes	▪	▪	▪	▪	▪	
Bangladesh	No	▪	▪	▪	▪	▪	▪
China	Yes	▪	✓	▪	▪	✓	✓
Democratic People's Republic of Korea	Yes		✓	✓	✓	✓	
India	Yes	▪	✓	✓	✓	✓	✓
Indonesia	Yes (Pilot)	▪	✓				
Japan	Yes	✓	✓	✓	✓	✓	✓
Malaysia	No						
Mongolia	No	▪	▪	▪	▪		▪
Nepal	Yes (Pilot)	▪		▪	▪	▪	✓
New Zealand	Yes	▪	▪	▪	▪	▪	▪
Pakistan	Yes	▪	✓▪	▪	▪	▪	▪
Philippines	Yes	✓	✓	▪	▪		✓
Republic of Korea	Yes	✓	✓	✓	▪	✓	▪
Sri Lanka	Yes		✍	▪	▪	✍	
Thailand	Yes	▪	▪	✓	▪	▪	✓
Viet Nam	(Forestry only)	▪	▪		▪		
Total	**13 (11)**	**3**	**8**	**5**	**3**	**5**	**6**
Percent of countries with crop insurance		**23**	**54**	**38**	**23**	**38**	**46**

Source: Mahul and Stutley, 2010 and FAO Asia-Pacific Survey 2010

Note: Details of any government support to crop insurance in Sri Lanka and Indonesia are not known.

Governments in five countries (38 percent) provide support to crop reinsurance. In China, China Re, the national reinsurer, is the major agricultural reinsurer in the market. In addition, the state governments in several provinces have entered into co-reinsurance agreements with PICC-led pool schemes in Zhejiang and Hainan Provinces to provide stop loss reinsurance protection up to 500 percent loss ratio. In India the national and state governments have shared (on a 50:50 basis) the excess claims on the NAIS for more than 25 years and GIC, the national reinsurer, is actively involved in the reinsurance of commercial WII index insurance. In the Democratic People's Republic of Korea, the government has in the past acted as a reinsurer of last resort for the national rice and maize MPCI scheme (however, the current status of this programme is not known). Finally, in the Republic of Korea, the government provides formal crop stop loss (SL) reinsurance protection for NACF and its co-insurers and international reinsurers for losses in excess of 180 percent loss

Figure 4.1: Government support to crop insurance in Asia and the Pacific region (% of countries)



Source: Table 4.1

ratio on the crop insurance programme. The cost of government SL reinsurance protection is 5.5 percent of the premium (NACF, 2010).

Japan is the most heavily supported crop insurance market and the government currently intervenes in six areas (Table 4.1). Other very heavily subsidized crop insurance markets include China, India, Democratic People's Republic of Korea and the Republic of Korea. In contrast, there is no government support to the mature crop insurance markets in Australia and New Zealand.

In the group of lower income or lower middle income countries, governments currently provide little or no support to crop insurance and no premium subsidies. In several countries that have introduced crop insurance in recent years, including Thailand (since 2007), Nepal (since 2009), Indonesia (since 2010) and Viet Nam (WII pilots awaiting implementation since 2008), the governments currently provide little or no support to crop insurance and no premium subsidies. In Viet Nam, however, the government is planning in 2011 to introduce a national PPPs pilot scheme for crops, livestock and aquaculture that will receive premium subsidies.

Agricultural insurance markets in which the government provides no form of premium subsidy or other support include the HICs of Australia and New Zealand. Australia and New Zealand are countries that traditionally have had no government intervention in agricultural insurance and that have diversified and very competitive private commercial agricultural crop, livestock, forestry and aquaculture insurance markets.

Government support to livestock insurance

Livestock insurance premium subsidies are the most popular form of government support in Asia and the Pacific region and are found in six countries (43 percent of the 14 countries with some form of livestock insurance) namely China, Indonesia, India (since 2007), Japan, Nepal, and the Republic of Korea. The next most common form of government support is reinsurance protection and this applies to China, India, Japan and Mongolia. Japan again has the most comprehensive support to livestock insurance by government of any country (Table 4.2 and Figure 4.2).

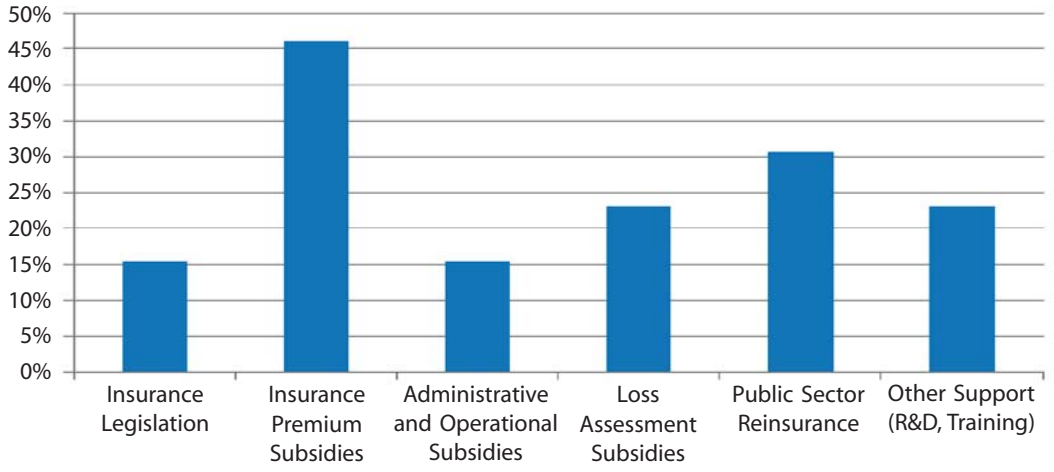
Table 4.2: Types of public sector support to livestock insurance by country 2010

Country	Livestock insurance in 2010	Insurance legislation	Insurance premium subsidies	A&O subsidies	Loss assessment subsidies	Public sector reinsurance	Other support (R&D, training)
Australia	Yes	▪	▪	▪	▪	▪	
Bangladesh	Yes	▪	▪	▪	▪	▪	▪
China	Yes	▪	✓	▪	▪	✓	✓
Democratic People's Republic of Korea	No	▪	▪	▪	▪	▪	▪
India	Yes	▪	✓	▪	✓	✓	▪
Indonesia	Yes (Pilot)	▪	✓				▪
Japan	Yes	✓	✓	✓	✓	✓	✓
Malaysia	No	▪					
Mongolia	Yes	▪	▪	▪	✓	✓	✓
Nepal	Yes	▪	✓	▪	▪	▪	▪
New Zealand	Yes	▪	▪	▪	▪	▪	▪
Pakistan	Yes	▪	▪	▪	▪	▪	▪
Philippines	Yes	▪	▪	▪	▪		▪
Sri Lanka	Yes	▪	▪	▪	▪		▪
Republic of Korea	Yes	✓	✓	✓	▪	▪	▪
Thailand	No	▪	▪	▪	▪	▪	▪
Viet Nam	Yes	▪	▪	▪	▪	▪	▪
Total	**14**	**2**	**6**	**2**	**3**	**4**	**3**
Percent		**14**	**43**	**14**	**21**	**29**	**21**

Source: Mahul and Stutley, 2010 and FAO Asia-Pacific Survey 2010

Note: No details of any government support to crop insurance in Sri Lanka are known.

Figure 4.2: Government support to livestock insurance in Asia and the Pacific region (% of countries)



Source: Mahul and Stutley, 2010 and FAO Asia-Pacific Survey 2010 (percentages taken from Table 4.2

Cost of government premium subsidy support to agricultural insurance

Types of premium subsidies

Government support to premium subsidies takes different forms in different countries. Annex 4.1 shows the premium subsidy structure and levels for crop and livestock insurance in each country. The simplest form of premium subsidies is a fixed 50 percent premium subsidy paid by the government and this applies to both crop and livestock insurance in the Republic of Korea. In Nepal livestock insurance attracts a fixed 50 percent premium subsidy. Japan also operates fixed premium subsidies of 51 percent for crops and 48 percent for livestock.

For crops the highest premium subsidy levels are currently found in the Philippines. For rice the central government premium subsidy is between 48 percent and 63 percent of the technical risk premium[21] according to risk zone and on top of this the lending institutions (banks) also provide subsidies of between 16 percent and 21 percent of risk premium. The effect is that the rice producers only pay between 36 percent maximum and 16 percent minimum of the rice policy technical risk premium.

Some countries operate a system of capped premium rates (e.g. India and Democratic People's Republic of Korea) that are well below the actuarially determined premium levels. In India, it has been government policy to make the NAIS scheme as widely available and affordable as possible

[21] In some countries premium subsidies are paid by governments as a percentage of the original gross premium (OGP) or commercial premium rate, and in other countries, including the United States of America, the Philippines and Republic of Korea, as a percentage of the technical risk premium. In the Philippines, PCIC's mandate only permits it to charge the technical risk premium rate to farmers and the costs of business acquisition and PCIC's A&O expenses have to be covered out of the interest the company raises on its paid-up share capital. Premium subsidies are therefore calculated as a percentage of the technical risk premium.

to small farmers and therefore food crop rates are capped at between 1.5 percent and 2.0 percent for *rabi* season food crops and between 2.5 percent and 3.5 percent for *kharif* season food crops. This in effect amounts to a premium subsidy as high as 75 percent. The NAIS scheme also pays additional premium subsidies to small and marginal farmers. Under the expansion of crop weather index insurance (WII) in India, the government has extended premium subsidies to AIC's WII programme since 2007. The premium subsidies are designed to bring the prices (average rates of eight percent to ten percent) down to comparable NAIS levels with an average of about 3 percent premium rate. Finally, in some Indian states, local governments are also providing premium subsidies to private sector CWII providers.

In Pakistan private sector insurers have elected to cap premium rates at two percent and to then correspondingly cap indemnity payments to a 300 percent loss ratio. The government has extended US$2.2 million in premium subsidies to the banks in rabi 2008/09 and kharif 2009 seasons). This amounts to a 58 percent average crop insurance premium subsidy in 2008/09.

China operates variable premium subsidies. Over the past three years the agricultural insurance premium subsidy levels have been increased significantly and in 2010 crop MPCI subsidies are now between 60 percent and 65 percent of premium and for livestock epidemic disease cover premium subsidies are 60 percent for dairy cows and as high as 80 percent for reproductive sows.

Costs of agricultural insurance premium subsidies

The recent World Bank survey of 65 countries showed that in 2007 agricultural insurance premium subsidies cost governments US$6.6 billion or 44 percent of global agricultural insurance premiums and out of this US$5.8 billion went towards crop insurance premium subsidies. This section updates the costs of government premium subsidies in Asia and the Pacific region by comparing available data for 2007 and 2009.

In 2007 the total agricultural insurance premium in Asia and the Pacific region was estimated at US$2.3 billion divided into crop insurance US$1.3 billion (58 percent of total) and livestock insurance US$0.97 billion (42 percent of total). The governments in five countries (China, India, Japan, the Philippines and the Republic of Korea) provided a total of US$423 million in crop insurance premium subsidies equivalent to 32 percent of total crop premiums. Five countries (China, India, Japan, Nepal and the Republic of Korea) provided a total of US$4 769 million in livestock premium subsidies (48 percent of livestock premium). The total cost of premium subsidies was US$892 million or 39 percent of total 2007 premium (Table 4.3 and Figures 4.3 and 4.4). Full details are presented in Annex 3.2).

The growth in agricultural insurance premium subsidies between 2007 and 2009 in Asia and the Pacific region has been fuelled by major increases in written agricultural insurance premiums in China and increased government premium subsidy levels. In 2007 the total agricultural insurance premium was US$681 million with premium subsidies of US$283 million (42 percent). In 2008 the total agricultural insurance premiums nearly doubled to US$1 167 million and premium subsidies rose to nearly US$900 million[22] (56 percent of total premium). In 2009 total agricultural insurance

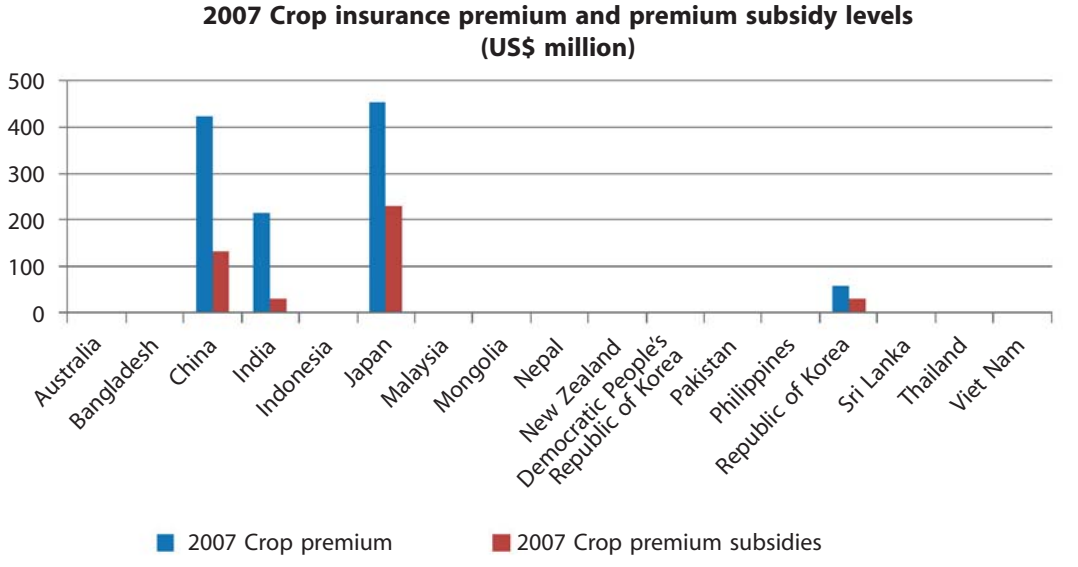
[22] CAAS, 2010 estimated for 2008 premium subsidies.

Table 4.3: Cost of crop and livestock premium subsidies in Asia and the Pacific region in 2007

Item	Detail	No. of countries	Total premium (US$ million)	Premium subsidies (US$ million)	Subsidy as % of total premium
Crop insurance (including forestry)	Countries with premium subsidies	8	1 151	423	37%
	Countries with no premium subsidies	6	187		
	Total crop insurance	14	1 338	423	32%
Livestock insurance	Countries with premium subsidies	6	915	469	51%
	Countries with no premium subsidies	8	60		
	Total livestock insurance	14	975	469	48%
All insurance	Countries with premium subsidies	9	2 066	892	43%
	Countries with no premium subsidies	8	246		
	Total crop + livestock	**17**	**2 313**	**892**	**39%**

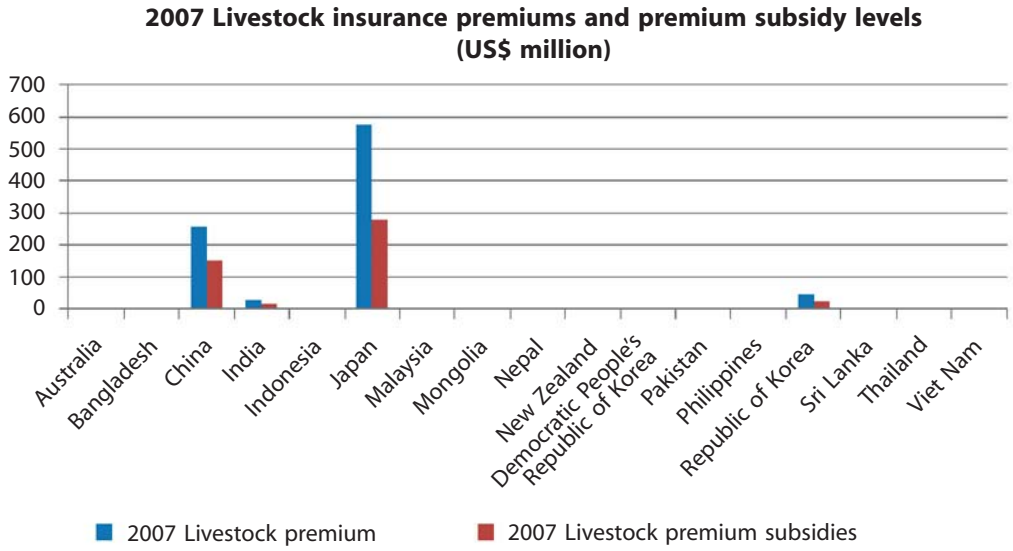
Source: Mahul and Stutley, 2010 and FAO Asia-Pacific Survey 2010

Figure 4.3: Crop insurance premium subsidies by country 2007



Source: Mahul and Stutley, 2010 and FAO Asia-Pacific Survey 2010 (Figures from Annex 3.2)

Figure 4.4: Livestock insurance premium subsidies by country, 2007



Source: Mahul and Stutley, 2010 and FAO Asia-Pacific Survey 2010 (Figures from Annex 3.2)

premium in China increased significantly to US$1 959 million with premium subsidies estimated at about US$1 175 million[23] (60 percent of total premium).

In 2009 the total cost of agricultural insurance premium subsidies for governments in Asia and the Pacific region rose to nearly US$2 billion or a 250 percent increase on 2007 subsidy levels. In 2009 total agricultural insurance premiums in Asia and the Pacific region were in the order of US$3.9 billion and total premium subsidies were in the order of US$1.96 billion or 50 percent of total premium. Five countries accounted for 99 percent of these premium subsidies with China and Japan the most heavily subsidized countries (Table 4.4).

Table 4.4: Estimated agricultural insurance premium and premium subsidies, 2009

Country	Premium (US$ million)	Premium subsidies (US$ million)	% Premium subsidy
China	1 959	1 175	60%
India	450	135	30%
Japan	1 200	588	49%
Pakistan	4	3	70%
Republic of Korea	116	58	50%
Other countries	195	2	1%
Total	**3 923**	**1 961**	**50%**

Source: Author's estimates

[23] Author's best estimate.

Although China (and India), the fastest growing emerging economies in Asia and the Pacific region, can probably continue to increase their agricultural premium subsidies further, it is very unlikely that smaller developing nations in the region that are only now seeking to scale up their agricultural insurance programmes would be able to afford the huge implied premium subsidy costs.

Trends in government support to agricultural insurance

On the basis of this review it appears that several governments in Asia and the Pacific region are studying ways of scaling up their agricultural insurance systems under PPPs agreements. These countries include most notably Thailand, Malaysia, Indonesia and Viet Nam, all of which are considering ways of promoting greater private sector involvement in agricultural insurance and premium subsidies are one of the measures under consideration. On the other hand, India is seeking to reduce the dependency of its national crop insurance scheme (the NAIS) on public sector funding by moving this onto a more market-oriented or commercial insurance footing. This section briefly reviews the trends in Viet Nam and India. Information on the other countries, territories and areas in Asia and the Pacific region is contained in the individual country reports in the annexes.

Case study 1: Viet Nam

Agricultural insurance in Viet Nam is currently very restricted; there is no crop insurance and only two companies provided limited insurance in 2010: Boa Viet (forestry insurance, rubber and sandalwood trees, livestock and an aquaculture pilot for catfish) and Groupama (dairy cattle insurance).

The Government of Viet Nam at central, provincial and local levels incurs major financial expenditure each year because of natural disasters (typhoons, flooding and drought) in the form of emergency relief, recovery and reconstruction operations and agriculture is one of the largest sectors that requires compensation. In 2010, the government visited various countries including China to study the subsidized agricultural crop and livestock insurance programmes and thereafter announced a pilot national programme from 2011 to 2013 that will be implemented in conjunction with the commercial insurance sector, Vina Re, the national reinsurer, and leading international reinsurers. Further details of the pilot programmes are contained in Box 4.1.

Case study 2: India modified NAIS

In India the government is seeking ways of gradually transforming the current public-sector NAIS scheme into a market-based PPPs crop insurance programme that is termed the "modified NAIS" or mNAIS approach. The NAIS scheme that has operated in one form or another since 1985 is a social crop insurance scheme that has been reliant on heavy subsidies by central and state governments since its inception. Although the programme has been very successful in mobilizing rural crop production credit for small and marginal farmers in India, it has suffered from a number of technical designs, operational and financial problems and, most notably from a farmer's point of view, the much delayed settlement of claims. In 2005 the government formed a task force with

Box 4.1: Viet Nam – Government subsidized pilot agricultural insurance programme 2011 to 2013

According to the Ministry of Agriculture and Rural Development (MARD) and the Ministry of Finance (MOF) a ***new pilot agricultural insurance programme*** will be launched by the government in conjunction with the insurance sector from 2011 to 2013. The objectives of the pilot programme are to protect rural livelihoods, to improve the efficiency of the insurance market and to enable farmers to recover (get back into production) more quickly following natural disasters and/or epidemic disease outbreaks.

Insured classes:

The pilot programme will include the following classes:

- crop insurance: rice
- livestock insurance: cattle and pigs
- poultry insurance
- aquaculture insurance: fin fish and prawns and shrimps.

Pilot provinces:

The pilot crop insurance programme for rice will be implemented in Nam Dinh, Thai Binh, Nghe An, Ha Tinh, Binh Tuan, An Giang, Dong Thap provinces.

The pilot livestock and poultry insurance programmes will be implemented in BacNinh, Nghe An, Dong Nai, Vinh Phuc, Hai Phong, Thanh Hoa, Binh Dinh, Binh Duong and Hanoi provinces.

Insured perils:

Crop insurance will cover catastrophe perils such as: typhoons (wind storms) and floods, drought and frost and also specific pests and diseases of rice (e.g. brown plant hopper disease).

Livestock insurance will cover epidemic diseases in cattle and pigs such as blue-ear disease and foot and mouth disease (FMD).

Poultry insurance will cover epidemic diseases including avian flu.

Aquaculture insurance will cover natural perils such as storm and flood and diseases of fish and prawns.

Premium subsidies:

The following premium subsidy levels are proposed in the draft:

- poor rural farming households, premium subsidies of 90 percent to 100 percent.
- other farmers, premium subsidies of 60 percent to 70 percent.
- agricultural production organizations, premium subsidies of 50 percent.

Source: MOF draft decision by the Prime Minister's Office posted on MARD's Web site (accessed 9 September 2010)

AIC and requested World Bank technical assistance to modify and improve the insurance coverage. The outcome of this major review exercise has been the mNAIS. In 2010 the government earmarked 50 districts or about 10 percent of the districts that were covered by the NAIS scheme for the mNAIS, which will be introduced starting in the *rabi* 2010/11 season. Key features of the modified programme include:

- the system of capped premium rates will be replaced by actuarially determined commercial premium rates;
- the premium subsidy levels will be correspondingly increased to ensure farmers can afford the much higher commercial premium rates;
- the mNAIS portfolio will no longer be protected by the federal and state governments' 50:50 excess of loss compensation (reinsurance) programme – this programme will be replaced by conventional reinsurance through GIC and international reinsurers;
- a proportion of the mNAIS portfolio will be offered to the private commercial insurance companies and it is understood that both ICICI Lombard and ITGC have expressed their interest in tendering for a share of the mNAIS (the NAIS has been hitherto underwritten exclusively by the national agricultural insurer, AIC);
- commercial premium rates will be charged under the mNAIS and it is anticipated that the demand by both local insurers and international reinsurers to participate in this programme would be high in 2010;

Box 4.2: Main features of India's mNAIS scheme for *rabi* 2010/11

Actuarial regime. The *mNAIS* scheme operates on an "actuarial regime" in which the government's financial liability is predominantly in the form of premium subsidies given to AICI and funded *ex-ante,* thereby reducing the contingent and uncertain *ex-post* fiscal exposure currently faced by the government under NAIS and reducing delays in claims settlement.

Up-front premium subsidies. AICI receives premiums (farmer collections plus premium subsidies from the government) and is responsible for managing the liability of the *mNAIS* through risk transfer to private reinsurance markets and risk retention through its reserves. It is financially able to operate on a sustainable basis.

On-account partial payment. The *mNAIS* product continues to be based on an area yield-based approach, with a provision for an early part payment to farmers (in season) based on weather indices.

Small insurance units. Crop-cutting experiments to assess crop yield estimates are lowered from block level to village level to reduce basis risk (i.e. the mismatch between the actual, individual crop yield losses and the insurance indemnity).

Cutoff dates. Adverse selection is reduced through the enforcement of early purchase deadlines ahead of the crop season.

Additional benefits. Additional benefits are offered for prevention of sowing, replanting, post-harvest losses, and localized risk, such as hail losses or landslides.

Early settlement of claims. *mNAIS* combines weather based indices for on-account partial payment of claims in case of adverse mid-season conditions, whereas area-yield indices are used for final payment of claims. The final estimation of loss is based on area-yield measurement at the time of harvest using crop cutting experiments.

Source: GFDRR, 2010

- in order to improve the insurance coverage provided to farmers, the size of the area-unit will be reduced to the individual village *panchayet* rather than the block-level and this will reduce basis risk, and the number of years area-yields that are taken into consideration in calculating the average yield and insured yield will be increased, as will the minimum coverage level from 60 percent to 70 percent;
- in order to speed up the process of indemnity payments, the mNAIS will introduce a combination of weather-based index insurance to permit on-account partial payment of up to 25 percent of the estimated claims in the event of adverse conditions occurring during the growing season and then the final claims adjustment will be based on the existing area-based crop-cutting experiments; and
- other modifications and technical strengthening introduced under the mNAIS are listed in Box 4.2. (GFDRR, 2010).

Issues and challenges for government support to agricultural insurance

There is a major challenge for countries in Asia and the Pacific region to sustain the current levels of government support to agricultural insurance. The spectacular growth in agricultural crop and livestock insurance penetration rates in China in recent years has by-and-large been fuelled by the very high levels of premium subsidies provided by national and provincial government. Similarly, the expansion of agricultural insurance over the past five years in the Republic of Korea has been stimulated by government's decisions to introduce 50 percent premium subsidies and this also applies to the rapid growth of crop weather index insurance (CWII) in India. Governments in these countries have been able, so far, to fund the rapidly increasing levels of premium subsidies, but the question is whether they will be able to sustain the exponential increases in agricultural insurance premiums and premium subsidies into the future. Furthermore, it is questionable whether other poorer countries in Asia and the Pacific region that are only now introducing agricultural insurance will be able to afford similar levels of agricultural insurance premium subsidies. The Philippines is an example where the restricted budget available for crop insurance premium subsidies has severely restricted PCIC's ability to scale-up the sales and penetration levels of its rice and maize MPCI insurance programmes. It is highly unlikely that the LI and LMI countries such as Bangladesh, Nepal, Pakistan, Viet Nam could afford the very high implied premiums subsidies of countries such as Japan, the Republic of Korea, China and India.

Where governments in Asia and the Pacific region are unable to afford premium subsidies, alternative ways of promoting the introduction and scaling-up of agricultural insurance need to be considered. There is now a wide body of literature suggesting that under PPPs governments can support private commercial insurers by providing legal and regulatory support, by investing in insurance market infrastructure and in subsidizing the often high start-up costs for a limited number of years, through to provision of free access to data and information, farmer education training and awareness programmes and finally, in some instances, by acting as a reinsurer of last resort. These alternative support measures are reviewed in Chapter 6 under the policy recommendations and conclusions to this report.

There are also major challenges for governments in those countries that currently do not have any form of agricultural insurance, or only a very limited provision of these products and services, to find ways of stimulating the demand for and supply of this class of business. It is notable that agricultural insurance is very underdeveloped in some of the largest countries in Asia and the Pacific region that have high percentages of rural populations that are dependent on agriculture, including Malaysia, Bangladesh, Viet Nam and Indonesia. In these countries high proportions of the farming populations are subsistence farmers and agricultural insurance may not be the most appropriate form of risk management instrument for these small farmers.

In countries that have very poorly developed insurance and agricultural insurance markets and a high proportion of small and marginal subsistence farmers, governments may need to consider alternative risk sharing and risk transfer mechanisms including improved natural disaster compensation programmes and/or some form of food security or social safety net programmes. Chapter 2 of this report noted that individual farmer agricultural insurance was best suited to the risk transfer needs of semi-commercial and commercial farmers, but not to the needs of subsistence farmers. For these subsistence farmers, governments may find it more appropriate to invest in the strengthening of their natural disaster compensation schemes and/or other food security or social safety net programmes.

Governments in the region also need to consider the very specific agricultural risk management needs of farmers in the small Pacific islands where there is currently no form of crop or livestock insurance. This theme is considered further in the next chapter (Chapter 5).

Chapter 5

Small farmer agricultural insurance initiatives in Asia and the Pacific Islands

This chapter is divided into two main sections, the first deals with a review of some of the small-scale private livestock and occasionally crop insurance initiatives that are being implemented by the informal or non-regulated insurance sectors in Nepal, Bangladesh and India. This is then followed by (a) a review of the issues surrounding the provision of agricultural insurance in the Pacific Islands countries that currently do not have any form of agricultural insurance and (b) the research into natural catastrophe insurance that is being carried out at both macro level and micro levels in the Pacific Islands region.

Case-studies in small farmer private mutual and self-help insurance

This section presents a series of case study reviews of some examples of innovative small-scale private livestock insurance programmes in Bangladesh, India and Nepal. The programmes reviewed include two programmes in Bangladesh that are being implemented by MFIs/NGOs namely the Grameen Fisheries and Livestock Foundation's Livestock Insurance Fund and the Proshika Participatory Livestock Compensation Fund (PLCF), as well as the Community Livestock and Dairy Development Project (CLDDP) and its livestock insurance in Andhra Pradesh, India. There are also two cooperative insurance schemes in Nepal, the Small Farmer Cooperative Ltd. (SFCL) livestock insurance programme and the Asian Development Bank (ADB) funded Community Livestock Development Programme (CLDP) insurance scheme.

Some common features of the microinsurance programmes for livestock in Bangladesh, India and Nepal are described below.

- the main providers tend to be microfinance institutions that have expanded their range of financial products and services into insurance, which is usually linked to lending. In Bangladesh, the large registered MFIs/NGOs such as Grameen, Proshika, BRAC are actively involved in providing microinsurance products to their members and in the case of Grameen and Proshika, livestock individual animal mortality cover. In Nepal the main providers of microinsurance are the multipurpose cooperative associations that are again providing insurance products to members. In Nepal and India, community-based organizations are also involved in the provision of livestock insurance, usually as part of a livestock development programme with funding and assistance from local or international development agencies.

- the most popular microinsurance products offered by these organizations are life, health and occasionally property and contents insurance. A few of the MFIs in the case study countries also offer livestock insurance. The author is, however, only aware of one example of microcrop insurance, in this case a cooperative crop insurance pilot in Nepal.

- microinsurance is usually linked to credit or in other words the products offered by the microinsurers are "credit-guarantee" policies where the sum insured is closely linked to the amount of the loan and the cover period terminates once the loan has been repaid.

- the microinsurance products and services are in most cases unregulated. As such, the products are not approved by or authorized by the insurance regulatory authority in each country. For this reason the microinsurers usually refer to their products as credit-guarantee and not insurance products. In Bangladesh and Nepal, current legislation only permits the MFIs to act as insurance agents who may apply for a licence to sell the insurance products of the mainstream commercial insurance companies.

- the lack of formal authorization or regulation of these microinsurance programmes means that the MFI cannot access formal excess of loss protection from local commercial insurers and/or reinsurers. In the case of crop or livestock that are exposed to covariate risk, this leaves the microinsurer very exposed to catastrophe losses and this discourages many microinsurers from offering agricultural insurance.

- only one of the micro-agricultural insurance programmes reviewed in this section attracts any form of financial or other support from national or local governments. As such, the premiums and claims are usually financed exclusively by the private mutual insurer and its members.

Bangladesh

In Bangladesh Microfinance Institutions (MFI) are a very important source of credit for resource poor households. The microfinance industry encompasses a total of over 4 200 entities, with the vast majority of financial services delivered through branches and in the form of cash. Dedicated microfinance institutions (NGOs, MFIs and Grameen Bank) currently serve about 32 million poor households in Bangladesh. The four largest institutions (Grameen, ASA, BRAC, Proshika), each of which is comparable in size to a small- or medium-sized bank, account for about three quarters of the microfinance market.

The NGOs/MFIs are regulated separately by the Microcredit Law of July 2006 that permits them to "offer different types of insurance services and other social development-oriented loan facilities" (Article 24). The NGOs/MFIs are not, however, recognized under the insurance act as organizations authorized to issue their own microinsurance policies and to accept risk in exchange for premium payment and to indemnify claims. Under the 2008 modifications to the insurance act, the role of NGOs and MFIs has been clarified as being restricted to acting as a broker or intermediary, distributing to their members authorized life and general insurance policies that are issued and underwritten by registered and approved insurance companies.

In Bangladesh microfinance companies are active in the insurance market. Bangladesh's MFIs started to offer a wide range of microinsurance products to their members in the late 1990s, including loan insurance, life insurance, health insurance and property insurance. The major providers of microinsurance today include BRAC, Grameen Kalyan, ASA, Proshika, Gonoshashtho Kendar, Shasthya Kendar, Integrated Development Foundation (IDF), and Society for Social Services (SSS) (Al Hasan, 2007). The 2007 INAFI market survey revealed that 61 MFIs were offering a total of 81 microinsurance products/schemes, of which loan protection insurance was the most popular product, offered by 57 (93 percent) of the MFIs, followed by life insurance, offered by 13 (21 percent) of MFIs. Four MFIs also offered livestock microinsurance (Table 5.1).

Table 5.1: Bangladesh, range of microinsurance products offered by MFIs

Type of insurance product	Number of MFIs offering product/scheme	Percent of MFIs offering product*
Loan protection insurance	57	93%
Life insurance	13	21%
Health insurance	5	8%
Livestock insurance	4	7%
Property insurance	2	3%

Source: Adapted by the author from Al Hasan, 2007.* Total number of MFIs = 61

The loan protection policy is designed to protect the MFI against the death of the borrower, which might lead to non-repayment of the loan. It is essentially a supply-driven product that the MFIs link on a compulsory basis to their microfinance and it is a standard product that is adopted by nearly all the MFIs that have entered the market for microinsurance. The livestock insurance products offered by two of the MFIs are reviewed below.

Grameen CLDDP Livestock Insurance Fund

The Grameen Fisheries and Livestock Foundation (Grameen Moshto Pashusampad Foundation, GMPF) is a sister organization of the Grameen Bank (GB). In 1999, GMPF added livestock and dairy activities to its fisheries programme for small rural householders under the United Nations Development Programme–funded Community Livestock and Dairy Development Project (CLDDP). The CLDDP dairy producers were provided livestock loans that were protected under a livestock mortality compensation scheme provided by the Livestock Insurance Fund (LIF).[24] (See Box 5.1 for details).

The LIF programme insures against the death of the dairy cow where this is "outside the control of the owner", and in effect it is an all-risks livestock mortality policy. Insurance is provided as part of an integrated package under which CLDDP veterinary and extension staff assists in the pre-inspection of the dairy cow or heifer and certify its health status. The animal is then routinely inspected and vaccinated by CLDDP-trained veterinary staff and in the event of death the cause

[24] See http://www.grameen-info.org/grameen/GrameenMotsho/index.html

Box 5.1: Features of Grameen CLDDP Livestock Insurance Fund – 2001 to 2008

Scope

- the Livestock Insurance Fund is a component of CLDDP Livestock Development Programme (1999) and compensates dairy cattle owners against the mortality of their cows.
- livestock mortality insurance is compulsory for dairy farmers who purchase cows/heifers on credit using CLDDP microloans.
- insured animals: heifers, dairy cows, beef cattle (>70 percent dairy cows).
- territorial scope: mainly northwest Bangladesh.

Features

- community-based programme.
- coverage: animal mortality because of disease, accident, and any cause outside the control of the owner.
- insurance is provided as part of an integrated package that includes credit, technical assistance, vaccines and veterinary services, concentrate feeds and fodder, and milk marketing services.
- guarantee amount (sum insured): loan amount/replacement cost.
- premium rate: 3 percent (previously 2.5 percent) of the loan money deducted at source.
- service fee of 2.5 percent of value of loan is charged to Livestock Development Fund (LDF) in order to contribute toward veterinary inputs (animal inspections, vaccinations etc.) and to cover salaries of veterinary staff.

Results

- between 2001 and 2005 a total of 4 250 dairy cattle was insured under the LLP with insurance premium of Tk 1.975 million. Livestock claims amounted to 163 dead cows (3.8 percent mortality rate) with paid claims of Tk. 1.485 million.
- between 2006 and 2008 a further 2 765 dairy cattle were insured by LLP with 31 livestock claims (1.1 percent mortality rate).
- overall, the LLP loss ratio at the end of 2008 was about 45 percent.

Key challenges

- the Grameen livestock mortality product is not recognized under the Insurance Act 1938(2008).
- the Grameen livestock mortality product is not reinsured and is exposed to catastrophe claims (flood, cyclone, epidemic disease).

Source: Author, based on information kindly provided by Grameen Bank in March 2009

of loss is verified by the veterinary staff. These measures lead to greatly reduced livestock mortality rates and the ability to levy very low premium rates for individual animal mortality cover. The sum insured is equivalent to the amount of loan taken out to purchase the cow and the premium is currently charged at a rate of 3 percent of the value of the loan. Coverage terminates once the loan has been repaid (usually over a maximum of two years). In addition, a fee of 2.5 percent of the value of the loan is levied to cover the cost of veterinary services, vaccinations, and technical assistance. The programme has now operated for eight complete years during which a total of slightly over 7 000 dairy cows have been insured with an average mortality rate of 2.8 percent. The LIF liability is totally retained within GMPF, and the programme does not carry any form of catastrophe reinsurance protection.

Proshika Participatory Livestock Compensation Fund

Proshika is one of the largest NGOs/MFIs in Bangladesh and since its formation in 1976 the Livestock Development Programme (LDP) has been a core component of Proshika's development activities for resource-poor farmers and rural landless households, especially women. The LDP has three main components: (i) livestock production (cattle, sheep, and goats); (ii) poultry production; and (iii) livestock support services. LDP provides a range of financial and technical support services to its group members, including livestock investment credit, training and skill development in animal husbandry practices, and training for para-veterinarians, vaccinators, and artificial insemination technicians.

Proshika was the first MFI in Bangladesh to introduce a livestock mortality loan protection scheme in 1990 under its Participatory Livestock Compensation Fund (PLCF) (Proshika, 2008). The PLCF is linked on a compulsory basis to Proshika's revolving credit fund for cattle, sheep/goats, and poultry-rearing projects. The PLCF compensates against the "sudden death" of insured livestock and poultry during the loan repayment period (usually 12 to 24 months), and it is in effect an all-risk accident and disease policy. It does not, however, compensate poor management practices or negligence on the part of the insured. The rates charged by the PLCF are between 3 percent and 5 percent of the purchase price (or loan amount) for cattle and sheep/goats and 10 percent for poultry. Over the 19 years that the PLCF has operated, a total of 11 739 livestock producers' groups have been insured under this programme and a total of 140 439 head of livestock have been insured, of which 87 percent have been cattle and smaller numbers of sheep and goats and 13 percent poultry. The long term loss ratio for the PLFC is 68 percent (Box 5.2).

Box 5.2: Proshika Participatory Livestock Compensation Fund

Scope

- the Participatory Livestock Compensation Fund (PLCF) pays for the loss caused by the sudden death of cattle, goats, and poultry under their livestock development programme.
- the PLFC mortality cover is compulsory for Proshika members taking out microcredit livestock investment loans from the MFI.

Features

- coverage: animal mortality resulting from accident and disease as well as sudden death.
- insured classes of livestock: cattle, sheep/goats and poultry.
- livestock mortality coverage is bundled as part of a package that includes credit and technical assistance.
- cover period: duration of the livestock loan, which is usually 12 months to 24 months.
- guarantee amount (sum insured): loan amount/purchase value/investment scale.
- subscription (premium) rates: originally 5 percent (cattle and goats) and 10 percent (poultry). In 2009 the rates applied were 3 percent (cattle) and 6 percent (poultry).
- premium contribution is paid before the loan is disbursed.
- deductible: 5 percent of the TSI applies for poultry insurance.
- loss adjustment: conducted by MFI members under the supervision of Proshika.

Box 5.2: *(continued)*

Results (1990 to 21/03/2009)

- 11 739 livestock producer groups have participated in PLCF since its inception.
- 140 439 head of animals have been insured under PLCF since its inception, of which cattle (and goats) account for 122 678 animals (87 percent) and poultry accounts for 17 761 birds (13 percent of total).
- total value of livestock loans protected under PLCF = Tk 598 million (TSI), with average sum insured per animal of Tk 4 256.
- total borrower's contributions (premium): Tk 31.4 million, with an average premium rate of 5.25 percent.
- total claims paid (number of animals): 4 855 animals giving an average mortality rate of 3.5 percent.
- value of total claims paid: Tk 21.3 million, giving a long-term average loss cost of 3.6 percent.
- loss ratio: 67.9 percent (average since inception in 1990 up to 21/03/2009).

Key challenges

- the PLCF mortality product is not recognized under the Insurance Act 1938(2008).
- proshika PLCF is NOT REINSURED and is exposed to catastrophe claims (flood, cyclone, epidemic disease).

Sources: Proshika, 2008 and World Bank, 2010a

India: Community livestock insurance scheme

India has operated a community-based livestock mortality insurance scheme for small-scale dairy cattle producers in Andhra Pradesh State since 2005. The scheme is targeted at women dairy livestock producers and is designed to protect the loans they take out to invest in dairy cattle. The scheme was conceived in 2005 on the principles of self-help groups and it is a mutual insurance scheme administered by community development organizations at village, block and district levels. The policy is voluntary and protects against unintentional causes of mortality (accident, named diseases subject to vaccination, surgical operations and strike, riot and civil commotion) in dairy cattle and includes coverage and originally carried a 4 percent premium rate, which applies to the sum insured (this rate has been reduced to 3 percent in 2009). Key features of the scheme are summarized in Box 5.3.

The community-run livestock insurance scheme operated for two full years from 2005/06 to 2006/07 as a self-financed mutual insurance scheme with no reinsurance protection and incurred an overall loss ratio of 50 percent. As the scheme was totally administered by the community, administration costs were kept to an absolute minimum or only 6 percent of premium.

On the basis of the success of the scheme, at the 2007/08 renewal Tata AIG Insurance Company Ltd. entered into a three-year insurance agreement with the scheme administrators with a premium rate of 2 percent. Under this insurance agreement Tata AIG issue a master policy to the self-help groups and district-level administration (Zilla Samakhya, ZS) on receipt of a deposit premium. The company receives a schedule of each cow that is purchased with a bank loan and that is insured under the scheme and periodically receives a premium adjustment. On receipt of claims notifications, the company settles losses. The community organization continues to be

Box 5.3: Community-run livestock insurance scheme in Andhra Pradesh State, India

Livestock are susceptible to different types of risks, both idiosyncratic and covariant. Death of the animals in accidents is not uncommon and mortality among livestock is one of the principal reasons that the poor default on loans, yet there is no comprehensive insurance for livestock.

Loan protection scheme for dairy cows and buffaloes

This livestock insurance scheme provides relief to the members/families of the self-help group (SHG) who own the milk cattle, in the case of death of the animal. This is a premium based scheme: every individual animal (buffaloes/cows) is covered against an annual premium equal to 4 percent of the value of the animal (plus a small entry fee). The value of the animal is estimated by a veterinary. The coverage value decreases with the age of the animal. The insurance policy is renewed during the next year after deducting a depreciation of 20 percent in the animal cost. For milch cows the insurable age is from two to ten years and for milch buffaloes from three to twelve years age.

The scheme is totally self-managed by the community. Accounting, monitoring and documentation systems are conceived and designed in-house.

Claim procedure

Upon the death of an insured animal, the claim form is sent to the Village Organization (VO). A member of the subcommittee verifies the claim by visiting the village. After discussing the issue with the subcommittee, the claim is either settled or rejected. The settled claim is given to the VO by way of a cheque. The VO pays the claim amount to the beneficiary.

Performance

The community-based animal insurance scheme is among the first of its kind in India. The scheme is community-based and relies on peer monitoring.

The number of animals insured increased from 3 500 in 2005/06 to 25 500 in 2007/08. Premium collected increased from US$3.7 million in 2005 to US$8 million in 2008. The claims ratio has been stable, at about 2.6 percent of the total insured animals. This makes this scheme financially viable. Operating costs represent 12 percent of the premium income. It is essential to keep the operating costs (e.g. underwriting cost, loss assessment costs, and claims processing costs) at a minimum to ensure the sustainability of the scheme. The success of the scheme is predicated on the peer monitoring system, which enables the community-based organization to prevent false claims. Community supervision and vigilance is found to very effective and should be increased.

Source: World Bank, 2008

wholly responsible for implementing the scheme in terms of identification of suitable dairy cows for beneficiaries, organizing bank loans to purchase the animal, tagging of the animal and vaccination, premium collection and payment to Tata AIG, submission of schedules of insured animals, and, in the event of loss, inspection of the dead animal to verify that the cause of loss is insured and, finally, notification of the claim to Tata AIG for settlement.

In 2007/08 the dairy livestock insurance scheme for women had operated for three full years and had insured a total of over 25 000 dairy cattle. On the basis of the success of the AP model the scheme was subsequently replicated in other states in India and also in South Asia with financial assistance from the World Bank. The objective is to achieve an insurance coverage of between three to five million head of cattle by 2010.

This insurance model might have applications in Nepal and Bangladesh and other countries in Asia and the Pacific region where the NGOs/MFIs/cooperatives have developed the necessary insurance infrastructure to implement and administer livestock mortality insurance and where their main requirement is to access formal insurance and reinsurance protection. However, until legislation is enacted by local governments in these countries these informal (unregulated) livestock insurance schemes will not be eligible for insurance/reinsurance protection.

Nepal

Nepal is operating several smallholder livestock insurance schemes linked to livestock investment loans including the Small Farmer Cooperative Limited (SFCL) scheme and the Community Livestock Development Programme (CLDP), which is funded by the Asian Development Bank (ADB) and which is implemented by the Department of Livestock (DoLS) with technical support from FAO.

Small Farmer Cooperative Limited (SFCL) Livestock Insurance

In Nepal the Small Farmer Cooperative Limited (SFCL) has implemented a compulsory livestock credit-protection scheme linked to livestock investment loans since 1987. Currently some 200 SFCL registered cooperatives offer livestock insurance for dairy cattle and buffaloes, each operating as a separate profit centre and with its own livestock insurance committee. The SFCL programme is regulated by the Ministry of Agriculture and Cooperatives, but is not recognized or authorized by the Insurance Commission. Some features of the scheme are presented in Box 5.4.

Box 5.4: SFCL livestock-credit insurance, Nepal

Approximately 200 of the SFCLs have formed their own livestock insurance committees and provide individual animal mortality and loss of use of the animal cover to their members.

Livestock insurance is linked to livestock loans through the cooperative and the programme attracts 50 percent premium subsidy support from government. The SFCLs currently charge a flat premium rate of 10 percent for livestock insurance of which the farmer pays 5 percent and government subsidizes 5 percent (50 percent of the total cost) to the SFCL. In the event of a claim, the owner bears 20 percent co-insurance and the loss is compensated at 80 percent of the insured value.

The programme is managed by the SFCL livestock insurance subcommittees that receive basic training from the Department of Livestock in animal health and simple veterinary procedures. These committees then inspect any new animal prior to granting of livestock insurance and they ensure that vaccination programmes are maintained during the cover period. Members who insure their animals are provided with free tagging and free livestock veterinary inspections and vaccinations.

The consolidated results of the SFCL livestock insurance programme show that over the period 1987/88 to 2005/06 the SFCLs insured a total of 62 000 head of animals with total sum insured of NRs 745 million or an average sum insured of about NRs 12 000 per animal and with paid premium of NRs 74.5 million (average premium rate is 10 percent). An average of 3 263 animals was insured each year by the SFCLs during this period. The results show very low animal mortality losses, with paid compensation of only NRs 8.6 million over the 19 years and corresponding 11.61 percent loss ratio and long term average loss cost of only 0.9 percent.

Source: World Bank, 2009a

A unique feature of the SFCL livestock insurance scheme is that it attracts government premium subsidy support. SFCL charges a single premium rate of 10 percent for individual animal "all risks" mortality insurance cover and this attracts a 50 percent premium subsidy from the government. The policy insures all causes of death of the animal, including epidemic diseases. Over time the programme has operated at a very low average loss ratio of 12 percent.

Issues faced by the SFCL programme centre on: (a) the low demand for livestock insurance – although cover is linked to livestock loans it is understood that in practice the cooperatives cannot force members to buy insurance; (b) the "all risks" cover provided under the policy; and (c) the fact that the scheme is not reinsured and therefore individual cooperatives are very exposed to catastrophe epidemic disease losses that would exceed the collected premiums and their claims reserves and lead to the collapse of the scheme.

Community Livestock Development Programme (CLDP) Insurance Scheme, Nepal

Under the CLDP there are two different models of livestock insurance programme: (a) a community managed insurance scheme which is provided for dairy animals and also for goats; and (b) a milk cooperative managed insurance scheme. The livestock insurance policy provides "all risks mortality" and loss of use cover and is closely linked to livestock credit. Key features of the programmes are summarized in Box 5.5.

Box 5.5: CLDP Livestock Insurance Scheme, Nepal

Community managed insurance scheme

Requirements

- minimum number of households: 100.
- minimum number of animals insured: in the case of cattle: 50, in the case of goats: 150.
- establishment of insurance fund:
  Farmers contribution: NRs 50 000 (dairy animals) and NRs 25 000 (goats).
  CLDP support: NRs 50 000 (dairy animals) and NRs 25 000 (goats).
- from the second year onwards, the annual premium rates are set at: 3 percent for large animals and 5 percent for goats.
- in case of the death of the animal up to 80 percent indemnity is provided to the farmer according to the recommendation of the insurance subcommittee.
- this type of insurance scheme is operated by forming a separate insurance committee under the main committee of the community.
- the insurance fund established at the beginning is mobilized as loans within the community members and income is earned from the interest charged.
- this scheme is limited to community members only.

Milk cooperative managed insurance scheme

- requirements are similar to those of the community managed scheme.
- this scheme is open to any interested member of the cooperative rearing dairy animals.
- dairy cooperatives have relatively better capacity and are better organized in comparison to a simple community.
- dairy cooperatives have a district level organization and the primary level cooperatives are linked with the district union of cooperatives. So, the insurance programme is institutionalized up to the district level through the dairy cooperatives. Example, Baglung model.

Source: World Bank, 2009a, based on Pandey, 2008, FAO Consulting Services for the CLDP

Box 5.6 summarizes the key strengths and challenges of the Nepalese CLDP livestock insurance programme. The CLDP programme represents a mutual livestock insurance programme that is managed by the community for its members and group cohesion ensures that the insured animals are closely monitored and managed and that mortality rates and insurance claims rates are minimized.

Box 5.6: Strengths and challenges faced by the CLDP livestock insurance programme, Nepal

Strengths	Challenges
• mortality rate is decreased; risk is lowered. • fund is generated within the community. • easy and fast to claim and get indemnity. • effective monitoring of the insured animals. • timely treatment and vaccination of insured animals. • the community feels ownership of the animals. • increases mutual understanding and cooperation between the farmers and the cooperative/community.	• in case of epidemic outbreak, the community/ cooperative could not cover indemnity claims of insured animals. • no legal recognition of community/cooperative managed livestock insurance scheme.

Source: World Bank, 2009a based on Pandey, 2008, FAO Consulting Services for the CLDP

The major issues faced by this programme are that it is not formally recognized as an insurance programme by insurance legislation and at present cannot attract excess of loss protection from local insurance companies and/or international reinsurers. These are the same issues faced by the NGO/MFI livestock insurance initiatives in Bangladesh.

Crop insurance has not been offered by the non-regulated insurance sector in most of the countries reviewed. One exception is a small pilot cooperative crop insurance scheme in Nepal that was started up in 2007/08 by two cooperatives with technical and financial assistance from the Ministry of Agriculture and Cooperatives. The main reasons the MFIs and cooperatives do not provide crop insurance include: the relatively small loans provided to individual members for growing crops and perceived low risk of default compared to the death of a large animal such as a dairy cow; a lack of knowledge on how to design and rate crop insurance products; and concerns over the catastrophe exposures because of perils such as drought, flood and frost (risks which the MFIs/cooperative insurers are not willing to accept in the absence of any of insurance or reinsurance protection).

Issues and challenges facing mutual agricultural insurers

In both Bangladesh and Nepal the NGO/MFI and cooperative livestock insurance schemes are not approved or authorized by the insurance regulators. The lack of official recognition of these programmes means that they are unable to attract insurance or reinsurance protection. In 2009

the Insurance Commissioner in Nepal set up a working group to study ways of bringing microlife insurance into line with commercial life insurance products and services and to enact suitable microinsurance legislation. At that time, however, crop and livestock microinsurance was not reviewed by the working group.

With the exception of the Andhra Pradesh community livestock insurance scheme, none of the other livestock programmes reviewed in Nepal and Bangladesh carry any form of catastrophe excess of loss insurance or reinsurance protection. The livestock programmes are therefore very exposed to catastrophe natural events (cyclone, flood, tsunami events in Bangladesh) and epidemic livestock diseases (Nepal and Bangladesh), which would exceed the 3 percent to 5 percent (and occasionally higher) premiums paid into the compensation funds by the insured livestock producers. In the event of catastrophe losses the livestock credit guarantee programme is likely to collapse and the outstanding credit (livestock investment loans) would not be repaid to the cooperative or MFI/NGO.

The programmes in Nepal and Bangladesh have not achieved scale over time and this may be because of the management's concerns about insuring too many animals in the absence of any reinsurance protection.

One of the most useful roles for governments in these countries would be to support the introduction of microinsurance legislation, thereby bringing these microinsurance programmes into line with the mainstream insurance products and services offered by commercial insurers. This would lead in turn to the strengthening and improvement of the microinsurance programmes.

Issues and options for agricultural insurance in the Pacific Island countries (PICs)

The 15 South Pacific Island countries (PICs) included under this study are mainly small island economies with relatively small populations and a high dependence on agriculture. Island states include Papua New Guinea, the largest country with a population of 6.7 million and agricultural GDP 34 percent of GDP, followed by Fiji (population 0.9 million, agricultural GDP 4 percent), Solomon Islands (population 0.5 million, AGDP 36 percent) and then in fourth place Vanuatu (population 0.2 million, AGDP 14 percent). Overall, these four countries account for about 90 percent of the total population of the PICs. The other PICs comprise Samoa, Micronesia (Federated States of), Tonga, Kiribati, Marshall Islands, Palau, Cook Islands, Tuvalu, Nauru and Niue.

The PICs are among the most vulnerable countries in the world to natural disasters. The PICs lie in a major tropical cyclone belt and the islands are very exposed to a combination of typhoons and associated flooding caused by storm surge and/or excess rain. The islands also lie in an extremely active seismic area along the Pacific "ring of fire" and are subject to earthquakes, tsunamis associated with earthquakes, volcanic eruption and landslides. Under the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) a major risk assessment exercise has been conducted over the past four years and a unique hazard database has been established of historical tropical cyclones (from 1948 to 2008) and earthquakes (from 1768 to 2009) for the 15 PICs listed above. This database shows that the average value of losses to infrastructure and the economies of these countries has been about US$1 billion per decade and as high as

US$4 billion in the 1980s and 1990s.[25] As many of the islands are geographically small with a high concentration of exposed values, the human and economic losses associated with these natural hazards is often very high. Between 1960 and 2007 the worst recorded events resulted in losses that ranged from: Fiji (12 percent of GDP and 11 percent of population affected); Tonga (30 percent of GDP and 42 percent of population affected), Vanuatu (86 percent of GDP and 16 percent of population affected) and in the most extreme case of earthquake/tsunami in Samoa (100 percent of GDP and 42 percent of population affected (World Bank, 2009b).

It is understood that in 2010 none of the Pacific Islands countries (PICs) had any formal agricultural crop or livestock insurance programmes, although a few large individual agribusiness risks may have been placed with overseas markets on a facultative basis. In the absence of any form of local agricultural insurance capability, farmers are very exposed to losses caused by natural hazards (typhoons, storm surges, floods, excess rain, earthquakes and tsunamis). In addition, the El Niño ENSO phenomenon brings periodic drought to many of the islands whereas excess rain and flooding may be associated with La Niña cycles. Farmers are therefore reliant on their own risk management and risk coping strategies and or local disaster relief compensation programmes that governments operate on at least some islands.

On most islands a high proportion of the population is rural and dependent on small-scale semi subsistence agriculture for employment and incomes. It is understood that much of the agriculture on the islands is characterized by small-scale subsistence farmers growing food for home consumption with relatively few commercial producers. The potential for commercial agricultural insurance is therefore likely to be very restricted in many of these islands.

Research is being conducted in the Pacific region at a macro level to assist the Pacific Island governments to develop disaster risk assessment tools and financial instruments to reduce their vulnerability to natural disasters (e.g. typhoon, flood and earthquake). The macro level work includes the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) that is being funded jointly by the GFDRR of the World Bank. Moreover, the Government of Japan aims to provide the Pacific Islands governments with a combination of disaster risk assessment tools to strengthen their abilities to model the financial impact of natural disasters and also financial instruments in the form of a pooled disaster risk fund to reduce their financial vulnerability to natural disasters. The PCRFI initiative builds on the experience of the CCRIF, the world's first multi-country catastrophe hurricane (and earthquake) insurance pool that acts as an *ex-ante* catastrophe risk financing mechanism and has the advantage of providing the small island governments with immediate financial liquidity to fund post-disaster emergency relief and early recovery operations rather than having to rely on *ex-post* funding, including government's natural disaster or contingency budgets if these exist and/or donor assistance, which may take many months to arrange. Both of these macro level disaster relief programmes are reviewed in this section although it should be noted that they are not specifically designed as agricultural insurance programmes.

[25] The Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) is a joint initiative of the World Bank, the Asian Development Bank (ADB), and Pacific Islands Applied Geoscience Commission (SOPAC) with co-funding by the Government of Japan and the Global Facility for Disaster Reduction and Recovery (GFDRR). For full details of PCRAFI see http://go.worldbank.org/7BXXDUVMC0

At a micro or individual farmer level, there is currently only one commercial typhoon index insurance scheme operating in Asia and the Pacific region, in this case for rice farmers in the Philippines and this product may have useful applications to agriculture in the Pacific Islands countries (PICs). Chapter 3 of this report provides a review of the MicroEnsure/Malayan Insurance Company typhoon index insurance pilot programme for rice growers, which is in its second full year of implementation. Applications of this programme to farmers in the PICs are examined below. Additional research is also being conducted by FAO into micro level hurricane insurance for farmers in the Caribbean, including the Bahamas hurricane coupon proposals for small farmers, livestock owners and fishermen (FAO, 2004) and hurricane index cover for small farmers (including producers of nutmeg and coconuts) in Grenada (FAO, 2010). Reference is also made below to these schemes.

In 2010 research into macro level and micro level agricultural risk management options was also being conducted at an island level, starting with Samoa, as part of the Pacific Regional Work Plan of the All ACP Agricultural Commodities Programme (AAACP). This programme is financed by the EU and is being implemented by several implementing agencies including the Agricultural Risk Management Team (formerly Commodity Risk Management Group) of the Agriculture and Rural Development (ARD) Department of the World Bank. This section also reviews the findings arising out of the Samoa agricultural risk management study.

Macro level hurricane and earthquake index insurance initiatives

Caribbean Catastrophe Risk Insurance Fund (CCRIF)

In 2007 a group of 16 Caribbean Island states formed the world's first multi-country catastrophe insurance pool reinsured in the capital markets to provide governments with immediate liquidity in the aftermath of hurricanes and earthquakes. The programme was designed with technical assistance from the World Bank. CCRIF currently does not insure agriculture specifically, but the index product could in principle be developed to respond to loss in agriculture as a subsector in each country. A key benefit of CCRIF is that by adopting a parametric or index approach to insuring and indemnifying hurricane and earthquake damage, claims payments can be settled very quickly following a catastrophic event. A further benefit for the 16 participating island governments is that by pooling risk CCRIF can purchase catastrophe reinsurance protection up to US$100 million of coverage for each insured peril at a much lower cost than if each island government tried to place its reinsurance requirements alone. CCRIF has now operated for three full years during which time it has responded to the major Haiti earthquake event of January 2010 with a payment of US$7.8 million made only 14 days after the event, and to several major hurricane events. Further information on CCRIF is contained in Box 5.7.

Although CCRIF currently does not directly insure the agricultural sector, it has received requests for technical assistance from several island governments for typhoon and flood damage cover for agriculture and in the future CCRIF may be able to offer specific index coverage for this sector.

Box 5.7: Catastrophe mesolevel hurricane and earthquake index cover: Caribbean Catastrophe Risk Insurance Fund (CCRIF)

CCRIF is the first multi-country risk pool in the world and is also the first insurance instrument to successfully develop parametric policies backed by both traditional and capital markets. It is a regional catastrophe fund for Caribbean governments, designed to limit the financial impact of devastating *hurricanes and earthquakes* by quickly providing financial liquidity when a policy is triggered. CCRIF operates as a public-private partnership and is set up as a non-profit "mutual" insurance entity in the Cayman Islands.

The origins of CCRIF date back to Hurricane Ivan in 2004, which caused billions of dollars of losses across the Caribbean. Following Ivan, the Caribbean Community (CARICOM) Heads of Government approached the World Bank for assistance to design and implement a cost-effective catastrophe risk transfer programme for Member Governments. This led to the establishment of CCRIF.

The CCRIF insurance products are macro level parametric insurance policies that indemnify each participating island government against hurricane and earthquake damage. CCRIF estimates the loss on the ground by using data from the National Hurricane Centre (NHC) in the case of hurricanes and the United States Geological Survey (USGS) in the case of earthquakes, and indemnity payments are based on a proxy relationship developed within a catastrophe risk model.

Coverage provided. CCRIF has in its first three years of operation offered separate hurricane (wind) and earthquake policies. Caribbean governments may purchase coverage that triggers for a "one-in-15-year" hurricane and a "one-in-20-year" earthquake, with maximum coverage of US$100 M available for each peril. The cost of coverage is a direct function of the amount of risk being transferred, ensuring no cross-subsidization of premiums and a level playing-field for all participants.

Premiums are determined by the amount of coverage a country decides to take, the attachment and exhaustion points of that coverage, and the risk profile of the country. Thus each country pays in exact proportion to the amount of risk it is transferring to CCRIF, so that there is no cross-subsidization.

Pooling of risk A key feature of CCRIF is that it permits the Caribbean States to pool their catastrophe risks in order to lower the cost of coverage by accessing the reinsurance and capital markets with a more diversified risk portfolio. For 2009/10, CCRIF's aggregate exposure for policies written was just over US$600 million. US$20 million was retained by CCRIF, with US$132.5 million in excess of loss reinsurance being from the international reinsurance markets, including Munich Re, Swiss Re, Paris Re, Partner Re and Lloyd's of London syndicate Hiscox. US$30 million of the top layer of risk was placed into the capital markets via a catastrophe swap between CCRIF and the World Bank Treasury. The top of the reinsurance structure, at US$152.5 million, provides claims-paying capacity for aggregate annual losses with a less than 1-in-1 000 chance of occurring.

Claims payments – In 2007 CCRIF paid out almost US$1 million to the Dominican and St. Lucian governments after the 29 November earthquake in the eastern Caribbean, and in 2008, CCRIF paid out US$6.3 million to the Turks and Caicos Islands after Hurricane Ike made a direct hit on Grand Turk. Haiti received a payment of US$7.75 M (approximately 20 times their premium for earthquake coverage of US$385 500) 14 days after being struck by a devastating earthquake of magnitude 7.0 on 12 January 2010. Most recently, in the 2010 tropical cyclone (TC) season, CCRIF has paid claims of US$12.8 million (TC Tomas) and US$4.3 million (TC Earl).

New products – Excess rainfall coverage will be available during the 2010/11 policy year as a proxy for catastrophic flood coverage. This cover has been developed by CCRIF with support from the World Bank's Global Fund for Disaster Risk Mitigation and with technical design assistance from the Caribbean Institute for Meteorology and Hydrology (CIMH).

With respect to the agricultural sector – CCRIF is closely monitoring activities by the World Bank and other development agencies with a view to ascertaining how CCRIF can be best utilized as part of the solution for the provision of index-based agricultural coverage, via governments or their agencies, to farmers.

Source: Author information taken from CCRIF, 2010. See also http://www.ccrif.org/faq

Pacific catastrophe risk financing initiative

Following the success of the CCRIF, the World Bank and other institutions are now exploring the possibility of designing a similar natural disaster pool risk transfer facility for the Pacific Island countries (PICs) under the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI). Under Phase I of this initiative a major risk assessment exercise has been completed for eight of the 15 countries namely the Cook Islands, Fiji, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu and country risk profiles for typhoon (and storm surge, flood and rain) and earthquake and tsunami have been prepared.[26] Second generation hazard and risk models are now being prepared for all 15 countries. The results of this major risk mapping and risk assessment exercise will be used to develop risk transfer and risk financing options to cover the costs of these natural disasters under the proposed Pacific Disaster Reserve Fund. This Fund would operate along similar lines to the CCRIF as an insurance pool providing catastrophe typhoon and earthquake index insurance cover to interested PIC governments, and would in turn purchase reinsurance cover on behalf of the pool members. Although the macro level index insurance programme is not specifically designed to protect the agricultural sector, PIC governments could use indemnity payments to compensate farmers incurring major losses. Further details of the PCRFI are contained in Box 5.8.

Box 5.8: Features of the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI)

Pacific Catastrophe Risk Assessment and Financing Initiative
A Joint World Bank/Asian Development Bank Initiative
Co-funded by GFDRR and the Government of Japan

The Pacific Catastrophe Risk Financing Initiative aims to provide Pacific Islands countries (PICs) with disaster risk assessment tools and financial instruments to reduce their vulnerability to natural disasters. It is based on two main activities that are described below.

Pacific Disaster Risk Assessment

The Pacific Disaster Risk Assessment aims to provide the PICs with disaster risk assessment tools to help them better understand and assess their exposure to natural disasters. This component builds on close collaborations with ADB, SOPAC, GNS, Geoscience Australia, Air Worldwide, SPC and PDC.

A regional hazard database for major disasters (earthquakes, tsunamis, tropical cyclones, and storm surge) is being developed. It compiles existing hazard data into one single regional database.

A regional GIS exposure database of assets at risk is under development. It builds on high resolution satellite imagery and field visits. More than 250 000 buildings and infrastructure footprints, including ground inspection of 80 000 buildings, are expected to be digitized by December 2010. Moreover, some imagery is being made available to the Government of Samoa and the Government of Tonga as part of their reconstruction programmes following the tsunami of September 2009.

Country-specific catastrophe risk models are under development. These models use the hazard and exposure data to simulate the economic impact of natural disasters in the PICs. They provide loss maps and other risk metrics that will allow the governments and their partners to assess better their fiscal exposure to natural disasters and develop cost-effective risk mitigation programmes.

[26] Copies of the Country Risk Profiles for these countries can be downloaded from http://go.worldbank.org/7BXXDUVMC0

Box 5.8: *(continued)*

Pacific Disaster Reserve Fund

The **Pacific Disaster Risk Fund** aims to improve the capacity of Pacific Islands countries to access immediate liquidity in case of natural disasters while maintaining their fiscal balance. The initiative was endorsed in the Action Plan of the PALM Leader Declaration at the 5th Pacific Alliance Leaders Meeting held in Japan in May 2009. Pacific Islands countries reiterated their interest for this initiative at the 2009 World Bank/IMF Annual Meetings and during side meetings at the 2009 Forum of Economic Ministers' Meeting. The operational and financial structure of the proposed Pacific Disaster Reserve Fund is still under discussion with the Pacific Islands countries and the donor parties.

Source: World Bank/ADB Briefing Note March 11, 2010. See also http://go.worldbank.org/7BXXDUVMC0

Typhoon index insurance for smallholder crop and livestock owners in Pacific Islands countries

The Philippines typhoon index for rice producers

The MicroEnsure/Malayan Insurance Company Typhoon Index Insurance Cover is currently the only micro level or individual farmer catastrophe windstorm index programme in the world. Key features of this product were reviewed in Chapter 3. The policy is a tropical storm and typhoon[27] index for rice farmers and has a dual indemnity trigger system: (a) maximum sustained wind speed at the closest point of track; and (b) distance from the insured location. The payout structure of the policy is illustrated in Figure 5.1.

Figure 5.1: Malayan insurance typhoon index policy indemnity payout structure

Wind speed payout parameter:		
Tropical cyclone classification (Saffir Simpson Scale)	**Wind speed (mph)**	**Malayan insurance (MicroEnsure) wind speed payout factor (% of policy limit)**
Tropical depression	0–38	Nothing
Tropical storm	39–58	Nothing
Severe tropical storm	59–73	15%
Hurricane 1	74–95	40%
Hurricane 2	96–110	60%
Hurricane 3	111–130	80%
Hurricane 4	131–155	100%
Hurricane 5	>155	100%
Distance of farm from hurricane centre payout parameter:		
100 km		100%
Between100 km and 140 km		140 – distance x 100% / 140–100
Over 140 km		Nothing

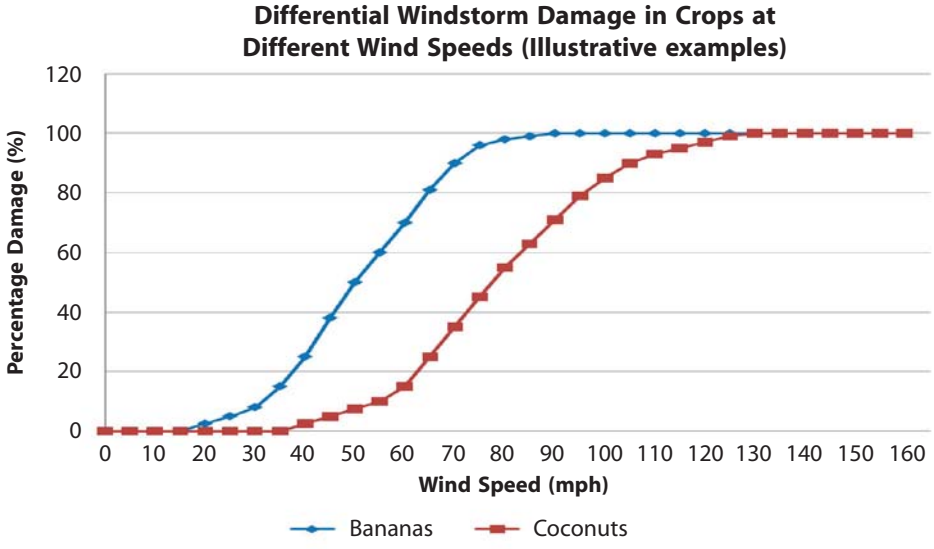
Source: Martirez, 2009

[27] In the Philippines and the Pacific, the term typhoon is commonly used to describe tropical cyclone events that are associated with sustained wind speeds of 74 mph and greater. In the North Atlantic and Caribbean, the term hurricane is used to describe events with sustained wind speeds of 74 mph and greater. In other words the terms typhoon and hurricane refer to the same thing. A tropical storm is associated with wind speeds of 39 to 73 mph.

The MicroEnsure Typhoon index is a relatively simple product to design and operate as there is a very accurate historical typhoon track database available for the Pacific region either through the Japanese Meteorological Authority (JMA) or through another regional organization such as the Pacific Islands Applied Geoscience Commission (SOPAC). Typhoon hazard mapping would be required to plot the frequency and severity of all historical tropical cyclone and typhoon events hitting each island and in order to establish the risk premiums attaching to each defined gridded risk zone. From an operational viewpoint the individual island insurers could enter into an agreement with the weather authority to provide real-time satellite tracking data for each named tropical cyclone event showing the maximum sustained wind speed at the closest point of track to each island and gridded reference point. The other main technical requirement would be to obtain GPS reference points for each insured location or farm.

Basis risk is likely to be very high for any individual farmer general crop tropical cyclone or typhoon index in the Pacific region. Some crops (e.g. bananas) are very much more susceptible to wind storm damage at low wind speeds than other crops (e.g. coconuts) and a single wind speed index cannot cover the individual susceptibility of each crop to windstorm damage. This is illustrated by reference to Figure 5.2. Significant wind storm damage involving snapping and toppling of the plants can occur in bananas at wind speeds of 15 mph to 38 mph as evidenced by the WINCROP banana insurance scheme in the Caribbean: over the 28 years this scheme has operated, roughly 50 percent of all claims costs have been incurred at wind speeds associated with tropical depressions; if the bananas are located close to the track of a tropical storm (wind speeds of 39 mph to 73 mph) very severe losses will occur in the bananas, and a direct hit by a category 1 hurricane (wind speeds from 74 mph to 95 mph) will result in total (100 percent) damage to the banana crop, including major uprooting of plants. In contrast, coconuts are much more resistant to windstorm damage: localized windstorm will not cause damage to the trees save for minor leaf

Figure 5.2: Illustrative wind speed damage curves for bananas and coconuts



Source: Author

damage, at tropical storm wind speeds leaf stripping and dislodging of fruit may occur, but severe damage to the trees (snapping, toppling and uprooting) will only occur under a Category 1 or 2 hurricane (wind speed 95 to 110 mph) with total damage occurring under a Category 3 hurricane (wind speed 111 to130 mph) or Category 4 hurricane (131 to 155 mph). Thus if a single wind speed index were to be sold to both banana growers and coconut growers in the Pacific Islands this would either end up indemnifying coconut growers for losses they have not incurred (index based on banana wind-damage curve), or if the index is set for damage in coconuts, banana growers might incur very severe losses in their bananas and not receive any indemnity.

Often the main cause of crop damage resulting from tropical storms or hurricanes (typhoons) is not mechanical wind damage, but rather storm surges or torrential excess rain and flooding associated with the typhoon. A wind speed index can only act as a proxy for crop losses resulting from excess rain, flood, storm surge and salinization of soils associated with a tropical storm or hurricane. There is a potential for very high basis risk where a tropical depression tracks over the insured location, but as the wind speeds are lower than 39 mph (the threshold for a tropical storm/ hurricane) there would be zero indemnity. However, the tropical depression may be slow moving and associated with very high rainfall levels that lead to extensive flood damage and that would not be indemnified by the typhoon product. One solution to this problem may be to combine a wind speed index with an excess rainfall index product.

Samoa typhoon index insurance options for fruit and vegetable farmers

In Samoa a cyclone is the key unmanageable risk faced by the agricultural sector in terms of widespread significant damage and where a cop insurance mechanism could benefit both farmers and government. In 2010 the World Bank conducted a preliminary risk assessment and feasibility study of the potential to introduce a tropical cyclone insurance cover for the fruit and vegetable sector in Samoa. This study was conducted as part of the Pacific Regional Work Plan of the All ACP Agricultural Commodities Programme (AAACP), which is being funded by the EU. This study noted that market based crop insurance either at an individual farmer level would only be operationally and financially viable for the single peril of a cyclone.

The study noted that Samoa benefits from strong natural disaster planning, which is implemented through the Disaster Management Office (DMO) and that it would be feasible to link an index based crop insurance programme to the DMO's existing system. In the start-up phase it was recommended that a macro level tropical cyclone index cover be designed for the DMO that in turn would be responsible for setting the payout procedures to individual farmers. However, in a second phase, it should be feasible to design an individual farmer indexed cyclone policy as a top up to the cover provided under the DMO macro index plan. (see World Bank, 2010b for further details).

This two-phase approach to providing typhoon index insurance first at a macro level and then at an individual farmer level could also be adopted in other PICs that have a strong national disaster risk management organization.

Other tropical cyclone micro level crop insurance initiatives. In the Bahamas, FAO has been assisting the Ministry of Agriculture and Marine Resources (MAMR) for a number of years to design

a catastrophe tropical storm and hurricane index cover that is intended to protect individual crop and livestock producers and also in-shore lobster fishermen. This simplified index would only use one parameter to trigger payouts, namely the maximum sustained wind speed recorded at the official trigger station or stations located on each island in the Bahamas. This project is still at a design stage pending decisions by the government on whether to invest in the FAO proposed technical design and rating project. In addition, in 2010 FAO contracted the University of Wageningen to conduct a design study in Grenada for a micro level crop insurance hurricane index programme for small farmers. The findings from both of these studies may have useful applications to the design of tropical cyclone insurance for farmers in the Pacific Islands countries.

Conclusions on crop insurance options for the Pacific Island countries

Traditional indemnity-based crop insurance options appear to very limited for farmers in the Pacific Island countries. Many factors can mitigate against the development of traditional indemnity-based crop insurance products in the Pacific Island countries. These factors include the small-scale of agriculture, the predominance of subsistence farming, the lack of time-series farm-level crop production and yield data on which to establish insured yields, and, most importantly, the lack of a low cost local loss adjustment capability with which to assess and adjust losses. Indeed the administrative and operating costs of a traditional crop insurance cover for very small farmers are likely to be prohibitively expensive.

There may, however be scope for weather index covers that insure against key perils such as typhoons, excess rain (as a proxy for flood) and possibly also for rainfall deficit (drought). For Pacific typhoons it is possible to access at relatively low cost a lengthy historical database of individual events for more than 50 years. In addition, a major hazard risk mapping exercise has already been conducted under the PCRAFI exercise in 8 of the 15 PICs and this could form the basis for either a macro level or micro level (individual farmer) typhoon cover in these countries. Typhoon index cover could be offered at very much lower administrative and operational costs because there would be no need for field level pre-inspections or loss assessment and these lowered costs could be passed on to farmers in the form of lowered premiums.

Options appear to exist for initially introducing mesolevel typhoon index cover linked to an existing disaster management programme and then, once experience has been gained, to develop micro level individual farmer index cover.

The option of forming a typhoon crop index pool insurance programme along the lines of the CRRIF in the Caribbean and the proposed PCRAFI fund for the Pacific Islands should also be considered. The options of a pool scheme include the greatly reduced costs of underwriting the scheme through a single underwriting entity (company), as well as the cost savings in the purchasing of reinsurance protection under a pooled programme.

Chapter 6

Options and recommendations for government support to agricultural insurance in Asia and the Pacific region

This final chapter summarizes some options for governments in Asia and the Pacific region to consider if they are seeking to promote the development of agricultural crop, livestock, forestry and aquaculture insurance in their countries.

Public-private partnerships

International experience tends to suggest that implementation of agricultural insurance is most efficiently and effectively managed by the private commercial crop insurance sector (see Hazell, 1992 and Mahul and Stutley, 2010). However, where insurance markets and infrastructure are poorly developed, governments may have important roles to play in promoting agricultural insurance, particularly in the start-up phases of new private commercial agricultural insurance programmes.

Box 6.1 presents a summary of some of the ways that governments can assist private insurance companies by enhancing insurance market infrastructure in the start-up phase of new agricultural insurance programmes. Various features of these interventions are considered further below.

Legal and regulatory

Governments can often support the introduction of agricultural insurance by creating a facilitating legal and regulatory environment. Countries such as Nepal, Bangladesh and India that have a growing microfinance and microinsurance industry may need specific legislation to bring these microinsurance products and programmes into line with commercial insurance legislation and to enable these programmes to access reinsurance capacity. In the case of weather index insurance (WII), specific legislation may need to be enacted to legalize these products.

Promoting microinsurance through MFIs, cooperative and mutual insurers

Where private commercial agricultural insurance is not available, governments may also play an important role in promoting the development of microinsurance through the MFIs, cooperatives and mutual societies. Chapter 4 of this report showed that where the private commercial sector is not willing or able to provide suitable agricultural insurance products to small farmers in countries such as Nepal, Bangladesh and in parts of India, the informal sector, including the NGOs/MFIs and cooperatives and/or community-based organizations have formed their own

Box 6.1: Roles for the government in supporting agricultural insurance

Legal and regulatory framework. One of the most important functions for governments in facilitating agricultural insurance markets is to establish an appropriate legal and regulatory framework and, where necessary, to enact specific agricultural insurance legislation.

Enhancing data and information systems. Time-series data and information on crop production and yields and climate are essential for the design and rating of any traditional crop insurance product or new weather index product. Governments can provide an invaluable service by creating national databases and making these databases available to all interested private commercial insurers either free of cost or at concessionary rates.

Product research and development. Among the major start-up costs for any new crop or livestock insurance programme is the design (including the design of loss assessment procedures) and rating of new products and pilot testing the new products and programmes. Such costs may be prohibitive for individual private commercial insurers especially in developing countries. In such situations there is justification for governments to provide financial support to product design and rating, especially where the products and rates are then made available to all interested insurers.

Education, training and capacity building. Governments can play an important role in new agricultural insurance programmes by supporting farmer awareness and education programmes, capacity building workshops and technical training programmes for key agricultural insurance staff.

Catastrophe risk financing. Agricultural insurance often has to protect against catastrophe perils of flood, drought, and windstorm in crops and epidemic disease outbreak in livestock. Most insurance companies do not have adequate capital to retain their catastrophe risk exposures and they typically purchase some form of contingency financing and/or reinsurance protection. For new companies that do not have large amounts of capital and have not yet built up claims reserves, the ability to retain risk is usually low and they typically need to purchase quota share treaty reinsurance and to then seek non-proportional reinsurance protection on their retention. In start-up situations where the insurance company does not have an established track record and loss history, the costs of reinsurance protection may be very high. In such situations, government support to the reinsurance programme may be highly cost effective.

Public sector premium subsidies. Premium subsidies are the most widely practiced form of government support to agricultural insurance – they are practiced by over two-thirds of countries that have some form of agricultural insurance. Governments justify the provision of agricultural insurance premium subsidies on the grounds that they make insurance more affordable for farmers, particularly small and marginal farmers, thereby increasing the rate of adoption and uptake of agricultural insurance. There are, however, some major drawbacks of premium subsidies, e.g. they disproportionately benefit larger farmers to the detriment of small and marginal farmers, they tend to promote moral hazard in that they encourage crop production in high risk regions, once premium subsidies are introduced they are very difficult to reduce or to withdraw, and they represent a major cost to governments.

Source: Author

microinsurance livestock insurance schemes (and in one case a crop insurance scheme). These schemes are readily accessible to their members, insurance and loss assessment management are trusted and premium payment terms are usually very flexible. Under these circumstances, governments should promote the formation and development of micro level mutual agricultural insurance schemes by enacting suitable legislation to permit such schemes to operate and to ensure they are properly regulated and that they are protected by catastrophe insurance and reinsurance.

Enhancing agricultural insurance infrastructure and data and information systems

There may be important roles for governments in Asia and the Pacific region to invest in upgrading the national meteorological weather stations in their countries in order to introduce weather index insurance. India is a country where both the public and private sectors in recent years have taken major steps to increase the weather station density and to upgrade the manual rainfall stations to fully automatic weather stations. Other countries, including the Philippines, Nepal, Bangladesh and Viet Nam, need to invest in similar upgrading of their weather station networks if they wish to expand into weather index insurance.

Furthermore, if area-yield index insurance is to be expanded in Asia and the Pacific region there appears to be a very important role for governments to strengthen their seasonal crop yield estimation survey procedures. India is the only country in the region with an area-yield index scheme and this is totally reliant on the crop-cutting surveys implemented each season by the local district administration in conjunction with the agricultural extension services. Countries that are currently examining the role of area-yield index insurance, including Bangladesh, Nepal and the Philippines, would need to strengthen their area-yield estimation capabilities before they could consider implementing such cover.

Product research and development

Many of the private insurance companies in Asia and the Pacific region have no experience with the design and rating of traditional crop insurance products or new crop weather index products. Local government could usefully support the provision of specialist technical assistance from international sources to assist their insurance associations to design and rate and prepare policy wordings for these new agricultural insurance products.

Education, training and capacity building

Governments can play a key role in supporting farmer awareness and education programmes, capacity building workshops and technical training programmes for key agricultural insurance staff. Given the fact that there is no tradition of crop insurance in many countries, territories and areas in Asia and the Pacific region, high priority will need to be given to financial and insurance literacy programmes for farmers and specific training in the role and benefits of the different crop and livestock and aquaculture insurance products. Insurance company staff will also need specialist training in product design, actuarial and rating, underwriting and claims administration and loss assessment systems and procedures. Similar training also needs to be provided to staff in the banks, MFIs, and input suppliers if these organizations get involved as delivery channels/agents.

Catastrophe risk financing

In many countries the government is involved in the reinsurance of agriculture. Key territories where governments already act as a catastrophe reinsurer (either directly or indirectly through a national reinsurance company) include China, India, Japan and the Republic of Korea. It is therefore recommended that the private insurers should first seek to place their reinsurance

requirements with local and international reinsurers and only turn to the government in the unlikely case that they cannot place their reinsurance programmes.

Premium subsidies

Premium subsidies are the most widely practiced form of government support to agricultural insurance practiced by over two-thirds of countries that have some form of agricultural insurance. As previously noted, premium subsidies in Asia and the Pacific region are in the order of 50 percent of the full cost of the premium, but in some countries governments provide subsidies as high as 75 percent to 80 percent of the premium. Premium subsidies are, however, very controversial for a number of reasons. The provision of non-discriminatory premium subsidies is regressive because they disproportionately benefit the larger farmers to the detriment of small and marginal farmers. Also, subsidies that cover a large part of the overall premium tend to promote moral hazard whereby farmers grow high risk crops that attract high premium subsidies in regions that are not technically suited to the crop. Once premium subsidies have been introduced by governments it is politically very difficult to reduce or to withdraw these subsidies and in many of the countries that operate non-discriminatory premium subsidies the fiscal costs to the government are extremely high.

It is recommended that premium subsidies should only be used selectively where a clear social need is identified and where the premium subsidies are targeted at special needs groups for a limited time period. Under certain circumstances, where small and marginal farmers are unable to afford crop insurance, there may be justification for offering limited premium subsidies that are phased out over a three- to five-year period (e.g. year 1, 50 percent premium subsidy, year 2, 35 percent premium subsidy, year 3, 20 percent premium subsidy, year 4 zero premium subsidy), at the end of which it is hoped the farmers will have been able to fully understand the benefits or otherwise of crop insurance and to make their own decisions about whether to continue to purchase cover in the future. Where crop insurance can be bundled with crop credit provision and the premiums financed as part of the seasonal credit this can also serve to overcome the problem of affordability.

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Annex 1
Additional tables to chapter 1

Annex 1.1: List of Asia-Pacific countries, territories and areas by income status 2009*

No.	Economy	Income Group
Countries		
1	Afghanistan	Low income
2	Bangladesh	Low income
3	Cambodia	Low income
4	Democratic People's Republic of Korea	Low income
5	Lao People's Democratic Republic	Low income
6	Myanmar	Low income
7	Nepal	Low income
8	Viet Nam	Low income
9	Bhutan	Low middle income
10	China	Low middle income
11	India	Low middle income
12	Indonesia	Low middle income
13	Kiribati	Low middle income
14	Maldives	Low middle income
15	Marshall Islands	Low middle income
16	Micronesia (Federated States of)	Low middle income
17	Mongolia	Low middle income
18	Pakistan	Low middle income
19	Papua New Guinea	Low middle income
20	Philippines	Low middle income
21	Samoa	Low middle income
22	Solomon Islands	Low middle income
23	Sri Lanka	Low middle income
24	Thailand	Low middle income
25	Timor-Leste	Low middle income
26	Tonga	Low middle income
27	Vanuatu	Low middle income
28	Fiji	Upper middle income
29	Malaysia	Upper middle income
30	Palau	Upper middle income
31	Australia	High income: OECD
32	Japan	High income: OECD
33	New Zealand	High income: OECD
34	Republic of Korea	High income: OECD
35	Brunei Darussalam	High income: non-OECD
36	Singapore	High income: non-OECD
Areas and Territories		
37	American Samoa	Upper middle income
38	China, Hong Kong SAR	High income: non-OECD
39	China, Macao SAR	High income: non-OECD
40	French Polynesia	High income: non-OECD
41	Greater Antilles	High income: non-OECD
42	Guam	High income: non-OECD
43	New Caledonia	High income: non-OECD
44	Northern Mariana Islands	High income: non-OECD

*__Source:__ World Bank List of Economies (2009)

Annex 1.2: Asia-Pacific countries, areas and territories: Population, GDP and Agricultural GDP*

No.	Economy	Income group	Population (2009) million	2008 GDP (current) US$ million	Agricultural GDP 2008 (%)	AGRIC GDP 2008 US$ million
1	Afghanistan	Low income	29.8	10 624	31.6	3 357
2	Bangladesh	Low income	162.2	79 554	19.0	15 115
3	Cambodia	Low income	14.8	10 354	34.6	3 583
4	Democratic People's Republic of Korea	Low income	23.9	n.a.	n.a.	n.a.
5	Lao People's Democratic Republic	Low income	6.3	5 543	34.7	1 923
6	Myanmar	Low income	50.0	n.a.	n.a.	n.a.
7	Nepal	Low income	29.3	12 615	33.7	4 251
8	Viet Nam	Low income	87.3	90 645	22.1	20 033
9	Bhutan	Low middle income	0.7	1 283	18.7	240
10	China	Low middle income	1 331.5	4 327 000	11.3	488 951
11	India	Low middle income	1 155.3	1 159 170	17.5	202 855
12	Indonesia	Low middle income	230.0	510 730	14.4	73 545
13	Kiribati	Low middle income	0.1	137	27.5	38
14	Maldives	Low middle income	0.3	1 261	6.2	78
15	Marshall Islands	Low middle income	0.1	158	n.a.	n.a.
16	Micronesia (Federated States of)	Low middle income	0.1	258	n.a.	n.a.
17	Mongolia	Low middle income	2.7	5 258	21.1	1 109
18	Pakistan	Low middle income	169.7	164 539	20.4	33 566
19	Papua New Guinea	Low middle income	6.7	8 239	33.6	2 768
20	Philippines	Low middle income	92.0	166 909	14.9	24 869
21	Samoa	Low middle income	0.2	523	10.8	57
22	Solomon Islands	Low middle income	0.5	645	36.0	232
23	Sri Lanka	Low middle income	20.3	40 565	13.4	5 436
24	Thailand	Low middle income	67.8	272 429	11.6	31 602
25	Timor-Leste	Low middle income	1.1	498	n.a.	n.a.
26	Tonga	Low middle income	0.1	278	25.6	71
27	Vanuatu	Low middle income	0.2	590	14.3	84
28	American Samoa	Upper middle income	0.1	n.a.	n.a.	n.a.
29	Fiji	Upper middle income	0.9	3 590	4.1	147
30	Malaysia	Upper middle income	27.5	221 773	10.9	24 173
31	Palau	Upper middle income	0.0	181	7.1	13
Subtotal			**3 511.5**	**7 095 349**	**13.2**	**938 097**
32	Australia	High income: OECD	21.9	1 015 220	2.5	25 381
33	Japan	High income: OECD	127.6	4 910 840	1.4	68 752
34	New Zealand	High income: OECD	4.3	129 940		n.a.
35	Republic of Korea	High income: OECD	48.7	929 121	2.5	
36	Brunei Darussalam	High income: non-OECD	0.4	11 471	0.7	80
37	China, Hong Kong SAR	High income: non-OECD	7.0	215 355	0.1	215
38	China, Macao SAR	High income: non-OECD	0.5	18 599	0.0	0
39	French Polynesia	High income: non-OECD	0.0			
40	Greater Antilles	High income: non-OECD	0.2			
41	Guam	High income: non-OECD	0.2			
42	New Caledonia	High income: non-OECD	0.3			
43	Northern Mariana Islands	High income: non-OECD	0.1			
44	Singapore	High income: non-OECD	5.0	181 948	0.1	182
Subtotal			**216.2**	**7 412 493**	**1.3**	**94 610**
Total			**3 727.2**	**14 507 842**	**7.0**	**1 008 373**

***Source:** World Bank: World Data Bank: http://databank.worldbank.org

Annex 2
Additional tables to chapter 3

Annex 2.1: Institutional and structural characteristics of agricultural insurance markets in Asia and the Pacific region

Country	INSURERS (Public = G), (Private = P), (Commercial = PC), Private mutual (PM), NGO/Community-based (CB)	PUBLIC-PRIVATE PARTNERSHIPS	Co-insurance pools for agriculture	REINSURERS (Government = G), (National reinsurer = NR), (Private local Reinsurer = PL), (Private international reinsurer = PI)	Premium subsidy (Yes/No)	Disaster payments (Yes/No)	Compulsory (C), Voluntary (V) or Compulsory for borrowing farmers only (CBF)
Australia	P	No	No	PI	No	Yes	Australia
Bangladesh	G, CB	No	No	not reinsured	No	Yes	Bangladesh
China	P, PM	Yes	Yes (crop and livestock)	G, NR, PI	Yes	Yes	China
Democratic People's Republic of Korea	G	No (all govt.)	No	G, PI	Yes	Yes	Democratic People's Republic of Korea
India	G, P, CB	Yes	No	G, NR, PI	Yes	Yes	India
Indonesia	P	Yes?	Unknown	Unknown	Yes	Unknown	Indonesia
Japan	PM	Yes	No	G	Yes	Yes	Japan
Malaysia	P	No	Yes (livestock)	PI	No	Unknown	Malaysia
Mongolia	P	Yes	Yes (livestock index)	G	No	Yes	Mongolia
Nepal	G, PM, CB	Yes	No	not reinsured	Yes	Yes	Nepal
New Zealand	P	No	No	PI	No	Yes	New Zealand
Pakistan	P	?	No	PI	Yes	Yes	Pakistan
Philippines	G, P	Yes	Yes (livestock)	PI	Yes	Yes	Philippines
Republic of Korea	P, PM	Yes	Yes (crop)	G, PL, PI	Yes	Yes	Republic of Korea
Sri Lanka	G, P	Yes	No	Unknown	Unknown	Unknown	Sri Lanka
Thailand	P	No	No	PI	No	Yes	Thailand
Australia	P	No	No	PI	No	Yes	Australia
Total		**9**	**5**		**9**	**14**	
Percent		53%	29%		53%	82%	

Source: Mahul and Stutley, 2010 and author, 2010

Annex 2.2: Features of area yield index insurance

Area-yield index insurance represents an alternative approach to MPCI insurance that aims to overcome many of the drawbacks of traditional MPCI crop insurance. The key feature of this product is that it does not indemnify crop yield losses at the individual field or grower level. Rather, an area-yield index product makes indemnity payments to growers according to yield loss or shortfall against an average area yield (the index) in a defined geographical area (e.g. region or paddy production zone). An area-yield index policy establishes an insured yield that is expressed as a percentage (termed the "coverage level") of the historical average yield for each crop in the defined geographical region that forms the insured unit (IU). Farmers whose fields are located within the IU may purchase optional coverage levels that typically vary between a minimum of 50 percent and a maximum of 80 percent of historical average yield. The actual average yield for the insured crop is established by sample field measurement (usually involving crop cutting) in the IU and an indemnity is paid by the amount that the actual average yield falls short of the insured yield coverage level purchased by each grower.

The key advantages of the area-yield approach are that moral hazard and anti-selection are minimized, and the costs of administering such a policy are much reduced and this offers the potential to market this product at lower premium costs to growers. The main disadvantage of an area-yield index insurance policy is that an individual grower may incur severe losses because of localized perils e.g. hail, or flooding by a nearby river, but because these localized losses do not impact the county or departmental average yield, the grower does not receive an indemnity. (See Box 1 for further details).

International experience with area yield index insurance

Area-yield index crop insurance has been implemented in many countries. In the late 1970s, India introduced area-yield index crop insurance and the United States and Canada introduced this product in the early 1990s. Recently, other countries such as Morocco, Mexico, Sudan, and Brazil have developed area based crop insurance products.

In India, area-yield crop insurance has operated for over 20 years and is currently the world's largest crop insurance programme insuring about 22.5 million farmers in 2009/10. The Agricultural Insurance Company of India (AICI) is responsible for implementing area-yield crop insurance under the National Agricultural Insurance Scheme (NAIS). The programme is targeted at small and marginal farmers (with less than two hectares) who are highly dependent on access to seasonal crop credit. Crop insurance is compulsory for borrowing farmers and voluntary for non-borrowing farmers. The IU is normally the block or *panchayet,* which comprises a group of nearby villages and may include up to 27 000 acres or more of a single crop and several thousands of small and marginal farmers. Farmers may select coverage levels of 60 percent, 80 percent or a maximum of 90 percent of the five-year average area-yield. The programme is administered through the rural agricultural bank branch network in each state, department and block (group of villages). Actual area-yields are established through sample crop cutting. This is a major and costly exercise and suffers from delays in processing the results. Indemnity payments are therefore often delayed for six months or more.

Box 1: Area-yield index insurance – Advantages and disadvantages

Advantages	Disadvantages
Adverse selection and moral hazard are minimized The indemnity is based on average area yields and not on individual farmers' yields. Individual farmers cannot therefore influence the yield outcome.	**Basis risk issues** The occurrence of basis risk depends on the extent to which individual farmer's yield outcomes are positively correlated with the area-yield index.
Yield data availability for insurance Time-series district-level area-yield data is available through SRID/MOFA.	**Not suitable for localized perils** Area-yield insurance will not work in areas with high losses as a result of localized perils e.g. hailstorms, or localized frost pockets.
Comprehensive multi-peril insurance is suited to the insurance of systemic risk The policy acts as an all risk yield shortfall guarantee policy and is best suited to situations where severe systemic risk (e.g. drought) impacts equally over the defined area/insured unit (e.g. paddy production zone).	**Requires homogeneous agroclimatic risk regions and cropping systems** Area-yield insurance works best in a homogeneous climatic zone and where cropping systems for the insured crop are uniform (e.g. same varieties, planting dates, management practices).
Lower underwriting and delivery costs There is no need to conduct pre-inspections on individual farms or to collect individual grower yield data.	**Accuracy of historical area yield data** Methods of yield measurement and reporting may not be accurate thus raising doubts about the historical area-yields.
Lower loss adjusting costs There is no requirement for individual grower infield area loss assessment that is very time-consuming and costly.	**Problems of accurate measurement of area yields** Sampling error and enumerator bias can be a major problem in determining average area yields.
Affordability of product The combination of reduced exposure to yield loss and reduced administrative costs offers more potential for cheaper premiums than for individual farmer MPCI.	**Time delays in settling claims** Farmers often have to wait for at least three to six months post-harvest for the official results of the area yields to be published and for indemnities to be paid if applicable.

Source: Author

In the United States of America area yield index insurance is marketed under the name Group Risk Plan (GRP). Under the GRP the payouts of the coverage are not based on the individual farmer's yield loss experience; they are based on the actual value of an area-yield index in a certain area, namely the IU, which in the United States is defined by the county level (2 500 km^2 average IU). The indemnities on the GRP proceeds when the actual yield for the insured crop at the county on which the insured is situated, as determined by the National Agricultural Statistics Service (NASS), falls below the guaranteed yield chosen by the farmer. Under the GRP, farmers can choose among different coverage levels (insured yield options): 90 percent, 85 percent, 80 percent, 75 percent or 70 percent of the expected county yield. The sum insured value for each crop is based on

a percentage of the expected market price. The grower may select an insured value of between a minimum of 90 percent and a maximum of 150 percent of the expected market price. The justification for permitting growers to insure at up to 150 percent of the expected market price is that this affords adequate protection for growers whose own yields are higher than the county average. Final payments are not determined until six months after the crop harvest when NASS releases the actual county yields for each county. Payments are then made within 30 days. GRP insurance policies are easier to administrate and less costly than the traditional individual grower MPCI policy. However, individual crop losses may not be covered if the county yield does not suffer a similar level of loss. This type of insurance is most appropriate for farmers whose crop production and yields (and losses) typically follow the county pattern.

The issue of basis risk

The key feature of the area-yield index insurance is that it does not indemnify crop yield losses at the individual field or grower level; rather, an area yield index product makes indemnity payments to growers according to yield loss or shortfall against an average area yield (the index) in a defined geographical area (e.g. a district). An area yield index policy establishes an insured yield that is expressed as a percentage (termed the "coverage level") of the historical average yield for each crop in the defined geographical region that forms the IU. Farmers whose fields are located within the IU may purchase optional coverage levels that typically vary between a minimum of 50 percent and a maximum of 90 percent of historical average yield. The actual average yield for the insured crop is established by sample field measurement (usually involving crop cutting) in the IU and an indemnity is paid by the amount that the actual average yield falls short of the insured yield coverage level purchased by each grower.

In terms of yield performance, basis risk can be defined as the potential mismatch between the individual field and the geographical area defined as the IU for the area-yield index insurance. Under an area-yield insurance cover, basis risk may occur in one of two forms (a) growers who have not suffered any yield shortfall below the coverage level receive indemnities from the insurance because the IU where they are situated has suffered a yield shortfall in respect to the guaranteed yield, and (b) growers that have actual yields below the coverage level, do not receive any indemnity from the insurance because the actual yield for the IU on which they are situated is above the coverage level. Both situations are serious drawbacks for the sustainability of an area-yield index insurance product. The issue of the basis risk must be seriously addressed in the design of area yield index insurance.

Basis risk can be mitigated but it cannot be eliminated from an area-yield index insurance portfolio. The issue of the basis risk is related to how correlated are the yields at growers field level and the yields in the geographical area selected as IU for the coverage. The choice of the guaranteed yields for the coverage and the selection of IU are key topics that need to be addressed in the design of area-yield insurance products to mitigate the basis risk. The experience with area-yield index insurance products demonstrates that the higher the coverage level is settled, the bigger the basis risk problem; likewise, the bigger the geographical area selected as IU, the bigger the basis risk problem. Basis risk is a serious issue for area-yield index products that have coverage levels settled close to the expected yields. Small yield shortfalls with respect to the expected yields are more

in relation with idiosyncratic risks, such as crop management and crop husbandry practices, than with weather events. At high coverage levels, the correlations between the yield performance at the individual grower field level and the yield performance at the geographical area selected as IU are not strong enough. The correct definition of the insured unit is also a key factor for the mitigation of basis risk issues in an area yield index insurance coverage. Area zone boundaries for an area-yield index insurance must be selected so as to group together the largest possible number of farms with similar climate and soils (Skees, 1997). In other words, the bigger the geographical area selected as IU, the lower the probability to group together the largest possible number of farms with similar climate and soils.

Annex 2.3: Agricultural insurance penetration rates

Country	2009 agricultural insurance premium US$	2008 GDP (current) US$ million	2008 agricultural GDP (US$ million)	2008 agricultural GDP as a % of total GDP	Agricultural insurance penetration rate
Australia	144 000 000	1 015 220	25 381	2.50%	0.57%
Bangladesh	100 000	79 554	15 115	19.00%	0.00%
China	1 958 678 000	4 327 000	488 951	11.30%	0.40%
India	450 000 000	1 159 170	202 855	17.50%	0.22%
Indonesia	1 000 000	510 730	73 545	14.40%	0.00%
Japan	1 200 000 000	4 910 840	68 752	1.40%	1.75%
Malaysia	1 000 000	221 773	24 173	10.90%	0.00%
Mongolia	87 342	5 258	1 109	21.10%	0.01%
Nepal	133 200	12 615	4 251	33.70%	0.00%
New Zealand	25 000 000	129 940	6 367	4.90%	0.39%
Pakistan	4 100 000	164 539	33 566	20.40%	0.01%
Philippines	3 000 000	166 909	24 869	14.90%	0.01%
Republic of Korea	115 809 480	929 121	23 228	2.50%	0.50%
Sri Lanka	170 609	40 565	5 436	13.40%	0.00%
Thailand	42 040	272 429	31 602	11.60%	0.00%
Viet Nam	100 000	90 645	20 033	22.10%	0.00%
Total	**3 903 220 671**	**14 036 307**	**1 049 233**		

Source: 2009 Agricultural insurance premiums based on author's best estimates in the conduct of the FAO Asia-Pacific Agricultural Insurance Survey 2010

2008 GDP and agricultural GDP based on World Bank figures

Annex 2.4: Crop insurance underwriting results by country

Countries with premium subsidies and or public programmes	Period	Currency	Total crop premium	Total crop claims	Loss ratio	Average crop premium subsidy %	Producer premium	Producer loss ratio
Bangladesh	1977–1995	Taka	3 962 337	19 766 803	499%	0%	3 962 337	499%
China	2003–2007	US$	25 486 887	165 448 366	65%	34%	168 934 813	98%
India (NIAS)	1999–2009	Rs	44 278 855 000	154 859 953 000	350%	10%	40 033 375 000	387%
India (WBCIS)	2007–2009	Rs	5 770 130 000	4 705 300 000	82%	n.a.	n.a.	n.a.
Japan	2003–2007	US$	2 092 416 600	1 401 555 872	67%	51%	1 026 951 613	136%
Pakistan	2008/09	US$	3 800 000	280 000	7%	58%	1 600 000	18%
Philippines	2003–2007	US$	9 520 591	6 935 714	73%	49%	4 887 186	142%
Republic of Korea	2001–2009	US$	355 000 000	302 460 000	85%	50%	177 500 000	170%

Countries with NO premium subsidies and private insurance	Period	Currency	Total crop premium	Total crop claims	Loss ratio	Average crop premium subsidy %	Producer premium	Producer loss ratio
Australia	2003–2007	US$	133 179 386	69 907 358	52%	0%	133 179 386	52%
India (WII – ICICI)	2003–2007	US$	2 292 690	1 748 070	76%	0%	2 292 690	76%
India (WII – ITGI)	2205–2007	US$	2 230 143	2 439 199	109%	0%	2 230 143	109%
Sri Lanka	2004–2007	US$	276 890	121 331	44%	0%	276 890	44%
Thailand	2007–2010	US$	250 754	156 698	62%	0%	250 754	62%

Source: Mahul and Stutley, 2010 and FAO Asia-Pacific Survey 2010

Annex 2.5: Livestock insurance underwriting results by country

Countries with premium subsidies	Period	Currency	Total livestock premium	Total livestock claims	Loss ratio	Average livestock premium subsidy %	Producer premium	Producer loss ratio
Bangladesh (SBC)	1981–2008	Taka	5 734 364	3 220 500	56%	0%	5 734 364	56%
India	1997–2004	Rs	10 785 700 000	8 587 900 000	80%	50%	5 392 850 000	159%
Japan	2003–2007	US$	2 850 490 540	2 752 512 650	97%	48%	1 474 008 600	187%
Nepal (DICGC)	1987–2006	NRs	135 141 000	51 945 000	38%	50%	67 570 500	77%
Nepal (SFCL)	1987–2006	NRs	113 032 000	10 212 000	9%	50%	56 516 000	18%
Republic of Korea	2005–2008	US$	169 647 563	137 657 947	81%	50%	84 823 781	162%

Countries with No premium subsidies	Period	Currency	Total livestock premium	Total livestock claims	Loss ratio	Average livestock premium subsidy %	Producer premium	Producer loss ratio
Bangladesh (Grameen)	2001–2005	Taka	1 975 000	1 485 000	75%	0%	1 975 000	75%
Bangladesh (Proshika)	1990–2009	Taka	31 400 000	21 300 000	68%	0%	31 400 000	68%
Mongolia	2007–2008	US$	176 381	203 082	115%	0%	176 379	115%
Nepal (CLDP)	2004–2008	NRs	831 778	536 130	64%	0%	831 778	64%
Philippines	2003–2007	US$	326 526	187 596	57%	0%	326 526	57%

Source: Mahul and Stutley, 2010 and FAO Asia-Pacific Survey 2010

Reference

Mahul and Stutley, 2010.

Annex 3
Additional tables to chapter 4

Annex 3.1: Crop and livestock premium subsidy levels Asia and the Pacific region

Country	Crop insurance premium subsidies	Type of premium subsidy	Subsidy level (% of premium)	Livestock insurance premium subsidies	Type of premium subsidy	Subsidy level (% of premium)	Comments
China	–	Variable by crop type/region	60% to 65%	–		60% dairy cows: 80% rep. sows	2010 premium subsidy levels. Full details presented in China Country Report.
Democratic People's Republic of Korea	–	Capped rates	75%#				In the early 1990s premium rates were capped at about 2%, but had been increased to about 4.5% by 1996.
India	–	Capped rates + Variable	15% to 67%	–	Fixed	50%	NAIS food crop rates are capped at about 33% of the actuarial rate, implied subsidy 67%. CWII has qualified for premium subsidies since 2007, with an average of about 50%. Livestock 50% premium subsidies have been provided since 2005/06.
Indonesia	–	Fixed	100% (2009/10 pilot)	–	Fixed	100% (2009/10 pilot)	Under the very small pilots, the government is currently paying 100% of premium.
Japan	–	Fixed	51%	–	Fixed	48%	2007 premium subsidy levels.
Nepal	–			–	Fixed	50%	
Pakistan	–		58%				Premium subsidies for subsistence farmers.
Philippines	–	Variable	48% to 63% (rice subsidies, government); 16% to 21% (rice subsidy, lending institution)				Both government and lending institutions subsidize rice and maize premiums. Farmer pays between 16% premium (low risk zone) and 36% of premium (high risk zone) for rice.
Republic of Korea	–	Fixed	50%	–	Fixed	50%	Premium subsidies are expressed as a percentage of risk premium.
Sri Lanka	?	?			?		
Total	**8 (57%)**			**6 (43%)**			

Source: Mahul and Stutley, 2010; Author's updated estimates based on FAO 2010 survey of countries in Asia and Pacific region

Annex 3.2: Crop and livestock insurance premiums and premium subsidy levels 2007 (US$)

Country	2007 crop premium	2007 crop premium subsidies	Crop subsidy (%)	2007 livestock premium	2007 livestock premium subsidies	Livestock premium subsidy (%)	2007 total premium	2007 total subsidy	Premium subsidy (%)
Australia									
Bangladesh									
China	422 831 591	131 764 517	31	258 959 690	151 000 000	58	681 791 281	282 764 517	41
Democratic People's Republic of Korea									
India	214 021 093	29 596 256	14	31 666 400	15 833 200	50	245 687 493	45 429 456	18
Indonesia									
Japan*	453 146 460	231 102 430	51	575 809 390	277 892 550	48	1 028 955 850	508 994 980	49
Malaysia									
Mongolia									
Nepal				133 220	66 610	50	133 220		
New Zealand									
Pakistan									
Philippines	2 400 000	1 200 000	50				2 400 000	1 200 000	50
Republic of Korea	58 700 000	29 350 000	50	48 600 000	24 300 000	50	107 300 000	53 650 000	50
Sri Lanka									
Thailand									
Viet Nam									
Total (countries with subsidies)	**1 151 099 144**	**423 013 203**	**37**	**915 168 700**	**469 092 360**	**51**	**2 066 267 844**	**892 038 953**	**43**
Total (countries with no subsidies)	187 766 142			60 465 350			248 231 492		
Total all countries	1 338 865 287		32	975 634 050		48	2 314 499 337		39

Source: Mahul and Stutley, 2010 and Author's updated estimates based on FAO 2010 survey of Asia-Pacific countries

Notes: * For Japan 2006 crop and livestock figures.

Reference

Mahul and Stutley, 2010.

Annex 4
Individual country reports

Overview of agricultural insurance: Australia[28]

1. Agricultural insurance market review

History of agricultural insurance

Crop insurance started in Australia in 1918 but did not expand until the 1960s. Crop insurance is very well established in Australia, is handled by private insurers, and is competitive. Expansion of the traditional broad acre hail insurance to many other crops happened from the 1980s onwards. Forestry insurance is also important. Livestock insurance is a much smaller industry than crop insurance but includes equine, livestock, and aquaculture insurance.

Agricultural insurance market structure 2008

Three private sector insurers underwrite crop and livestock business; nine offer crop insurance only, and three offer livestock only. Insurance companies write most broad acre crop insurance (e.g. cereals, oilseeds). Three managing underwriting agencies write specialist lines such as cotton and horticulture, and there are a few specialist livestock agencies, mainly focusing on racehorses. Forestry insurance is also offered by insurers and through agencies.

Agricultural insurance products available

Crop hail and named-peril crop insurance are available, but not revenue-based or multiple peril crop insurance (MPCI) policies. Greenhouse insurance is available. Although broad acre crop insurance is the dominant and longstanding crop insurance, which covers principally hail and fire, in the 1980s and 1990s there was an expansion of schemes for specific crop sectors, notably cotton and viticulture. Forestry insurance is an important product in Australia. Livestock insurance covering accident and mortality is available, as well as aquaculture insurance. A number of weather derivatives are transacted. There are no weather index insurance products, although these have been researched in the private sector.

Delivery channels

For crop insurance, brokers are the most important distribution channel. In decreasing order of importance after brokers are the insurer's own agents, producer associations and cooperatives, input suppliers ("stock and station agents") and banks. There are specialist association schemes with their own distribution channels, for example the forest growers association, the dried fruit industry, and cotton ginners. Distribution networks are well established and competitive. For livestock insurance, the same channels are important, although linkages with banks are less developed. There are no special delivery channels or programmes for small farmers.

[28] Source of country overview information: World Bank Survey 2008; information updated to 2010 on basis of FAO 2010 survey.

Table 1: Agricultural insurance available 2008

Crop insurance products available				Greenhouse	Forestry
MPCI	Named-peril	Crop revenue	Index-based		
No	Yes	No	No	Yes	Yes
Livestock insurance products available					**Aquaculture**
All risk	Accident and mortality	Epidemic disease	Other	Index-based	
No	Yes	No	No	No	Yes

Source: World Bank Survey, 2008

Voluntary versus compulsory insurance

Crop and livestock insurance is voluntary.

Agricultural reinsurance

Private sector reinsurance (quota share, surplus, and stop loss) is widely developed and competitive. It is not considered a constraint for named-peril crop insurance, livestock insurance, or index insurance. For those initiatives in Australia developed to investigate multiple peril yield insurance, reinsurance is a moderate constraint. Drought is a major catastrophic hazard in Australia.

2. Public support for agricultural insurance

Types of public support for agricultural insurance

There is no form of public support for agricultural insurance in Australia.

Premium subsidies

There is no premium subsidy on agricultural insurance in Australia.

Public cost of agricultural insurance

There is no cost to the government in support of agricultural insurance.

3. Agricultural insurance penetration

Insurance penetration rate

In 2007 it was estimated that about 25 000 crop insurance policies were issued and that 50 percent of farmers were insured. The area insured was 15 million ha or 50 percent of the cropped area. The figure has been relatively stable over time and reflects the significant penetration of insurance in the large broad acre crop sector in Australia. There has been growth in specialist sectors such as viticulture.

Updated information on 2009 insurance penetration rates by sector is presented in Table 3 in terms of actual gross written premium (GWP) as a percentage of potential GWP. Broad acre crop insurance is very popular with farmers (75 percent penetration rate) and this similarly applies to industrial crops and viticulture. However, insurance uptake is very low for orchard crops and for horticultural crops. Livestock insurance penetration rates for extensive beef cattle, sheep and dairy are about 18 percent and for intensive pig and poultry production about 22 percent. Finally, the forestry insurance sector remains very important with a 2009 GWP of US$23 million and a 23 percent penetration rate.

4. Financial performance

Five-year results

Estimates are not available for the industry as a whole. One company involved in all crop insurance sectors shows loss ratios varying from 29 percent to 71 percent over a five-year period. Companies writing a national portfolio have a diversification of risk, for example spatially from western to south-eastern Australia and Queensland for broad acre, several viticulture regions, and different product types. Premium income for the agricultural insurance market in Australia is volatile and is influenced by drought (affecting the cropped area which is insured) and more recently by commodity prices (affecting the value of crops insured). An estimate of the market premium income in Australia by class of business is provided for 2008 below:

Table 2: Estimated crop and forestry premium income, 2008

Class of business	Market premium income (US$ million)	Comment
Broad acre crops	96.0	Substantially increased in 2008 as a result of commodity prices.
Cotton	11.5	Area of cotton is still much reduced as a result of the drought. Premium income has reached US$47.7 million in the past.
Viticulture	17.2	–
Orchard	1.9	–
Forestry	28.8	–

Source: World Bank Survey, 2008

Livestock accident and disease insurance premium estimates for the market are $A50 million (US$47.5 million). However, a majority of this figure is bloodstock insurance. There is no livestock epidemic insurance. The figure of 5 percent of livestock being insured is because of catastrophe cover being available for feedlot cattle, a high proportion of which are insured. There is a limited amount of aquaculture insurance, estimated at $A1 million (US$0.95 million) of premium income.

In 2008 total agricultural insurance premiums were estimated at US$203 million, but in 2009 (latest available figures) there was a US$60 million reduction in written premium to US$144 million (see Table 3). The global recession and reduction in commodity prices are thought to be the main reasons for reduced demand for agricultural insurance in Australia in 2009.

Cost of agricultural insurance provision

For both crop and livestock insurance, the following are estimates for companies in the market of costs compared to original gross premium (OGP):

Marketing and acquisitions (commissions):	13.0% of OGP
Insurer administration excluding loss adjustment	7.0% of OGP
Loss adjustment costs	2.5% of OGP
Total costs	22.5% of OGP

Note: Overseas reinsurers pay a premium tax of 3 percent of OGP.

5. Public disaster assistance programmes

Australian farmers have suffered from major drought problems in the last decade. These affect both rainfed annual cereal cropping areas and the major irrigation zones (for example in the tributaries to the Darling River), where headwater reservoirs have been subject to major limits on water allocations.

Australia has an "Exceptional Circumstances" (EC) payment that has been applied for drought and bushfire losses in particular. These amounted to $A1.7 billion (US$1.6 billion) in 2007 and $A1.3 billion (US$1.2 billion) in 2006. Grain farmers received $A760 million (US$722), and dairy farmers also received subsidies. Australian government expenditure on drought assistance in the five years to 2006 was more than $A41.6 billion (US$39.5 billion).

EC payments provide several forms of assistance to farmers (and to small businesses deriving at least 70 percent of their turnover directly from agriculture). Areas must be declared as disaster-affected. Direct payments may be made (relief payments) as special exit payments for farmer quitting agriculture, for re-training or relocation, and as tax deferrals.

6. Additional tables

Table 3: Australia 2009 agricultural insurance penetration rates (US$ million)

Sector	Potential insured values	Potential GW premium	Actual GW premium	Penetration rate
Broad acre crops (cereals, grain legumes, oilseeds)	8 685	83	62	75%
Forestry – hardwood, softwood and high value timbers	13 536	102	23	23%
Livestock – extensive (beef cattle, sheep, dairy)	13 825	111	20	18%
Industrial crops (cotton, sugar cane)	1 952	39	17	44%
Viticulture (wine, table and dried grapes)	1 065	27	11	41%
Orchard crops (fruit, nuts and olives)	2 678	107	7	7%
Livestock – intensive (pigs, poultry)	2 978	18	4	22%
Aquaculture	1 834	73	<1	1%
Horticultural ground crops	4 976	124	<1	0%
Total	**51 527**	**683**	**144**	**21%**
All crop	*19 356*	*380*	*98*	*26%*
Livestock	*16 803*	*129*	*24*	*19%*
Forestry	*13 536*	*102*	*23*	*23%*
Aquaculture	*1 834*	*73*	*<1*	*1%*

Source: Meyers, 2010

Reference

Meyers, B. 2010. *Agriculture insurance situation in Australia*. Presented at Agricultural Insurance and Reinsurance Conference, Beijing, April 2010.

Overview of agricultural insurance: Bangladesh[29]

1. Agricultural insurance market review

History of agricultural insurance

Bangladesh is a low-income country with a 2008/09 GDP per capita of US$621. The Bangladesh economy is based primarily on agriculture, which contributes about 22 percent of total gross domestic product (GDP) and employs about 48 percent of the labour force aged 15 years and above. According to the 2001 population census there were 25.5 million households (HHs) in Bangladesh, of which 19.5 million, or 76 percent of the total, were rural HHs. The net cultivated area is nearly 20 million acres, and with up to three annual crops being grown, the cropping intensity is about 170 percent. Average farm size is small about 1.2 acres (0.5 hectares) per HH.

Bangladesh is ranked as the world's fifth most exposed country to natural disasters such as floods, cyclones, droughts, and earthquakes. Recent major floods occurred in 1988, 1998, 2004, and 2007. The 2007 floods directly affected 46 districts and over 14 million people, caused 970 human deaths, affected 2.2 million acres (0.89 million hectares) of agricultural land, and caused 1 459 livestock deaths. The country is very exposed to tropical storms and associated storm surges that can lead to major casualties in the coastal regions as evidenced by the death toll of 300 000 persons in a 1970 cyclone. Cyclones also cause major damage to agriculture and as a result of Cyclone Sidrin 2007, 0.69 million hectares of land were partially or totally destroyed and over 460 000 head of livestock and poultry were killed. The country is also prone to droughts. Between 1949 and 1991 the country experienced 24 droughts: the worst drought year was 1971 when 42 percent of the area of the country was affected. Other risks to agriculture include hail, excess temperatures, low temperatures, and crop and animal pests and diseases. The country is also very prone to climatic change in the form of reduced annual average rainfall and increased average temperatures over the next century.

Agricultural crop insurance was first introduced into Bangladesh on a pilot basis in 1977 by the state-owned insurance company, Sadharan Bima Corporation (SBC). SBC offered an individual-grower multiple peril crop insurance product as well as livestock mortality insurance (since 1981) and aquaculture insurance (in the mid-1990s). However, on account of poor underwriting results and lack of demand, SBC has almost ceased to underwrite agricultural insurance today.

Shrimp production in Bangladesh is concentrated in the southern coastal region and is highly exposed to floods, tropical cyclones and tidal surges, and diseases of shrimp. The SBC shrimp policy was introduced in the 1990s as a named-peril cover restricted to floods, cyclones and tidal surges, and diseases were specifically excluded. The policy covered both loss of fish stock (shrimp and

[29] Source of country overview information: FAO Survey 2010.

prawns) and loss or damage to the shrimp farm installations, buildings, ponds, and feedstock on site. The policy was marketed on a voluntary basis with a fixed premium rate of 0.99 percent of the sum insured, which was based on the input costs (stock, feed, etc.) for each 120-day shrimp production cycle. The programme never achieved the required sales levels, the fixed premium rate was far below the correct technical rate(s), and in the absence of a conventional deductible the product was exposed to first loss. On account of the very poor underwriting results, SBC withdrew this cover in 2004.

Currently, agricultural insurance provision is very limited and is only available through four NGOs/MFIs as part of their livestock loan protection schemes. In 2008, several thousand head of cattle were insured under these informal schemes.

Agricultural insurance market structure

The Bangladesh insurance industry is regulated by the Chief Controller of Insurance (CCoI), Department of Insurance (DoI), Ministry of Finance. In Bangladesh, public and private limited insurance companies are regulated by the Insurance Act 1938 (revised in 2001) and the Insurance Rules 1958. In 2008, new legislation was enacted under the Insurance Regulatory Authority Ordinance 2008 and the Insurance Ordinance 2008, which replaced the 1938 Act and 1958 Rules.

In 2009 there were 62 registered insurance companies operating in Bangladesh: 60 are private companies and two are public-sector insurers including Sadharan Bima Corporation (SBC).

Insurance penetration is very low in Bangladesh in comparison with other South Asian countries. From 1999 to 2004, the average gross premium income (total of life and non-life business) as a share of GDP was 2.7 percent in India, 1.27 percent in Sri Lanka, and 0.65 percent in Pakistan; it was, however, only 0.51 percent of GDP for Bangladesh. In 2007, the total market gross premium volume stood at Tk 42.5 billion (US$625 million), of which the private-sector company share of premium was Tk 38.6 billion (91 percent of total). In 2007, the insurance premium in Bangladesh was slightly less than US$3.0 per capita. The market is dominated by life insurance and non-life insurance accounted for only about Tk 10.7 billion (US$157 million) or 25 percent of total premium in 2006. The non-life insurance market was about US$114 million in 2007/08, representing about 2 percent of non-agricultural GDP and less than US$2.3 per capita.

Sadharan Bima Corporation (SBC), the public-sector insurer (and reinsurer), is the only regulated company that has underwritten crop (1977 to 1995) and livestock insurance (1981 to 2008). SBC has stopped underwriting agriculture on account of limited demand and uptake of its voluntary agricultural insurance products and very poor underwriting results. To date in Bangladesh, no private commercial insurance company has offered agricultural insurance.

Microfinance companies are active in the non-regulated insurance market. Bangladesh's MFIs started to offer a wide range of microinsurance products to their members in the late 1990s, including loan insurance, life insurance, health insurance and property insurance. The major providers of microinsurance today include BRAC, Grameen Kalyan, ASA, Proshika, Gonoshashtho Kendar, Shasthya Kendar, Integrated Development Foundation (IDF), and the Society for Social Services (SSS).

Several of these MFIs offer livestock-credit insurance including Grameen and Proshika, but none of these programmes is formally (re)-insured against catastrophe (flood or disease) losses. To date, the MFIs have not provided any form of crop insurance to their borrowing members.

Agricultural insurance products available

SBC crop insurance:

SBC adopted a conventional individual-grower multiple peril crop insurance (MPCI) yielded-shortfall policy that provided coverage against a wide range of climatic perils, including the potentially catastrophic climatic perils of floods, droughts, and winds and biological perils of pests and diseases. The programme started on a pilot voluntary basis for rice (Aman, Boro, and Aus), wheat, sugar cane, and jute. The sum insured was set at 80 percent of the past three-year average yield for each crop on each farm and valued at the government intervention price for the crop, or in other words a revenue-based valuation. Premium rates were calculated on an actuarial basis, but as these were deemed to be unaffordable for poor farmers, actual premium rates were capped at between 3 percent for wheat and jute and a maximum of 5 percent for Aman paddy and sugar cane. Loss adjustment was based primarily on "eye estimation" techniques. During the period 1977 to 1995, the programme was insured exclusively by SBC, which retained 100 percent of the losses, and there was no support from the government. The annual average loss ratio was very high – 508 percent.

SBC livestock insurance:

The SBC livestock insurance pilot project started in 1981 and provides individual animal accident and mortality cover. The demand for this voluntary programme has been very low. Over the 24 years of operation the programme has insured a total of 7 591 head of cattle, or an average of only 330 cattle per year, and generated an average annual premium of slightly below Tk 240 000 (about US$3 500).

SBC also offered shrimp insurance from the mid 1990s up to 1994 when it withdrew cover on account of very poor underwriting results.

The range of livestock and crop insurance products offered by the non-regulated sector are very restricted at present in Bangladesh (Table 1).

Proshika was the first MFI to introduce a livestock mortality loan protection scheme in 1990 under its Participatory Livestock Compensation Fund (PLCF). The PLCF is linked on a compulsory basis to Proshika's revolving credit fund for cattle, sheep/goats, and poultry-rearing projects. The PLCF compensates against the "sudden death" of insured livestock and poultry during the loan repayment period (usually 12 to 24 months), and it is in effect an all-risk livestock accident and disease policy. It does not, however, compensate poor management practices or negligence on the part of the insured. The rates charged by the PLCF are between 3 percent and 5 percent of the purchase price (or loan amount) for cattle and sheep/goats and 10 percent for poultry.

The Grameen Fisheries and Livestock Foundation (Grameen Moshto Pashusampad Foundation, GMPF) is a sister organization of the Grameen Bank (GB). Since 1999, GMPF has operated a livestock-credit compensation scheme for members of its Community Livestock and Dairy Development Project (CLDDP): livestock producers who access dairy cattle investment loans are protected under a livestock mortality compensation scheme provided by the Livestock Insurance Fund (LIF). The LIF programme insures against death of the dairy cow where this is "outside the control of the owner", and is an all-risks livestock mortality policy. The sum insured is equivalent to the amount of loan taken out to purchase the cow and premium is currently charged at a rate of 3 percent of the value of the loan. Coverage terminates once the loan has been repaid (usually over a maximum of two years). In addition, a fee of 2.5 percent of the value of the loan is levied to cover the cost of veterinary services, vaccinations, and technical assistance.

The programme has now operated for eight complete years during which a total of slightly over 7 000 dairy cows have been insured with an average mortality rate of 2.8 percent. The LIF liability is totally retained within GMPF, and the programme does not carry any form of catastrophe reinsurance protection.

Table 1: Agricultural insurance available 2010

Crop insurance products available				**Greenhouse**	**Forestry**
MPCI	Named-peril	Crop revenue	Index-based		
No	No	No	No	No	No
Livestock insurance products available					**Aquaculture**
All risk	Accident and mortality	Epidemic disease	Other	Index-based	
Yes	Yes, part of all risk coverage	Yes, part of all risk coverage	–	No	No

Source: Author, FAO Survey, 2010

Delivery channels

In Bangladesh all livestock insurance is currently provided through the NGOs/MFIs and is linked to livestock investment loans.

Voluntary versus compulsory insurance

The NGO/MFI livestock compensation covers are compulsory for any famer accessing loans to purchase dairy cattle or buffalo. Cover terminates once the livestock investment loan has been repaid.

Agricultural reinsurance

There is no tradition of agricultural crop or livestock reinsurance in Bangladesh. The former SBC pilot crop, livestock and aquaculture programmes were never reinsured.

Similarly, none of the non-regulated NGO/MFI livestock-credit protection schemes are reinsured and these companies are therefore very exposed to catastrophe losses, which would exceed their reserves.

2. Public support for agricultural insurance

Types of public support for agricultural insurance

In Bangladesh there has been no government support to agricultural insurance to date. The former SBC crop and livestock and aquaculture insurance programmes carried no premium subsidies and this similarly applies to the MFI livestock compensation schemes.

3. Agricultural insurance penetration

Insurance penetration rate

SBC

The SBC pilot crop and livestock insurance programmes were marketed on a voluntary basis and never achieved very high levels of demand by farmers or penetration. Between 1981 and 2009 the livestock programme insured a total of 7 591 head of cattle, or an average of only 330 cattle per year, and generated an average annual premium of slightly below Tk 240 000 (US$3 500 per year).

NGOs/MFIs

Over the past 19 years the Proshika livestock credit protection scheme has insured a total of 11 739 livestock producers' groups and a total of 140 439 head of livestock of which 87 percent have been cattle and smaller numbers of sheep and goats and 13 percent poultry. The GMPF livestock scheme has insured a much smaller number or 7 000 cattle over the past eight years. The insurance penetration rates of the MFIs are also very low.

4. Financial performance

Long-term underwriting results

SBC crop and livestock insurance

During the period 1977 to 1995 SBC's crop insurance programme experienced a very high annual average loss ratio of 499 percent. The poor results were largely a result of the very small size of portfolio and lack of spread of risk and the pressure to charge premium rates at well below the true actuarial rates.

The SBC livestock insurance pilot project has performed better with a long-term loss average ratio (1981 to 2008) of 56 percent.

NGO/MFI livestock insurance

For Proshika, over the past 19 years claims have been paid out on the death of 4 855 head of animals/poultry with an implied average mortality rate of 3.5 percent, with total claims valued at Tk 21.3 million against premium receipts of Tk 31.4 million, equivalent to an average loss ratio of 68 percent.

The Grameen livestock mortality compensation programme has now operated for eight complete years during which a total of slightly over 7 000 dairy cows have been insured with an average mortality rate of 2.8 percent and the loss ratio between 2000 and 2005 was 75 percent.

Cost of agricultural insurance provision

Costs of agricultural insurance provision through SBC and the NGOs/MFIs are not known.

5. Public disaster assistance programmes

The Ministry of Food and Disaster Management (MoFDM) through the Disaster Management Bureau (DMB) is responsible for coordinating Bangladesh's national disaster management plans and programmes across all ministries, agencies (including NGOs), and sectors. Disaster risk reduction planning and post-emergency management and rehabilitation are coordinated at all levels from national, regional, and district (*zila*) levels down to the subdistrict (*upazila*) and union *(thana)* levels. The DMB/MoFDM has its own budget for short-term disaster relief immediately after a major event. The main forms of MoFDM disaster relief include: food aid (GR rice), cash provision to families for deaths and injuries (GR cash), cash assistance for rebuilding damaged houses, food for work programmes (VGD) and vulnerable group feeding (VGF), and a money-for-work programme. In 2005/06 MoFDM disbursed Tk 2.2 billion (US$32.5 million) under this latter programme.

In addition, the Ministry of Agriculture (MoA) and the Ministry of Fisheries and Livestock (MoFL) are responsible under their own budgets for providing affected farmers, fishermen, and livestock owners with post disaster medium- and long-term financial assistance after major natural cyclone, flood, or drought events, which are declared a disaster.

Finally, some of the larger NGOs/MFIs have also established their own disaster management programmes and emergency loan provisioning, for example: 1) PKSF, the apex organization for NGOs and MFIs in Bangladesh, which established a Disaster Management Fund (DMF) in 2000 to help microcredit borrowers through PKSF partner organizations (POs) to access emergency loans following a disaster – this enabled them to buy food and medicines, to repair damaged houses, to re-establish drinking water tube wells, and to undertake any other rehabilitation activities; and 2) BRAC operates a flood asset replacement loan scheme to enable their micro borrowers to access loans in kind (e.g. seeds, poultry, livestock, or tree seedlings) after floods for income-generating activities.

6. Additional tables

Box 1: SBC multiple peril crop insurance programme, 1977 to 1995

Summary details of SBC crop insurance policy

Features	Details
Type of policy	Individual grower multiple peril crop insurance (MPCI) loss of yield policy.
Insured perils	Multi-peril: flood, drought, cyclone, hail, pest, disease, insect.
Insured crops	Aman paddy, Boro paddy, Aus paddy, wheat, jute, sugar cane.
Policy holder	The scheme was offered to two groups of farmers: members of the agricultural cooperatives under BRDB and individual farmers taking loans from commercial banks and BKB.
Voluntary or compulsory	Voluntary, but some linkage to credit institutions was intended.
Sum insured	The sum insured was set at 80 percent of the preceding three-year average yield of the particular farm in question, and valued at the government-declared procurement price of the crop. The sum insured was therefore determined on an individual farm basis.
Deductible	20 percent (80 percent yield guarantee). A 10% excess also applied. For total losses, the claims were limited to a scale according to the stage in the growth cycle when the loss occurred.
Premium rates	Rates applied to 80 percent yield guarantee. Uniform premium rates in all areas. Typical premium rates were: Aman 5 percent, Aus 4 percent, Boro 3 percent, jute 3 percent, wheat 3 percent, and sugar cane 5 percent.
Exclusions	Qualitative loss and damage, price fluctuations, fire, theft, animal damage, nuclear risks, war, civil war, riots.
Loss assessment procedure	Eye estimation and crop cutting according to needs to establish actual yield and amount of yield loss or damage to the crop. Loss assessment team comprising SBC official, TEO, and credit agency official.
Government subsidy	None
Reinsurance	None

Summary of crop insurance results, 1977 to 1995

Item	Total (1977 to 1995)	Annual average
No. of farmers insured	18 782	989
Crop area insured (Ac)	23 794	1 252
Sum insured (Tk)	110 529 276	5 817 330
Premium (Tk)	3 962 337	208 544
Claims paid (Tk)	19 766 803	1 062 647
Average premium rate	3.6%	3.7%
Loss cost	17.9%	17.9%
Loss ratio	499%	508%

Source: World Bank, 2010a

Reference

SBC 2009.

Overview of agricultural insurance: China[30]

1. Agricultural insurance market review

History of agricultural insurance

Agricultural insurance in China started in 1982 with the introduction of livestock and crop insurance. There were two phases in the development of agricultural insurance. The first was from 1982 to 2002, when agricultural insurance was developed by the People's Insurance Company of China (PICC) and extended into rural areas through the local government. Insurance was operated as a social welfare mechanism to protect farmers against natural disasters. Agricultural premium income peaked at CNY 816 million (US$98 million) in 1992 but had declined to CNY 330 million (US$40 million) by 2002.[31] During this period, underwriting results were poor, and PICC reduced its involvement in the lead up to its partial privatization.

A second phase has been the major expansion leading to the present market, starting with the introduction of new, subsidized agricultural insurance programmes in 2003. The government has promoted the expansion of new agricultural insurance companies, and confirmed in 2006 and 2007 the importance of agricultural insurance as a core part of its agricultural development policy. Subsidized agricultural insurance has become an important component of promoting agricultural production and stabilizing and enhancing rural incomes. Since 2003 China United Property Insurance Company and PICC were followed by four specialized agricultural insurance companies (Sunlight, Anxin, Anhua, and Groupama). In 2005 the market was still very small at CNY 729 million (US$91.1million), with China United and Sunlight holding 34 percent and 30 percent market shares, respectively. A detailed analysis of the market was contained in a report by the World Bank in 2007.[32] Since 2005 the market has expanded rapidly, fuelled by premium subsidies, increasing from US$106 million in 2006 to US$682 million in 2007. The updated total agricultural insurance market premiums for the period 2000 to 2009 are shown in Figure 1 showing a 2008 premium of US$1 617 billion and a 2009 premium of US$1 959 billion. China now is the second largest agricultural insurance market in the world after the United States.

Agricultural insurance market structure 2008

The 2008 agricultural insurance market was varied in structure. The following is a summary:

- Three specialist insurers provided crop and livestock insurance (Anxin, Ancheng, Anhua);
- two property and casualty general insurers also provided crop and livestock insurance (PICC, and China United Property Insurance Company CUPIC);

[30] Source of country overview information: World Bank Survey 2008 and FAO Survey 2010.

[31] Swiss Re, 2008.

[32] World Bank, 2007.

- two provincial pools led by PICC operated for crop and livestock insurance (Zeijiang, Hainan);
- one specialist mutual insurer provided crop insurance only (Sunlight);
- one mutual insurer provided crop and livestock insurance (Groupama); and
- one private insurer provided crop insurance (Guoyuan).

Given China's vast territory, most initiatives are based in a province, with the development of specific crop and livestock products relevant to that province. However, PICC and China United operate in several provinces. The market consists of a mix of general insurers, specialist agricultural insurers, mutual and private insurers, and pools. In 2008 all agricultural insurance was provided by private and or mutual insurance companies; there are no public sector agricultural insurers in China.

In 2008, 16 provinces were selected for subsidized crop insurance, and subsidized sow insurance is nationwide.

Agricultural insurance products available

The majority of China's crop insurance is individual grower multiple peril crop insurance (MPCI). This is the universal policy that receives subsidies from the central and provincial government. However, some products based on named-peril crop insurance are available. A small crop weather index pilot project is underway with the Anxin Insurance Company. The main crops insured in China are maize, rice, soybean, wheat, and cotton.

Table 1: Agricultural insurance available 2008

Crop insurance products available				**Greenhouse**	**Forestry**
MPCI	Named-peril	Crop revenue	Index-based		
Yes	Yes	No	Yes	Yes	Yes
Livestock insurance products available					**Aquaculture**
All risk	Accident and mortality	Epidemic disease	Other	Index-based	
Yes	Yes	Yes	No	No	Yes

Source: World Bank Survey, 2008

Livestock insurance is extended to include government slaughter orders. There has been a major expansion of livestock insurance as a result of the government's decision to subsidize sow insurance and, more recently, dairy cow insurance. In the event of government compensation following government slaughter orders, insurers pay the difference between the compensation level and the sum insured of the animal concerned. The main livestock insured in China are breeding sows. Additionally, dairy cattle and poultry are insured, as well as other farm livestock.

Delivery channels

In decreasing order of importance, the delivery channels in China are: producer associations, co-operatives and village committees; insurance brokers; input suppliers; banks; and the insurer's own agent network. Farmers often participate in insurance as a result of collective decision-making at the village or cooperative level. Issuance of group policies is an important administrative feature in China. The majority of farmers in China are small-scale. There are no specific measures for small and marginal farmers, but the group policy at village or cooperative level, mentioned above, is an important measure to allow small farmers to access insurance.

Voluntary versus compulsory insurance

Under Chinese regulations, insurance is voluntary for both crops and livestock. However, heavy subsidy levels and collective decisions by farmer groups encourage participation. In one case, farmers not participating (by not paying their share of premium) were automatically enrolled for insurance for the portion of premium related to the subsidy.

Agricultural reinsurance

Reinsurance (quota share and stop loss) is provided by the national reinsurer, China Re. In addition, private and international reinsurers provide layers of stop loss cover for specific lines of crops or livestock. Provincial governments may also act as reinsurer or co-reinsurer of last resort for specific programmes in the event that reinsurance limits are exceeded. Such agreements are case-by-case.

2. Public support for agricultural insurance

Types of public support for agricultural insurance

At present there is no specific agricultural insurance legislation, although the government is understood to be intending to introduce legislation in the future. Most new provincial agricultural insurers are set up with some financial assistance from the government. The most important financial contribution of the government is the premium subsidy (see below).

There are no subsidies to the insurer for administrative costs or loss adjustment costs. However, in the case of livestock losses, government officials may be involved in loss adjustment, and such costs are borne by provincial governments. There are also no subsidies for training and education. CIRC (the regulatory authority for insurance) is providing some research and development assistance to insurers, apart from other services to support insurance activities and regulation. Provincial and local governments are working with insurance companies to implement agricultural insurance.

As noted above, under the pool co-insurance programmes operating in several states, the provincial governments are participating in the reinsurance programmes as a catastrophe stop loss reinsurer. This reinsurance protection is provided free of cost. All premium taxes for agricultural products are exempted.

Premium subsidies

During the development of pilot crop and livestock insurance, subsidies have ranged from 20 percent to 100 percent, depending on the province, but typically were in the region of 50 percent. The premium subsidy for crops in 2007 was 25 percent provided by central government, plus 25 percent paid by provincial government, and the remaining 50 percent of crop premiums were payable by farmers. Central government increased its share to a 35 percent subsidy in 2008, thereby increasing the overall premium subsidy level to 60 percent for crops.[33]

The premium subsidy for sow insurance in 2007 was 50 percent from central government and 25 percent from provincial government. In 2008 this increased to 50 percent central government and 30 percent provincial government, i.e. 80 percent subsidy in total. For dairy cow insurance, the combined subsidy is 60 percent. The proportions between the central and provincial governments may vary. Local county governments, or contract farming operations, may additionally add to subsidies on a case-by-case basis.

The updated to 2010 premium subsidy levels for crops and livestock are presented in Table 3. For crops, the maximum premium subsidy level is 65 percent, forestry has been added to the list of eligible products with 55 percent subsidy, the subsidy level for dairy cattle is 65 percent and for reproductive sows a very high 80 percent and finally premium subsidies have been added for yaks and Tibetan sheep (65 percent).

Public cost of agricultural insurance

The cost of premium subsidies in 2007 was estimated at CNY 1 billion (US$132 million) for crop insurance, and CNY 1.15 billion (US$151 million) for livestock insurance or 42 percent of total premium. The cost of premium subsidies in 2008 is estimated by CAAS (2010) at US$900 million or 56 percent of total premium, but the allocation to crops and livestock is not known. Finally, data are not available for the actual premium subsidy levels in 2009, but the author estimates these to be in the order of US$1 175 million (60 percent of total premium).

Indirect costs incurred by provincial governments are also not available, including information on provincial government catastrophe reinsurance payments.

3. Agricultural insurance penetration

Insurance penetration rate

Agricultural insurance has expanded rapidly since 2005, based on developments in specific provinces. The following summarizes the penetration:

For crops, in 2007 an estimated 50 million policy holders were insured on 15.33 million hectares. This compares to a national cropping area of 153.6 million hectares, or a penetration of

[33] Swiss Re, 2008.

approximately 10 percent of the area. The insured area increased to this figure from 3.73 million hectares in 2005 and 9.66 million hectares in 2006. A substantial expansion was expected in 2008. Additional crops to be insured in 2008 were peanuts and rapeseed.

For livestock, in 2007 a total of 51.5 million breeding sows were insured, which represents approximately 80 percent of all sows in China. An additional 5.2 million of livestock of other types as well as 325 000 poultry were insured.

It is not possible to report crop and livestock insurance coverage levels or penetration rates for the period 2008 to 2010. Some limited information is available on the total number of insured farmers (policy sales), which is shown in Figure 2. This indicates that in 2009 a total of 133 million policies were issued to Chinese farmers (or about 13 percent of all farmers).

4. Financial performance

Five-year results

Insurance underwriting results of the whole market comprising ten insurance companies operating in 16 provinces for the years 2003 to 2007 are presented below.

Table 2: Whole market agricultural insurance results, 2003 to 2007

Year	Premium (US$ million)	Paid claims (US$ million)	Loss ratio
2003	58	40	69%
2004	48	51	106%
2005	91	70	77%
2006	106	73	69%
2007	682	302	44%
Average	197	107	55%

Source: World Bank Survey, 2008

Cost of agricultural insurance provision

No information is available on the costs of administering agricultural insurance programmes by company. In general terms, for agricultural insurance, the overall costs of acquisition, administration, and loss adjustment are 20 percent to 30 percent of gross premium. There is no premium tax for agricultural insurance in China.

5. Public disaster assistance programmes

Government intervenes extensively to support agriculture in China through policy reforms and subsidies. With respect to agricultural insurance specifically, the most important inputs are premium subsidies, followed by support from government technical agencies (e.g. in loss assessment) and through government reinsurance as a last resort.

Natural disasters may be compensated on a case-by-case basis. For example, the February 2008 snowstorm destroyed 9.4 million ha of crops and 15.8 million head/birds of livestock and poultry, including 73 000 pigs. The insured paid loss was only CNY 77.4 million (US$10.8 million) and mainly for the insured breeding sows. The government announced input subsidies for seeds, seedlings, breeders, CNY 1 500 (US$208) for each farmhouse destroyed, and CNY 3 000 (US$417) per affected family. As noted, the government compensates for compulsory slaughter of livestock as a result of diseases.

Each year, about 40 million ha of crops are destroyed by insect pests, diseases, hail, typhoons, floods, drought, and other perils, with losses amounting to US$12.5 billion (CNY 100 billion) annually. In 2004 alone, China experienced five rounds of severe flooding, seven typhoons, and four earthquakes, with economic losses amounting to US$6.3 billion (CNY 50 billion).

There has been an increasing trend of agricultural damage as a percentage of total crop value.[34] Annual public agriculture subsidies amount to about US$8.6 billion and a part of these funds is being channelled to agricultural insurance premium subsidies. Furthermore, information on government support to agricultural is contained in Box 1.

Box 1: Government measures to support agriculture

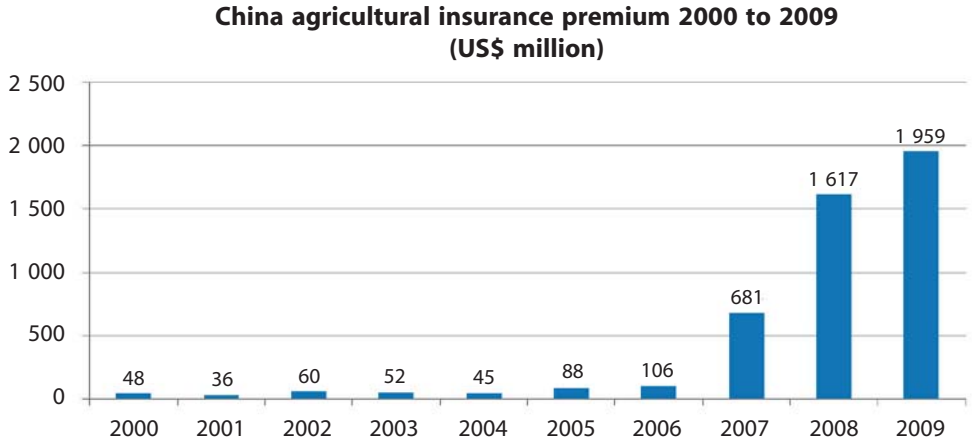
In addition to the plan to eliminate agricultural taxes, in 2004 the central government announced direct subsidies to farmers for grain production. Direct agricultural subsidies from the centre are provided primarily to grain farmers, based on the number of acres planted. In Heilongjiang and Shanghai, farmers are given subsidies through Bank of China branches. In Shanghai, farmers can receive a debit card to obtain their subsidy. In the first year of this subsidy programme, the Ministry of Finance (MOF) allocated CNY 11.6 billion (US$1.5 billion) in direct grain subsidies, with the majority of this subsidy, CNY 10.3 billion (US$1.3 billion), going to 13 major grain-producing provinces (Jilin, Liaoning, Hebei, Henan, Shandong, Jiangsu, Anhui, Hunan, Hubei, Sichuan, Jiangxi, and Inner Mongolia Autonomous Region). The net increase in income per family is estimated to be approximately CNY 75 (US$9.4). Central government subsidies are often supplemented with provincial funds, resulting in different levels of subsidies across provinces. In Heilongjiang, improved soybean- and corn-seed subsidies were CNY 10 per mu, and CNY 15 per mu for rice. The total subsidy per household was approximately CNY 55. In 2006, MOF increased the subsidy by allocating CNY 14.2 billion (US$1.8 billion) in direct grain subsidies to 30 provinces and autonomous regions. Other agricultural subsidies include support for seeds and machinery.

Source: World Bank, 2007

[34] World Bank, 2007.

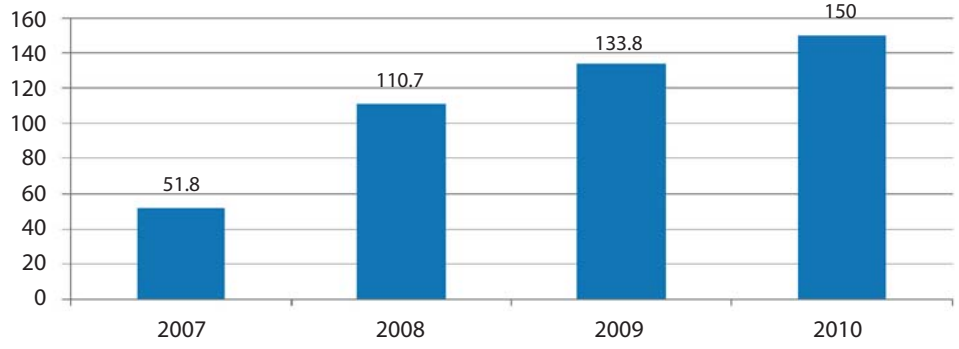
6. Additional tables

Figure 1: China growth in agricultural insurance premiums 2000 to 2009 (US$ million)



Source: Wang and Dick, 2010

Figure 2: China agricultural insurance policy sales (million)



Source: PICC, 2010

Table 3: China – Government premium subsidy levels 2007 to 2010

Year	Sector	Details	Central Government	Local (Provincial) Government	Total subsidies	Number of Provinces	Areas
2007	Crops	Maize, rice, wheat, soya, cotton	25%	25%	50%	6	Inner Mongolia, Jilin, Jiangsu, Hunan, Xinjiang, Sichuan
	Livestock	Reproductive Sows	50%	25%	75%	22	Hebei, Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan, Hainan, Inner Mongolia, Guagxi, Chongquing, Sichuan, Yunnan, Guizhou, Tibet, Shanxi, Gansu, Qinhai, Ningxia, Xinjiang
2008	Crops	Maize, rice, wheat, soya, cotton, peanut, rapeseed	35%	25%	60%		
	Livestock	Reproductive Sows	50%	30%	80%	22	Same provinces as 2007
	Livestock	Dairy Cows	30%	30%	60%	22	
2009	Crops	Maize, rice, wheat, soya, cotton, peanut, rapeseed	40%	25%	65%	12	Inner Mongolia, Jilin, Jiangsu, Hunan, Xinjiang, Heilongjiang, Anhui, Henan, Hubei, Hainan, Jiangxi
	Crops	Maize, rice, wheat, soya, cotton, peanut, rapeseed	35%	25%	60%	5	Liaoning, Jiangsu, Zhejiang, Fujian, Shandong
	Forestry	Commercial and public forestry	30%	25%	55%	3	Jiangxi, Hunan, Fujian
	Livestock	Reproductive Sows	50%	30%	80%	22	Same provinces as 2007
	Livestock	Dairy Cows	30%	30%	60%	22	
2010	Crops	Maize, rice, wheat, soya, cotton, peanut, rapeseed	40%	25%	65%	17	Inner Mongolia, Jilin, Hunan, Xinjiang, Xichuan, Hebei, Heilongjiang, Anhui, Henan, Hubei, Hainan, Jiangxi, Yunnan, Shanxi, Gansu, Ginhai, Ningxia
	Crops	Maize, rice, wheat, soya, cotton, peanut, rapeseed	35%	25%	60%	6	Liaoning, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong
	Crops	Potato	40%	25%	65%	2	Sichuan, Inner Mongolia
	Crops	Barley	40%	25%	65%	5	Sichuan, Qinhai, Yunnan, Gansu, Tibet
	Forestry	Commercial and public forestry	30%	25%	55%	6	Jiangxi, Hunan, Fujian, Zhejiang, Liaoning, Yunnan
	Livestock	Reproductive Sows	50%	30%	80%	22	Same provinces as 2007
	Livestock	Dairy Cows	30%	30%	60%	22	
	Livestock	Yak and Tibetan sheep	40%	25%	65%	5	Sichuan, Qinhai, Yunnan, Gansu, Tibet

Source: PCIC, 2010

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Overview of agricultural insurance: India[35]

1. Agricultural insurance market review

History of agricultural insurance

Crop insurance began in 1972 on a pilot basis. India has implemented subsidized public-sector area-yield index multiple peril crop insurance (MPCI) since 1979. In 1985 the Comprehensive Crop Insurance Scheme (CCIS) was introduced in sixteen states and two union territories by the General Insurance Corporation of India (GIC). The CCIS was provided only to recipients of crop credit (loanees) on a compulsory basis. The CCIS was replaced by the National Agricultural Insurance Scheme (NAIS) in the *rabi* season 1999/2000. The NAIS was closely modelled on the CCIS area-based approach. The objectives of this subsidized national crop insurance scheme are threefold: (a) to provide a measure of financial support to farmers in the event of crop failure as a result of an insured peril; (b) to restore the credit eligibility of the farmer after a crop failure for the next season; and (c) to support and stimulate the production of cereals, pulses, and oilseeds.

Livestock insurance was introduced in the late 1960s but assumed importance only after the general insurance industry was nationalized in 1972.

Agricultural insurance market structure

The entire insurance business in India was nationalized in 1972 under the General Insurance Business (Nationalization) Act. In 1972 the Government of India created the GIC, a national insurer, to supervise, control and provide general insurance business.

Between 1985 and 2002 the CCIS and then the NAIS was insured by the GIC. In 2000 GIC was restructured as a national reinsurance company providing direct reinsurance to the general insurance companies in the Indian market, and in 2001 the insurance sector was opened up to private insurance companies.

In 2002 the Agriculture Insurance Company of India Limited (AIC), a specialist public sector crop insurance company, was formed by the government, and responsibility for implementation of the NAIS area yield index scheme was transferred from GIC to AIC. Since 2001 two private insurers, ICICI Lombard and IFFCO-Tokyo, have invested in crop weather index insurance for poor resource farmers. In addition, there are six public insurance companies providing livestock insurance to Indian livestock producers.

[35] Source of country overview information: World Bank Survey 2008 and FAO Survey 2010.

Agricultural insurance products available

AIC is the largest and sole public sector crop insurer in India. Traditionally, AIC has only insured a single product, an area-yield index MPCI insurance policy under the NAIS. This scheme is heavily subsidized by federal and state governments. The area-yield index policy insures a wide range of food crops, oilseeds, horticultural, and commercial crops. The policy insures against yield loss resulting from non-preventable risks including: (a) natural fires and lightning; (b) storms, hailstorms, cyclones, typhoons, tempests, hurricanes, tornados, etc.; (c) floods, inundation and landslides; (d) droughts, dry spells; and (e) pests/diseases.

Since 2001/02 ICICI Lombard, a private commercial company in conjunction with BASIX, a local NGO, has underwritten a portfolio of crop weather index insurance products for small and marginal Indian farmers. IFFCO-Tokyo has also started marketing crop weather index insurance for a number of years. Prior to 2007/08 these private sector crop insurance initiatives did not attract a government premium subsidy.

Since 2004/05 AIC has conducted major research and development into crop weather index insurance and applications of remote sensing insurance to agriculture, and beginning in the 2006/07 season, AIC's weather index programme has attracted government premium subsidies.

The public sector livestock insurance companies are offering livestock accident and mortality cover. Some aquaculture insurance is also available through the public sector insurers.

Table 1: Agricultural insurance available 2008

Crop insurance products available				**Greenhouse**	**Forestry**
MPCI	Named-peril	Crop revenue	Index-based		
No	Yes	No	Yes, area yield and weather index	No	No
Livestock insurance products available					**Aquaculture**
All risk	Accident and mortality	Epidemic disease	Other	Index-based	
No	Yes	No	No	No	Yes

Source: World Bank Survey, 2008

Delivery channels

The NAIS crop insurance programme is marketed exclusively by the banks on behalf of AIC in each state. In 2006/07 the NAIS insured almost 20 million Indian farmers including owner occupiers, sharecroppers, and tenant farmers. AIC's crop weather index insurance programme is also marketed through the state banks. Crop weather index insurance is marketed by private commercial insurers through their own agents, local Microfinance Institutions (MFI), and producer associations. Livestock insurance is predominantly sold by the public insurers' own sales agents, followed in order of importance by the banks, MFIs, and producer associations.

Since 2006 the insurance regulator has licensed microinsurance agents (MFIs, NGOs and self-help groups) to market microinsurance products (all rural insurances including crop and livestock insurance) to farmers.

Voluntary versus compulsory insurance

Public sector crop insurance through AIC is compulsory for all farmers who access seasonal crop production credit from the lending institutions (e.g. loanee farmers). However, AIC crop insurance is voluntary for non-loanee farmers. Private-sector crop weather index insurance offered by the commercial insurance companies is purely voluntary. Livestock insurance in India is voluntary.

Agricultural reinsurance

Since inception in 1985 the CCIS and its successor, the NAIS, have been reinsured by government under a 50:50 excess of loss agreement by the federal government and participating state governments and union territories. For food crops and oilseeds any losses incurred by AIC in excess of a 100 percent loss ratio are reinsured by government, and for commercial and horticultural crops losses in excess of a 150 percent loss ratio are reinsured by the government. GIC, the national reinsurance company, does *not* reinsure the NAIS.

AIC's crop weather index programme is reinsured on a proportional (quota share) treaty basis partly by GIC under a programme of compulsory cessions, and partly by international reinsurers. Similarly, the private company crop weather index insurance programmes are reinsured on a proportional (quota share) basis both by GIC (compulsory cessions) and by international reinsurers. Where these weather index programmes are actuarially rated, access to reinsurance capacity has not been a major constraint.

Currently in India, access to commercial reinsurance is considered a moderate constraint for livestock mortality insurance and for weather index insurance. Lack of reinsurance is considered to be a major constraint for livestock epidemic disease insurance, and this cover is not currently available in India. AIC noted that in the future if the NAIS is turned into a more market-oriented scheme and is actuarially rated and reinsured by the private commercial sector, reinsurance may be a major constraint given the enormous size of this national scheme.

2. Public support for agricultural insurance

Types of public support for agricultural insurance

The NAIS scheme represents a public sector undertaking that has both social and economic objectives, namely to provide India's predominantly small and marginal farmers with access to seasonal production credit at affordable premium rates. Government financial support to the NAIS is shared on a 50:50 basis by the federal government and the state and union territory governments and includes:

- **Affordable premium rates** that are capped at well below the actuarially required rates for food crops and oilseeds. The rates charged for commercial and horticultural crops are closer to the actuarially determined rates (see Table 2).

- **Subsidies on agricultural insurance premiums** paid by small and marginal farmers (defined as farmers with less than 2 ha of land and less than 1 ha of land, respectively). Under NAIS the premium subsidy level was originally set at 50 percent, and this has been reduced in subsequent years to 30 percent in 2003/04, 20 percent in 2004/05, and 10 percent thereafter up to 2007. Reference to Table 3 shows that in 2006/07 premium subsidies paid to small and marginal farmers amounted to nearly US$7 million or 5 percent of total premium income.

- **Subsidies on AIC's A&O expenses**. AIC pays a fee of 2.5 percent premium to the state-level banks for their services in marketing and administering the NAIS policy on behalf of the insurer. AIC in turn receives a subsidy on its own A&O expenses, which in 2003/04 amounted to a reimbursement of 60 percent of the company's annual operating expenses, 40 percent of its expenses in 2004/05, and 20 percent of its operating expenses thereafter up to 2007. Table 3 shows that over the past five years the A&O subsidy has averaged about 3.3 percent of AIC's total premium income from the NAIS.

- **Free loss assessment**. The state governments are responsible for conducting seasonal in-field sample Crop-Cutting Experiments (CCE) that are used to determine the average yield for each crop in each block or village *panchayat* as part of the national system of recording crop production and yields. The NAIS uses the CCE results to indemnify area-yield losses at the block or village *panchayat* level (termed the insured unit). In 2006 about 700 000 CCEs were conducted at an average cost of about Rs 300 per CCE or a total cost of Rs 210 million (about US$5.3 million). AIC receives the CCE results free of charge; but the downside is that the company may have to wait for more than six months after the crop season for the official CCE yield results to be published, and loss settlements may therefore be much delayed.

- **Excess of loss reinsurance by government on NAIS**. The government has incurred very high financial costs in settling excess claims, with an average cost of US$228 million over the past five years (equivalent to 71 percent of all claims) and a high in the 2002/03 season of US$335 million (82 percent of annual total claims). (See Figure 1 for structure of government stop loss reinsurance programme).

- **Premium subsidies on crop weather insurance since 2006/07**. In 2006/07 the government authorized the payment of premium subsidies on AIC's crop weather index portfolio. In 2007/08 government premium subsidies amounted to Rs 1 billion (US$25 million). In 2007/08 various state governments have also approved the payment of premium subsidies to private insurance companies offering crop weather index insurance.

Public-sector livestock insurance has attracted 50 percent premium subsidies since 2007. The excess losses (over and above collected premiums) paid by the public sector insurers amounted to Rs 242.1 million in 2005/06 and Rs 251 million in 2006/07 (about US$6 million in both years).

3. Agricultural insurance penetration

Insurance penetration rate

The NAIS is the world's largest crop insurance programme, and in 2006/07 sold a total of 20 million policies, equivalent to about 15 percent of all Indian farmers. The insured area has been very stable over the past five years at about 192 million ha or 14 percent of total gross cropped area (Table 4).

Figures for livestock insurance show that in 2003/04 a total of 6.7 million head of cattle (2.5 percent of the national herd) were insured, and in 2004/05 this figure rose to 7.9 million cattle or 3 percent of the total (Table 5).

In 2007/08, crop weather insurance was purchased by a total of 627 000 farmers on 984 000 ha, which is a remarkable achievement for a programme that has only been implemented on a commercial basis for about four years (Table 7).

4. Financial performance

Five-year results

AIC's five-year crop insurance results for NAIC are reported in Table 6. Over the past five years the programme has expanded from 12.9 million policies in 2002/03 with TSI of US$2.3 billion and premium of US$72.5 million to 20 million policies (55 percent increase) in 2006/07, TSI of 4.0 billion (89 percent increase) and premium of 132 million (72 percent increase). After 23 years of operation, the NAIS is a very large smallholder crop insurance programme.

Over the past five years the average rate has been 3.1 percent against a long-term average loss cost of 9.7 percent and a corresponding five-year loss ratio of 314 percent, which indicates that the programme has been very under-rated. As noted previously, a central objective of the government is to provide as many Indian farmers as possible with access to crop insurance at affordable rates, and government policy has therefore been to cap rates at well below the commercial rates of about 12.5 percent to 15 percent they would need to levy in order to cover expected claims and acquisition and administration costs.

The very small average size of a policy is shown in Table 6 with average sum insured per policy (per farmer) of US$200 and average premium per policy of US$6.2. With such a low premium volume per policy it would not be feasible for AIC to offer individual farmer MPCI insurance; thusan area-yield index approach is the only viable option.

The AIC 2007/08 crop weather index results are reported in Table 7 and show TSI of 412 million with premiums of US$33 million at an average rate of 8.0 percent. Crop weather insurance in India is priced at the full and actuarially determined commercial premium rate required to attract support from international reinsurers. The loss ratio in 2007/08 was 73 percent.

The six-year results (2003/04 to 2008/09) for the ICIC-BASIX private commercial crop weather index programme are reported in Table 10 and show a long-term loss ratio of 56 percent, indicating the programme is profitable although relatively small in terms of coverage and premium generated. The CWII results for other private Indian insurers including IFFCO-Tokyo (ITGI) are contained in IFAD and WFP (2010).

The public/private sector livestock insurance results are reported in Table 11 for the eight-year period 1997/98 to 2004/05 and show a long term loss ratio of 79 percent. GOI (2007) notes that inclusion of scheme administrative and operating (A&O) costs including commission payments (about 15 percent of premiums), management expenses (10 percent of premiums) and other administrative costs (10 percent) the combined ratio would be in the order of about 120 percent for the livestock programme, or in other words it is not profitable over time.

Cost of agricultural insurance provision

AIC is heavily subsidized by federal and state governments. The banks are responsible for marketing and administering the NAIS scheme on behalf of AIC, and their charges amount to 5 percent of premium. AIC's own A&O costs amount to a further 2 percent of premium. AIC does not pay for loss assessment, namely the results of the CCEs on which basis area-yields are determined and losses are settled. As such, the company operates at a very low overall cost structure of only 7 percent of premium (Table 8).

5. Public disaster assistance programmes

The Indian government provides a wide range of additional support to agriculture including:

a. Input subsidies on the price of fertilizers, irrigation, power, credit, etc.;
b. output subsidies including minimum support prices for key commodities; and
c. disaster relief.

Details of the national disaster relief programmes are contained in Table 9.

6. Additional tables

Table 2: NAIS premium rates

Season	Crops	Premium rate
kharif	Bajra and oilseeds	3.5% of sum insured or actuarial rate, whichever is less
	Other crops (cereals, other millets, and pulses)	2.5% of sum insured or actuarial rate, whichever is less
rabi	Wheat	1.5% of sum insured or actuarial rate, whichever is less
	Other crops (other cereals, millets, pulses, and oilseeds)	2.0% of sum insured or actuarial rate, whichever is less
kharif and rabi	Annual commercial and horticultural crops	Actuarial rates

Source: World Bank Survey, 2008

Table 3: NAIC/AICI subsidies and government reinsurance, FY2003 to FY2007

Year	Premium subsidies (US$ million)	Percent of premium	A&O expense subsidies (US$ million)	Percent of premium	LAE subsidies	Re-insurance premium subsidies	Claims paid by govern-ment (US$ million)	Percent of claims
FY2003	9.9	14%	2.8	3.8%	yes	no	335.5	82%
FY2004	6.1	9%	2.6	3.8%	yes	no	202.7	82%
FY2005	4.9	4%	3.3	2.9%	yes	no	175.6	68%
FY2006	5.5	4%	4.0	3.2%	yes	no	214.2	67%
FY2007	7.0	5%	3.8	2.9%	yes	no	213.1	55%
Average	6.7	7%	3.3	3.3%	n.a.	n.a.	228.2	71%

Source: World Bank Survey, 2008

Table 4: Estimated NAIS/AIC crop insurance penetration, FY2004 to FY2008

Year	Number of policies	Percent of farmers insured*	Insured area (million of ha)	Percentage of national crop area insured**
FY2003	12.9 million	10%	18.4	10%
FY2004	16.2 million	12%	29.6	16%
FY2005	16.6 million	12%	27.7	14%
FY2006	17.9 million	13%	27.3	14%
FY2007	20.0 million	15%	30.0	16%
Average	16.7 million	13%	26.6	14%

Source: World Bank Survey, 2008

* Calculated on the basis of AIC estimates of 130 million farming families in 2007 (assumed constant in previous five years).

** Calculated on the basis of MOA/GOI gross cultivated area for FY2003 to FY2005 (area for FY2006 and FY2007 not available and assumed at 2005/06 level).

Table 5: Estimated livestock insurance penetration, 2003 to 2004

Year	Number of insured cattle	Percent of national cattle herd insured
2003	6.7 million	2.5%
2004	7.9 million	3.0%
2005	–	–
2006	–	–
2007	–	–
Average	–	–

Source: World Bank Survey, 2008

Note: Data for swine, sheep, goats and poultry were not available.

Table 6: NAIS/AIC crop insurance results, FY2003 to FY2007

Year	Number of policies (million)	TSI (US$ million)	Premium (US$ million)	Paid Claims (US$ million)	Loss ratio (%)	Loss cost (%)	Average sum insured (US$)	Average premium (US$)	Average premium rate (%)
FY2003	12.9	2 302.3	72.5	410.8	566	17.8	178	5.6	3.1
FY2004	16.2	2 403.6	69.3	245.7	354	10.2	148	4.3	2.9
FY2005	16.6	3 680.3	116.2	259.8	224	7.1	222	7.0	3.2
FY2006	17.9	4 263.5	126.8	320.4	253	7.5	238	7.1	3.0
FY2007	20.0	4 030.1	132.2	384.8	291	9.5	202	6.6	3.3
Average	16.7	3 336.0	103.4	324.3	314	9.7	200	6.2	3.1

Source: World Bank Survey, 2008

Table 7: AIC crop weather insurance results, FY2007

Number of policies	Insured area (ha)	TSI (US$ million)	Premium (US$ million)	Paid Claims (US$ million)	Loss ratio	Loss cost	Average premium rate
627 000	984 000	412.4	33.1	24.1	73%	5.8%	8.0%

Source: World Bank Survey, 2008

Table 8: AICI costs as a percent of OGP for crop insurance

Costs	Percent of OGP
Marketing and acquisition	5
Administration	2
Loss adjustment	–
Total	7

Source: World Bank Survey, 2008

Note: Insurance premium taxes were negligible and were therefore not included.

Table 9: Government disaster relief programmes

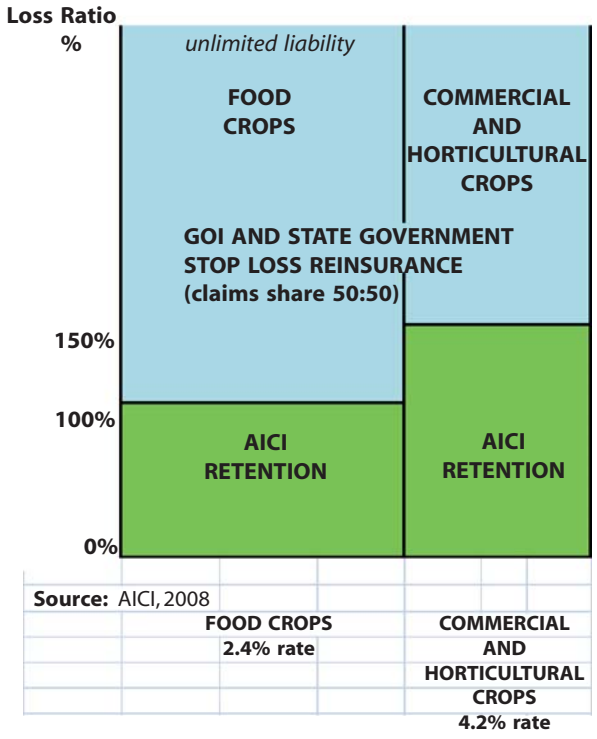
Name of programme/fund	Calamity Relief Fund (CRF) and National Calamity Contingency Fund (NCCF)
Organizations responsible for funding	Federal government (CRF and NCCF) and provincial government (CRF)
Organizations responsible for implementation	Mainly provincial governments
Perils/events covered by disaster relief fund	Cyclone, drought, earthquake, fire, flood, tsunami, hailstorm, landslide, avalanche, cloud burst, and pest attack
Criteria for declaring a disaster to receive compensation	Largely scientific
Eligibility for disaster relief dependent on agricultural experience	Not linked

Table 9: *(continued)*

Disaster relief paid by the government to producers (US million)	
2003	782.0
2004	824.0
2005	1 521.7
2006	1 340.0
2007	–

Source: World Bank Survey, 2008

Figure 1: India government stop loss reinsurance structure for NAIS



Source: AICI, 2008

Table 10: Results of ICICI Lombard BASIX crop weather index insurance programmes

Year	States covered	Weather stations	No. insured	Premium (Rs)	Claims (Rs)	Loss ratio
2003/04	1	1	230	88 685	41 860	47%
2004/05	1	5	402	824 681	471 485	57%
2005/06	6	36	6 689	1 703 098	950 000	56%
2006/07	7	50	11 716	1 430 171	2 063 160	144%
2007/08	7	45	4 545	1 539 175	298 922	19%
2008/09	8	40	10 604	2 098 638	470 671	22%
Total			**34 186**	**7 684 448**	**4 296 098**	**56%**

Source: IFAD and WFP, 2010

Table 11: India: Livestock insurance results 1997/98 to 2004/05

Year	Number of insured animals	Premium US$	Claims US$	Loss ratio
1997/98	6 300 000	36 565 405	20 420 039	56%
1998/99	7 900 000	35 785 508	29 679 232	83%
1999/00	9 800 000	31 528 486	26 272 972	83%
2000/01	8 900 000	30 990 456	29 116 206	94%
2001/02	9 100 000	27 683 220	22 140 369	80%
2002/03	6 300 000	25 029 510	22 963 978	92%
2003/04	6700 000	23 936 715	20 907 139	87%
2004/05	7 900 000	31 666 400	20 552 800	65%
2005/06	n.a.	n.a.	n.a.	n.a.
2006/07	n.a.	n.a.	n.a.	n.a.
2007/08	n.a.	n.a.	n.a.	n.a.
Total	62 900 000	243 185 700	192 052 735	79%
Average	7 862 500	30 398 213	24 006 592	

Source: GoI, 2007

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Overview of agricultural insurance: Indonesia[36]

1. Agricultural insurance market review

History of agricultural insurance

There is no tradition of agricultural crop and livestock insurance in Indonesia, although for several decades large forestry and plantation and pulp paper companies have purchased facultative forestry fire insurance fronted by local insurance companies and reinsured by a handful of UK and European specialist agricultural and forestry reinsurers.

Indonesia is very exposed to the ENSO-El Niño cycle and the acute droughts associated with the phenomenon, followed by excess rain and flooding. This coupled with concerns over climate change impacts on food production and security has led the Government of Indonesia in 2009/10 to introduce through the Ministry of Agriculture (MOA) two pilot agricultural insurance programmes in West and Central Java, one offering MPCI crop insurance and the other livestock mortality and theft cover.

Moreover, since 2009 the International Finance Corporation of the World Bank, in conjunction with the Australian Agency for International Development (AUSAID) has financed a feasibility study for the introduction of micro level (individual farmer) rainfall deficit insurance for maize farmers located in Negusa Tengara Barat (NTB) and East Lombok, East Java.

Flood weather index insurance has in fact been implemented in Indonesia since 2009, but not for agriculture. A flood index insurance scheme for small and marginal urban property owners in Jakarta was designed by GTZ in collaboration with Munich Re between 2006 and 2008 and is currently underwritten by the Asuransi Wahana TataInsurance Company. This scheme uses manual river-height gauge stations to trigger an indemnity. The product was launched in 2009 but has yet to achieve significant sales levels.

Agricultural insurance market structure

In 2005 there were over 150 registered life and non-life insurance companies in Indonesia with total market premium of about US$3.8 billion (1.4 percent of GDP). For life insurance the market penetration rate is 0.8 percent of GDP and lower for non-life insurance at 0.6 percent of GDP.

Currently there are no companies that are specialists in agricultural insurance. Under the MOA's pilot crop (and livestock) insurance schemes, it is understood that the business is placed by Daspindo a local insurance broker with a pool of ten co-insurers who are participating in the pilot scheme.

[36] This report for Indonesia draws on information collected from the Central Bank Indonesia during the July 2010 survey visit; IFC, 2010; Pasaribu, 2010, GTZ, 2009 and FAO Survey 2010.

Agricultural insurance products available

Forestry and plantation fire cover is available on a facultative basis for commercial standing timber (eucalyptus, pine, acacia etc.) and plantation crops (e.g. oil palm).

Under the 2009/10 MOA pilot initiatives, traditional indemnity based MPCI crop insurance cover is being offered to rice growers and an individual animal mortality and theft cover is being marketed to livestock raisers.

The maize weather index insurance (WII) cover, which has been the subject of a feasibility study, has not yet been pilot tested is a three (vegetative) phase rainfall deficit product.

Table 1: Agricultural insurance available 2010

Crop insurance products available				**Greenhouse**	**Forestry**
MPCI	Named-peril	Crop revenue	Index-based		
Yes (pilot)	No	No	Yes (R&D phase)	No	Yes (limited facultative basis)
Livestock insurance products available					**Aquaculture**
All risk	Accident and mortality	Epidemic disease	Other	Index-based	
No	Yes (including theft)	No	No	No	No

Source: FAO Survey 2010

Delivery channels

The main proposed delivery channels are through the commercial banks and rural banks.

Voluntary versus compulsory insurance

It is understood that the MOA pilot crop and livestock insurance programmes are to be linked to credit.

Agricultural reinsurance

It is not known if the MOA pilot crop and livestock programmes are reinsured. Currently these programmes are very small.

2. Public support for agricultural insurance

Types of public support for agricultural insurance

Premium subsidies

Under the 2009/10 MOA pilot crop and livestock insurance schemes, the government has financed 100 percent of the premiums.

For the longer term, it is understood that the government is exploring three different models for agricultural insurance, namely: 1) fully government financed premium subsidies; 2) commercial insurance designed to link input suppliers and agribusiness with insurance companies; and 3) crop-credit linked insurance where farmers would be required to purchase insurance in order to access credit.

Public cost of agricultural insurance

Figures are not available on the public cost of the pilot MOA crop and livestock insurance schemes.

3. Agricultural insurance penetration

Insurance penetration rate

In 2009/10 the pilot MOA crop and livestock programmes have been implemented on a very small scale in West and Central Java. The crop MPCI scheme covers 600 farmers with an insured area of 100 ha and the livestock scheme has 135 insured animals belonging to 135 farmers.

4. Financial performance

Cost of agricultural insurance provision

The MOA pilot crop MPCI scheme carries a fixed 3.75 percent premium rate that has not been set on an actuarially calculated basis – rather it has been set according to the average premium rates on the Indian area-yield index scheme. The MOA livestock pilot carries a fixed 3.5 percent premium rate. No further information is available on 2009/10 premiums for the pilot programmes.

The total estimated premium volume in 2009 including forestry insurance is about US$1 million.

5. Public disaster assistance programmes

Details of any public sector disaster schemes are not available.

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Overview of agricultural insurance: Japan[37]

1. Agricultural insurance market review

History of agricultural insurance

In 1929 the Livestock Insurance Act was enacted as a modern disaster relief measure. The National Forest Insurance Law was enacted in 1937 in order to compensate forest owners for damage by fire, weather impacts (wind, water, snow, drought, frost, tidal waves), and volcanic eruptions. The Crop Insurance Act was established in 1938.

The Agricultural Cooperative Association Law was enacted in 1947. This law became the main pillar of the reorganization of agricultural organizations as a part of the democratization and modernization of farm villages in Japan. Under this law, the Agricultural Disaster Compensation Programme aims at providing stability to farm businesses by compensating losses that farmers may incur as a result of unexpected accidents. The Agricultural Disaster Compensation consolidates livestock insurance and crop insurance and provides relief to farmers whose crops or livestock have been damaged by weather events, diseases, and pests.

The Agricultural Insurance Scheme relies on the principle of solidarity among farmers. Each cooperative creates a fund where farmers contribute through premiums. The scheme now insures almost all major crops.

Agricultural insurance market structure 2008

The Agricultural Insurance Scheme is based on the principle of solidarity among farmers. It relies on a network of cooperatives at the local, regional, and national levels. Premium rates are set when the cooperatives/federations pay reinsurance premiums to the government. Management fees of cooperatives and federations for operating the scheme are included in the national budget every year. There are currently about 300 cooperatives nationwide.

Agricultural insurance products available

The insurance products available under the Japanese agriculture insurance scheme are specified by law. The policy wording used for this market is an "all risk" policy. Listed below are the types of agricultural insurance products available in Japan:

- rice, wheat, barley insurance (nationwide programme)
- livestock insurance (nationwide programme)
- fruit production and fruit tree insurance (optional programme)
- field crop and sericulture insurance (optional programme)
- greenhouse insurance (optional programme).

[37] Source of country overview information: World Bank Survey 2008.

Forestry insurance covers against fire, weather perils such as wind, water, snow, drought, frost, tidal waves, and volcanic eruption.

Table 1: Agricultural insurance available 2008

Crop insurance products available				Greenhouse	Forestry
MPCI	Named-peril	Crop revenue	Index-based		
Yes	Yes	No	No	Yes	Yes
Livestock insurance products available					**Aquaculture**
All risk	Accident and mortality	Epidemic disease	Other	Index-based	
Yes	Yes	Yes	No	No	Yes

Source: World Bank Survey, 2008

Delivery channels

The only delivery channel of agriculture insurance in Japan is through about 300 cooperatives. There is no specialized delivery channel for small and marginal farmers. Almost all farmers in Japan are small farmers with an average of 1.9 cultivated ha each.

Voluntary versus compulsory insurance

The voluntary or compulsory nature of the Japanese agriculture insurance scheme depends on the type of insurance product and the farm size. Main agriculture products such as wheat, barley and rice are insured on a compulsory basis. However, farmers who do not meet some criteria (such as minimum insured area) are not eligible for the compulsory cover and can opt to purchase a policy on a voluntary basis. Other agricultural insurance products such as livestock insurance, fruit and fruit tree insurance, field crop insurance, and greenhouse insurance are voluntary.

Agricultural reinsurance

All of the agricultural insurance liability is reinsured by the Japanese government.

2. Public support for agricultural insurance

Types of public support for agricultural insurance

The Japanese government has a deep commitment to the development of agricultural insurance. The government provides approximately 50 percent premium subsidies. In addition, it acts as reinsurer of last resort for the whole agricultural insurance scheme.

Premium subsidies

According to estimates from the Management Improvement Bureau of the Ministry of Agriculture, Forestry, and Fisheries of Japan, for the period from 1990 to 2005 the government of Japan spent, on average, US$640 million every year to subsidize 50 percent of the cost of agricultural mutual relief premiums.

Public cost of agricultural insurance

(i) Agricultural mutual relief premiums subsidies	US$640 million on average per year
(ii) Grants to federations	US$44 million on average per year

As mentioned earlier, the government of Japan acts also as reinsurer of last resort for the whole agricultural insurance scheme. The average loss ratio for the government reinsuring the agricultural insurance scheme for the period 2003 to 2005 was 125 percent.

3. Agricultural insurance penetration

Insurance penetration rate

In 2007 about 2.1 million policies were issued, and the insured area reached 2.0 million ha, representing about 44.0 percent of total primary crop harvested area and as high as 90 percent of the total cereal only area (Table 2). Given the fact that the scheme is compulsory for rice and wheat growers it may be that the estimates based on cereal area only provide a better representation of the penetration rates for crops insurance. The number of insured livestock in Japan in 2005 was 6.7 million heads. Forestry insurance is a big business in Japan with 394 000 ha insured and 31 000 policies issued.

4. Financial performance

Five-year results

The average loss ratio for the whole market was 94 percent for the period 1986 to 1995.

Cost of agricultural insurance provision

No data available.

5. Public disaster assistance programmes

Disaster Countermeasure Basic Act of 1951. The Disaster Countermeasure Basic Act is the basis of disaster management in Japan. Under this law the farmers affected by natural disasters are eligible for a variety of low interest loans with rather generous conditions in comparison with the normal ones. Affected farmers also are entitled to tax reductions or exemptions. In case the area where the farm is located is declared an "extreme severity disaster", farmers have access to additional special services.

6. Additional tables

Table 2: Estimated crop insurance penetration, 2003 to 2007

Year	No crop policies	Total primary crop area (ha)#	Cereals, total + (total)#	Insured area (ha)	Penetration rate all primary crops (%)	Penetration rate cereals only (%)
2003	2 410 174	4 129 381	1 985 665	1 775 478	43	89
2004	2 345 520	4 105 729	2 018 320	1 816 366	44	90
2005	2 266 041	4 088 553	2 020 400	1 821 071	45	90
2006	2 195 721	4 043 131	2 006 280	1 809 559	45	90
2007	2 064 464	4 026 547	1 983 589	1 761 200	44	89
Total	11 281 920	20 393 341	10 014 254	8 983 674	44	90

Source: # total primary crop area and cereal area FAOSTAT

Table 3: Crop and livestock insurance results, 2003 to 2005

Year	Number of policies (million)	TSI (US$ million)	Premium (US$ million)	Paid claims (US$ million)	Average sum insured (US$)	Average premium (US$)	Average rate	Loss ratio
Crops								
2003	2.4	11 776.8	420.2	805.7	89 114	3 180	3.6%	192%
2004	2.3	13 030.9	456.8	320.1	101 377	3 554	3.5%	70%
2005	2.2	11 821.0	398.2	24.5	–	–	3.4%	–
Livestock								
2003	5.9	11 006.7	547.0	524.3	1 861	92	5.0%	96%
2004	6.6	12 938.1	604.2	586.6	1 973	92	4.7%	97%
2005	6.7	12 827.2	596.9	570.6	1 921	89	4.7%	96%
Total								
2003	8.3	22 783.5	967.3	1 330.0	3 769	160	4.3%	138%
2004	9.2	25 969.0	1 061.0	906.7	3 883.8	159	4.1%	85%
2005	8.9	24 648.1	995.1	595.1	–	–	4.0%	–%

Source: World Bank Survey, 2008

Diagram 1: Organization of the Japanese agricultural scheme

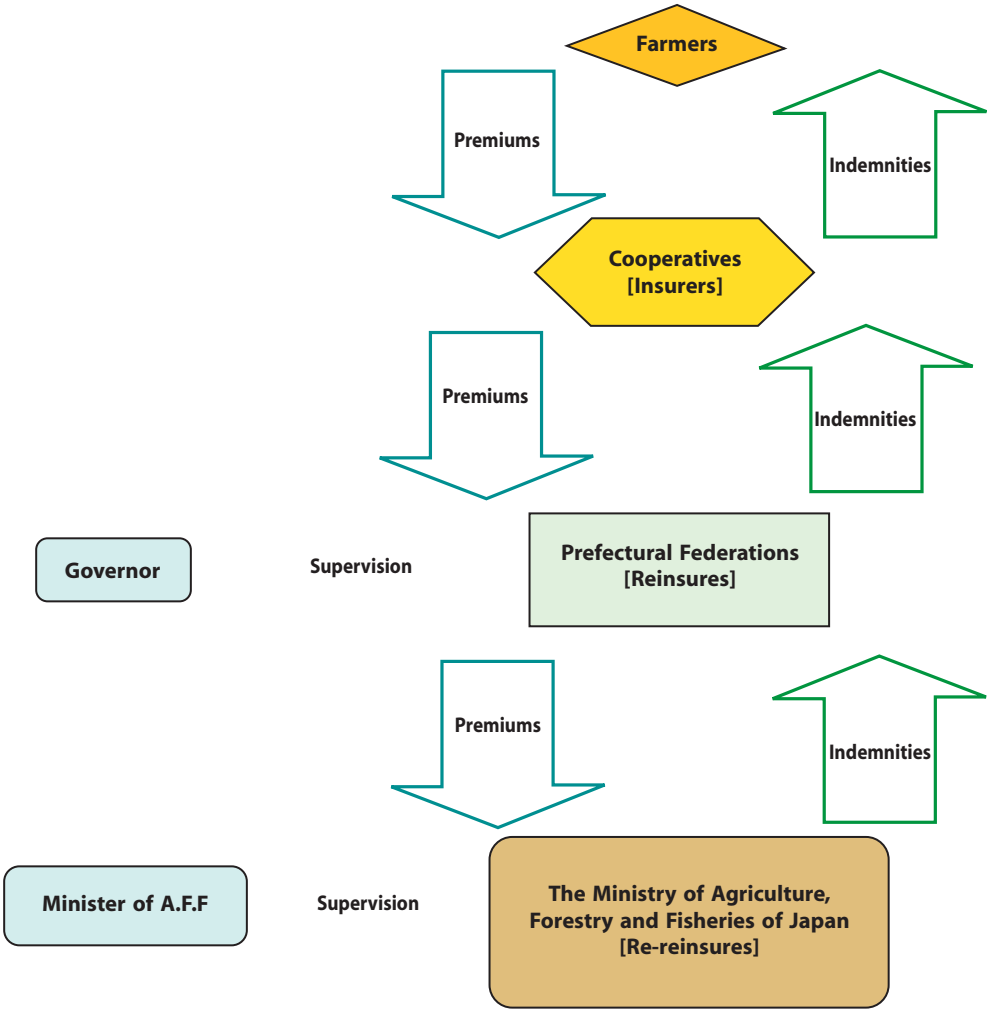
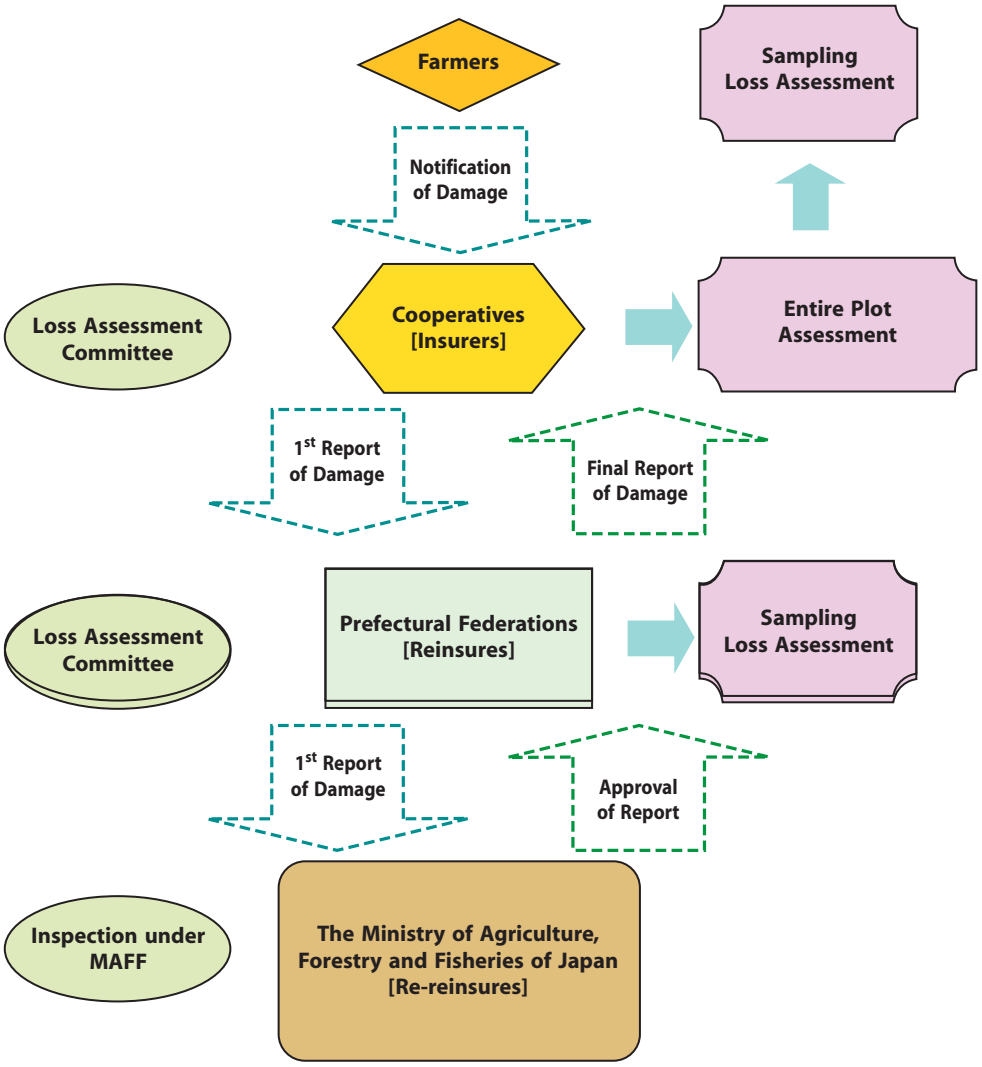


Diagram 2: Loss assessment process on the Japanese agricultural scheme



Source: World Bank Survey, 2008

Requirements for conclusion of insurance contracts of each insurance programme

Compulsory or voluntary	Insurance programme, etc.		Requirements for conclusion of insurance contract	Founding regulation
Compulsory subscription system insurance	Rice, wheat and barley insurance	Farmers, etc., eligible for *ipso facto* subscription	Farmers within the scope of 20 to 40 acres of paddy rice or 10 to 30 acres of upland rice, wheat or barley (in the case of Hokkaido, 30 to 100 acres of paddy rice or upland rice or 40 to 100 acres of wheat or barley) and meeting or exceeding the criterion stipulated by the prefectural governor shall have concluded an insurance contract because of the fact of the act of crop cultivation.	Article 104 of the Agricultural Disaster Law
		Farmers, etc., eligible for optional subscription	Farmers who do not satisfy the above criteria and whose total cultivated acreage of paddy rice, upland rice or wheat or barley meets or exceeds the criterion stipulated by the cooperative (not exceeding 10 acres) shall be able to conclude an insurance contract if the cooperative has not refused the farmer's application for subscription within 20 days of its filing.	Article 104–2 of the Agricultural Disaster Law
Voluntary Subscription System Insurance		Livestock insurance	A person engaged in the business of raising cattle, horses, or swine shall apply for subscription, and the insurance contract shall be concluded through a cooperative approving this application.	Article 111 of the Agricultural Disaster Law
		Fruit and fruit-tree insurance	Farmers within the scope of 5 to 30 acres of any of the items eligible for harvest insurance and tree insurance and meeting or exceeding the criterion stipulated by a cooperative shall apply for subscription, and the insurance contract shall be concluded through the cooperative approving this application.	Article 120–2 of the Agricultural Disaster Law
		Field crop insurance	Farmers within the scope of 5 to 30 acres (in the case of Hokkaido, 30 to 100 acres) of any of the items eligible and meeting or exceeding the criterion stipulated by a cooperative shall apply for subscription, and the insurance contract shall be concluded through the cooperative approving this application.	Article 120–12 of the Agricultural Disaster Law
		Greenhouse insurance	Farmers whose installation acreage of designated greenhouses owned or managed is within the scope of 2 to 5 acres and meeting or exceeding the criterion stipulated by a cooperative shall apply for subscription, and the insurance contract shall be concluded through the cooperative approving this application.	Article 120–19 of the Agricultural Disaster Law

Note: Based on information from the Ministry of Agriculture, Forestry and Fisheries.

Japan: updated agricultural insurance results 2003 to 2007

Crops

Year	No. of policies	Insured area (ha)	TSI US$	Mutual relief premiums US$	Paid claims US$	Average policy size US$	Average policy premium US$	Average rate	Loss ratio
2003	2 410 174	1 775 478	11 744 216 550	419 086 500	803 491 275	4 873	174	3.57%	192%
2004	2 345 520	1 816 366	12 959 177 410	454 298 460	318 323 220	5 525	194	3.51%	70%
2005	2 266 041	1 821 071	13 136 111 480	450 824 360	44 988 732	5 797	199	3.43%	10%
2006	2 195 721	1 809 559	12 603 892 600	452 798 060	201 485 817	5 740	206	3.59%	44%
2007	2 064 464	1 761 200	10 254 431 320	315 409 220	33 266 828	4 967	153	3.08%	11%
Total (2003 to 2007)				2 092 416 600	1 401 555 872				91%

Livestock

Year	No. of policies	No. of insured animals	TSI US$	Mutual relief premiums US$	Paid claims US$	Average policy size US$	Average policy premium US$	Average rate	Loss ratio
2003	5 912 000	5 912 000	10 976 216 950	545 505 500	522 826 900	1 857	92	4.97%	96%
2004	6 558 000	6 558 000	12 866 836 290	600 833 010	583 390 390	1 962	92	4.67%	97%
2005	6 678 000	6 678 000	12 904 932 900	600 534 520	574 081 160	1 932	90	4.65%	96%
2006	6 867 000	6 867 000	12 849 688 800	575 809 390	557 300 640	1 871	84	4.48%	97%
2007	6 763 000	6 763 000	12 015 131 520	527 808 120	514 913 560	1 777	78	4.39%	98%
Total (2003 to 2007)				2 850 490 540	2 752 512 650				96%

All lines

Year	No. of policies		TSI US$	Mutual relief premiums US$	Paid claims US$	Average policy size US$	Average policy premium US$	Average rate	Loss ratio
2003	8 322 174		22 720 433 500	964 592 000	1 326 318 175	2 730	116	4.25%	138%
2004	8 903 520		25 826 013 700	1 055 131 470	901 713 610	2 901	119	4.09%	85%
2005	8 944 041		26 041 044 380	1 051 358 880	619 069 892	2 912	118	4.04%	59%
2006	9 062 721		25 453 581 400	1 028 607 450	758 786 457	2 809	113	4.04%	74%
2007	8 827 464		22 269 562 840	843 217 340	548 180 388	2 523	96	3.79%	65%
Total (2003 to 2007)				4 942 907 140	4 154 068 522				94%

Source: Management Improvement Bureau, Ministry of Agriculture, Forestry and Fisheries, Japan

Japan: Updated premium subsidy levels

Crop

Year	Government	Farmers	Total	Government (%)	Farmer (%)
2003	213 567 950	205 510 200	419 078 150	51	49
2004	231 220 400	223 078 060	454 298 460	51	49
2005	229 954 121	221 241 451	451 195 572	51	49
2006	231 102 430	222 044 030	453 146 460	51	49
2007	159 982 676	155 427 356	315 410 032	51	49
Total (2003 to 2007)	1 065 827 577	1 027 301 097	2 093 128 674	51	49

Livestock

Year	Government	Farmers	Total	Government (%)	Farmer (%)
2003	263 609 500	281 896 000	545 505 500	48	52
2004	290 063 970	310 769 040	600 833 010	48	52
2005	290 085 960	310 448 560	600 534 520	48	52
2006	277 892 550	297 916 840	575 809 390	48	52
2007	254 829 960	272 978 160	527 808 120	48	52
Total (2003 to 2007)	1 376 481 940	1 474 008 600	2 850 490 540	48	52

Total premium subsidies

Year	Government	Farmers	Total	Government (%)	Farmer (%)
2003	477 177 450	487 406 200	964 583 650	49	51
2004	521 284 370	533 847 100	1 055 131 470	49	51
2005	520 040 081	531 690 011	1 051 730 092	49	51
2006	508 994 980	519 960 870	1 028 955 850	49	51
2007	414 812 636	428 405 516	843 218 152	49	51
Total (2003 to 2007)	2 442 309 517	2 501 309 697	4 943 619 214	49	51

Source: Management Improvement Bureau, Ministry of Agriculture, Forestry and Fisheries, Japan and FAO Survey 2010

Overview of agricultural insurance: Malaysia[38]

1. Agricultural insurance market review

History of agricultural insurance

Malaysia, unlike several of its neighbours, has never implemented a national agricultural crop or livestock insurance scheme.

Since the 1980s there has been some limited private commercial insurance of plantation export crops including rubber, oil palm, coconut, fruit and cocoa. These crops have been insured under a forestry/plantation fire policy with additional perils (FAO, 1986; FAO, 1991).

Crop insurance for cereals and other field crops has not been available to date in Malaysia although on several occasions in the past there have been attempts to introduce crop insurance. In 2002, the National Insurance Association of Malaysia (NIAM) was invited by the government to establish a national agricultural insurance programme. In 2004, NIAM with technical support from Partner Reinsurance Company, Zurich branch, designed proposals for a national paddy (rice) Multiple Peril Crop Insurance (MPCI) programme. Although the programme was well received by NIAM's members, the government and farmers, the programme was not implemented because of the high premium rates. NIAM notes that although the deferment was a disappointment, it was a blessing in disguise as the target sector was plagued with perennial flood and pest related losses.[39] In 2010 there were proposals to reconsider launching crop insurance through the Tani pool.

Until 2008 there was no formal livestock or poultry insurance in Malaysia. Malaysia suffered catastrophe (uninsured) losses in swine under the Nipah virus outbreak of 1998/99 – in the absence of any form of livestock insurance the government partially compensated their direct losses (see further discussion below). On 31 January 2008 the Bank Negara gave approval for the formation of a poultry and livestock insurance scheme. It was agreed to form a pool that would be managed by Malaysian Re. On 5 February 2008 the Standing Committee invited NIAM members to establish a new Tani Malaysia scheme geared toward commercial livestock and poultry farms. On 24 July 2008 nine insurance companies signed up to the Tani Malaysia Pool with capital of RMI 1 750 000 million.[40] Tani, has however, subsequently faced major delays in launching the livestock insurance scheme because the proposed livestock wordings were not well received by the test market and by treaty reinsurers. Although the wordings have been simplified to conform to those in other markets, to date the livestock insurance scheme has not been incepted. (NIAM, 2010).

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[38] Source of country overview information: Author and FAO Survey 2010.

[39] http://www.niam.org.my/tani.htm

[40] Extract from the address of the Chairperson Mr Sonny Tan Siew Hock, at the 35th Annual General Meeting of NIAM on 27/03/2008.

Agricultural insurance market structure

The Malaysian insurance market in 2009 was composed of 35 companies including 30 direct insurers, of which 15 are general (non-life) insurers and five local reinsurers. These insurers are members of the National Insurance Association of Malaysia (NIAM). The plantation crops (rubber, oil palm etc.) have been insured by various private commercial insurers.

The Tani Malaysia Livestock Insurance Pool was formed in July 2008 with the membership of nine domestic insurance and or reinsurance companies under the leadership of Malaysian Re including: Labuan Reinsurance (L) Ltd., Malaysian Reinsurance Bhd, MUI Continental Insurance Berhad, Oriental Capital Assurance Berhad, Progressive Insurance Bhd, RHB Insurance Berhad, Takaful Ikhlas Sdn Bhd, Uni.Asia General Insurance Bhd. As noted, the pool had not formally commenced underwriting livestock insurance by 2010.

Agricultural insurance products available

The plantation crops (rubber, oil palm etc.) have been insured under a forestry/plantation fire policy providing cover against the loss of the tree (standing asset) as a result of fire plus allied perils of flood, windstorm, and sometimes animal damage (e.g. elephants).

Currently there are no crop or livestock insurance products available in Malaysia and there are no weather index programmes.

Table 1: Agricultural insurance available 2010

Crop insurance products available				**Greenhouse**	**Forestry (Plantation)**
MPCI	Named-peril	Crop revenue	Index-based		
No	No	No	No	No	Yes
Livestock insurance products available					**Aquaculture**
All risk	Accident and mortality	Epidemic disease	Other	Index-based	
Yes	No	No	–	No	No

Source: Author and FAO Survey, 2010

Delivery channels

Details are not known.

Voluntary versus compulsory insurance

The fire and allied perils cover has been marketed on a voluntary basis to the medium to large estates/plantations.

Agricultural reinsurance

Not applicable as there is no crop or livestock reinsurance in place. The plantation sector traditionally reinsured its fire covers on a facultative basis using specialist reinsurance brokers to place their business with international markets.

2. Public support for agricultural insurance

Types of public support for agricultural insurance

There is no government support for agricultural insurance in Malaysia at present.

3. Agricultural insurance penetration

Insurance penetration rate

The insurance penetration rates for primary crops such as oil palm, rubber and cocoa are currently very low. The risks are well spread and owners do not see the need to insure their crops (Shen, 2010). There is no crop or livestock insurance at present.

4. Financial performance

Five-year results

Not applicable.

Cost of agricultural insurance provision

Not applicable.

5. Public disaster assistance programmes

In the past the government has operated both crop and livestock disaster compensation programmes.

For plantation crops, the former compensation programmes were provided through the Federal Land Development Authority (FELDA), the Federal Land Consolidation and Rehabilitation Authority (FELCRA) and the Rubber Industries Smallholder Development Authority (RISDA). Crops included under the government compensation programmes are rubber, oil palm, cocoa and coffee, and covered hazards included fire, flood, windstorm, animal damage (elephant) and insect damage (bagworms). The compensation schemes were compulsory for the settlers and participants in the FELDA, FELCRA and RISDA programmes. The compensation funds were either financed directly by the government or, in the case of rubber, by a cess on grower's rubber exports and by the government (FAO, 1986). The current status of these disaster compensation programmes is not known.

In the case of livestock, Malaysia suffered a catastrophe epidemic disease outbreak of Nipah virus in Negri Sembilan between September 1998 and May 1999. The epidemic caused the death of 105 people and also devastated the swine industry – 1.1 million pigs had to be culled, 951 pig farms ceased production and close to 36 000 people lost their jobs in the pork/food industry and the livelihoods of up to 700 000 people were affected. The government paid RM 140 million in compensation for the pigs destroyed and an estimated RM 548 million was spent in the disease control programme. None of these losses was insured.

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NIAM See Web site at: http://www.niam.org.my/tani.htm

Overview of agricultural insurance: Mongolia[41]

1. Agricultural insurance market review

History of agricultural insurance

Livestock insurance programmes were introduced in 2006. Crop insurance is not available.

Agricultural insurance market structure

In 2007/08 there were four private insurance companies offering livestock insurance through the Livestock Indemnity Insurance Pool, a public-private co-insurance pool.

Agricultural insurance products available

Index-based livestock insurance is the only agricultural insurance product sold in Mongolia. It pays indemnities whenever the adult livestock rate exceeds a specific threshold for a localized region (e.g. the soum in Mongolia). Insured species are cattle, camels, horses, sheep, and goats.

Delivery channels

Livestock insurance policies are delivered through companies' own insurance agent networks, which comprises from 140 to 170 insurance agents. Banks and MFIs are the other insurance delivery channel. Specifically, 20 credit officers deliver insurance in the three Mongolian provinces where livestock insurance is available. There are no special delivery channels or programmes for small or marginal farmers.

Voluntary versus compulsory insurance

Livestock insurance is voluntary.

Agricultural reinsurance

The livestock insurance programme is currently reinsured by a government-sponsored stop loss reinsurance treaty, backed by a World Bank contingent loan. Access to private international reinsurance is considered to be a major constraint for the development of the index-based livestock insurance programme.

[41] Source of country overview information: World Bank Survey 2008.

2. Public support for agricultural insurance

Types of public support for agricultural insurance

There is no current agricultural insurance legislation, but there is plan to draft a livestock insurance law in the future. Public support for start-up costs, training and advertising is provided by the government, with the assistance of the donor community. The National Statistic Office, a public entity, performs the annual livestock census, which is used for the calculation of the livestock mortality index. The government provides stop loss reinsurance to the Livestock Indemnity Insurance Pool at an actuarially fair price. Another form of public support to livestock insurance in Mongolia is the exception of sales taxes on livestock insurance premiums.

Premium subsidies

No premium subsidies are provided to producers.

Public cost of agricultural insurance

The public cost of insurance has been relatively high during the first years of pilot-implementation as a result of start-up costs, mostly funded by the donor community. However, the programme is designed to be financially sustainable without heavy public subsidies.

3. Agricultural insurance penetration

Insurance penetration rate

The number of insured animals was 246 200 for the 2007 season; 286 700 for the 2008 season; and 309 000 for the 2009 season in the three pilot *aimags*. This represents an insurance penetration rate of 14 percent for the 2009 season.

4. Financial performance

Five-year results

Table 1 presents whole market livestock insurance results for 2007 and 2008.

Table 1: Livestock insurance results, 2007 to 2009

Year	Number of policies	TSI (US$ million)	Premium (US$)	Paid claims (US$)	Loss ratio
2007	2 222	4.6	71 972	977	1.4%
2008	3 034	5.8	104 409	202 105	193.6%
2009	3 281	5.0	87 342	–	–

Source: World Bank Survey, 2008

Cost of agricultural insurance provision

Operating costs represent 45 to 50 percent of the original gross premium (OGP). These costs are mainly driven by the delivery costs (including insurance agents' commissions) but do not include start-up costs covered by the donor community.

5. Public disaster assistance programmes

Other forms of disaster assistance to agricultural producers are available in Mongolia. After major catastrophic events the government provides financial support to the herders and farmers. The National Emergency Management Agency is in charge of the programme's implementation. A hard winter event known locally as *dzud* is the major cause of livestock mortality and is the peril covered by the disaster relief programme. The disaster relief programme in Mongolia covers losses in excess of a 30 percent livestock mortality rate.

Overview of agricultural insurance: Nepal[42]

1. Agricultural insurance market review

History of agricultural insurance

Nepal has 3.4 million agricultural households cultivating an average of 0.79 ha per household. About 90 percent of these own livestock, with cattle the most important class of animal, followed by sheep, goats, and buffalo; the typical household owns one or two large ruminants only.[43]

Livestock insurance in Nepal dates back to 1987 when the Nepal Rastra Bank (Central Bank of Nepal) and the public sector Deposit Insurance and Credit Guarantee Corporation (DICGC) jointly developed an individual animal all risks mortality livestock insurance scheme, designed to protect the livestock investment loans provided by the public sector banks to small-scale farmers. At the same time, in 1987, the private cooperative (mutual) sector also developed a very similar livestock-credit all risks mortality insurance cover operated by the Small Farmer Cooperatives Limited (SFCL). Subsequently, other organizations have also developed livestock insurance. The government provides limited financial support to the programme in the form of a fixed 50 percent premium subsidy for livestock insurance through DICGC and SFCL.

Crop insurance is in its infancy, having first been introduced in 2007/08 on a very small pilot-scale by two cooperatives in conjunction with the Department of Agriculture.

Agricultural insurance market structure

The Nepalese insurance market is regulated by the Insurance Board (Beema Samiti), Ministry of Finance. In 2008 the Nepalese insurance market consisted of 22 registered life and non-life insurance companies. With the exception of one state life/non-life company, the market is comprised of private commercial insurance companies. The non-life insurance market was about US$114 million in 2007/08, representing about 2 percent of non-agricultural GDP and less than US$2.3 per capita.

To date none of the regulated insurance companies have insured agriculture, and any livestock or crop insurance available has been implemented by the non-regulated or informal sector including the DICGC, SFCL, Community Development Programme, and the Centre for Self Help. The livestock and crop insurance products offered by these companies are not approved by the Insurance Board and they are therefore considered to be credit-guarantee protection covers. There are currently about 400 individual cooperatives in Nepal offering livestock insurance to their members. The government of Nepal provides fixed 50 percent premium subsidies to the DICGC and SFCL

[42] Source of country overview information: World Bank Survey 2008.

[43] National Agricultural Census 2001.

livestock insurance programmes but not to the other livestock or crop insurance programmes. There is no tradition of crop insurance in Nepal. However, since 2007 two cooperatives have commenced pilot crop insurance schemes for named crops and perils.

To date there has been no reinsurance of either crops or livestock in Nepal. In view of the limited capital reserves of the individual cooperatives, these programmes are very exposed to catastrophic losses (e.g. epidemic diseases in livestock or wind and floods in crops).

Agricultural insurance products available

The range of livestock and crop insurance products offered by the non-regulated sector is very restricted at present in Nepal (Table 1). The livestock-credit insurance cover offered by all non-regulated insurers is an all risks mortality policy for individual animals and cover also includes loss of use of the animal. Cattle and buffalo account for most of the livestock underwritten in Nepal, but under the Community Livestock Development Programme (CLDP), financed by the Asian Development Bank (ADB) and with technical assistance from FAO, there is a small ruminant (goats) insurance programme. In 2008 premium rates for livestock insurance varied from 10 percent charged by the SFCL programme to 6 percent by DICGC and 3 percent for the CLDP programme. Named-peril crop insurance is currently being pilot tested by two cooperatives in Nepal for windstorm in bananas and for drought, flood, frost, and hail in paddy, maize, and vegetables.

Table 1: Agricultural insurance available 2008

Crop insurance products available				**Greenhouse**	**Forestry**
MPCI	Named-peril	Crop revenue	Index-based		
No	Yes	No	No	No	No
Livestock insurance products available					**Aquaculture**
All risk	Accident and mortality	Epidemic disease	Other	Index-based	
Yes	Yes, part of all risk coverage	Yes, part of all risk coverage	–	No	No

Source: World Bank Survey, 2008

Delivery channels

In Nepal nearly all livestock insurance is linked to credit either through the rural banks or the MFIs, including, most importantly, the cooperatives. With the exception of the DICGC Livestock Insurance Scheme, all livestock and crop insurance is implemented by the MFIs and cooperatives on behalf of their members.

Voluntary versus compulsory insurance

The DICGC Livestock Insurance Programme is compulsory for farmers wishing to access livestock investment loans from the rural development banks and one MFI. The cooperatives link livestock loans and livestock insurance, although this is not mandatory in most cases. Crop insurance is voluntary in Nepal.

Agricultural reinsurance

There is no tradition of agricultural crop or livestock reinsurance in Nepal. The non-regulated mutual livestock and crop insurers are therefore very exposed to catastrophe losses that would exceed their reserves. The DICGC Livestock Credit Guarantee Programme is effectively underwritten by the government of Nepal.

2. Public support for agricultural insurance

Types of public support for agricultural insurance

In Nepal, government support to agricultural insurance includes:

a) fifty percent premium subsidies on the DICGC and SFCL livestock insurance programmes (see Table 2);
b) capital start-up costs for the two pilot cooperative mutual crop insurance schemes; and
c) technical support and training from the Departments of Livestock and Agriculture, Ministry of Agriculture, and Cooperatives.

3. Agricultural insurance penetration

Insurance penetration rate

Livestock insurance figures for the whole market are not available. The DICGC and SFCL combined figures are shown in Table 3. These two programmes have insured an average of about 12 500 livestock (cattle and buffalo) over the past five years, which represents only 0.1 percent of Nepal's cattle and buffalo herd of 11.4 million heads of animals in 2006/07. Crop insurance is only in its second year of being pilot-tested in Nepal and less than 150 farmers are currently insured.

4. Financial performance

Five-year results

Livestock insurance – The combined DICGC and SFCL livestock insurance results for the past four years are summarized in Table 3 and show a very low long-term average loss ratio of 18.2 percent. Over the past 20 years the DICGC loss ratio has averaged 38 percent and the SFCL has averaged 9 percent.

Crop insurance – The pilot programmes are too new and too small to report results.

Cost of agricultural insurance provision

The DICGC's administrative and operational costs for livestock insurance are compared with SFCL in Table 4. The DICGC implements its programme through the development and commercial banks and faces a very high cost structure averaging 57 percent of premiums over 20 years. From

2003/04 to 2006/07 (during which the numbers of insured animals declined significantly) their costs were as high as 108 percent of premiums, which is unsustainable. In contrast, SFCL reports a very low average cost of only 3.6 percent of premiums. SFCL elects its own members to manage the livestock insurance schemes, and, as these posts are unsalaried, this explains their very low operating overheads for livestock insurance.

5. Public disaster assistance programmes

The Ministry of Agriculture and Cooperatives provides limited ad hoc disaster relief for crops and livestock. Compensation for catastrophe events (e.g. floods) is usually paid in kind in the form of free seeds or other crop inputs.

6. Additional tables

Table 2: Crop and livestock insurance penetration, FY2004 to FY2008

Crop

Year	Number of policies	Percent of farmers insured	Insured area (ha)	Percent of national crop area insured
FY2008	103 (two mutual cooperatives)	..	4.1	..

Note: Prior to FY2008 there was no crop insurance in Nepal

Livestock

Year	Number of policies	Number of insured cattle/buffalo	Percentage of national herd insured
FY2004	11 399	13 678	0.12
FY2005	10 950	12 591	0.11
FY2006	11 470	13 738	0.12
FY2007	8 462	9 450	0.08
Average	10 570	12 364	0.11

Source: World Bank Survey, 2008

Table 3: Livestock insurance results, FY2004 to FY2007

Year	Number of policies	Number of insured livestock	TSI (US$ milion)	Premium (US$)	Paid claims	Loss ratio (%)	Average sum insured (US$)	Average premium (US$)	Average premium rate (%)
FY2004	11 399	13 678	2.2	186 576	30 688	16.4	192	16.4	8.5
FY2005	10 950	12 591	2.2	173 769	27 176	15.6	204	15.9	7.8
FY2006	11 470	13 738	2.7	233 778	33 844	14.5	239	20.4	8.5
FY2007	8 462	9 450	1.8	133 220	40 690	30.5	214	15.7	7.3
Average	10 570	12 364	2.2	181 836	33 099	18.2	212	17.1	8.0

Source: World Bank Survey, 2008

Table 4: Livestock insurers' costs as a percent of OGP

Costs	DICGC livestock insurance (20-year average)	DICGC livestock insurance (2003 to 2007)	SFCL livestock insurance
Marketing & acquisition	12.0%	13.7%	–
Administration	45.2%	94.6%	–
Loss adjustment	–	–	–
Total	**37%**	**108.3%**	**3.6%**

Source: World Bank Survey, 2008

Note: Insurance premium taxes were negligible and were therefore not included.

Overview of agricultural insurance: New Zealand[44]

1. Agricultural insurance market review

History of agricultural insurance

Crop insurance started expanding significantly after 1981, although it existed for cereal crops prior to that date. Livestock insurance was started in the 1970s.

Agricultural insurance market structure 2008

Four private sector insurers and one mutual insurer offer both crop and livestock insurance. One private company offers livestock insurance only. There is no public sector insurance. Lloyd's of London is also licensed as a direct insurer and offers equine and livestock insurance through three facilities. Forestry insurance is also offered.

Agricultural insurance products available

Named-peril crop insurance, principally hail, plus specialist policies for hail, frost, and other named-perils, is being offered. Specialist policies for different fruit and vegetable crops have been developed. Forestry insurance is an important product in New Zealand. Livestock insurance covers accident and mortality and livestock epidemic cover is offered. Aquaculture insurance is available for marine and on-land fish farms. Some yield-based and index products have been developed, but they are not actively marketed.

Table 1: Agricultural insurance available 2008

Crop insurance products available				**Greenhouse**	**Forestry**
MPCI	Named-peril	Crop revenue	Index-based		
No	Yes	No	Yes	Yes	Yes
Livestock insurance products available					**Aquaculture**
All risk	Accident and mortality	Epidemic disease	Other	Index-based	
No	Yes	Yes	No	No	Yes

Source: World Bank Survey, 2008

Delivery channels

Insurance brokers are the most important distribution channel. The insurers' agent networks (including agencies of input suppliers) are used. Producer associations are also important for

[44] Source of country overview information: World Bank Survey 2008.

certain crops, such as the fruit sector. For livestock insurance, brokers and agent networks are the main distribution channels. There are no special delivery channels or programmes for small farmers.

Voluntary versus compulsory insurance

Crop insurance is voluntary. In the case of the kiwifruit industry, decisions on an industry scheme that is compulsory for all growers are taken by the industry growers association.

Agricultural reinsurance

Private sector reinsurance (quota share and stop loss) is widely developed. It is not considered a constraint for named-peril crop insurance, livestock insurance or index insurance. It is a moderate constraint for epidemic livestock disease insurance and multiple peril crop insurance (MPCI).

2. Public support for agricultural insurance

Types of public support for agricultural insurance

There is no form of public support for agricultural insurance in New Zealand.

Premium subsidies

There are no premium subsidies on agricultural insurance in New Zealand.

Public cost of agricultural insurance

There is no cost to the government in support of agricultural insurance.

3. Agricultural insurance penetration

Insurance penetration rate

The information on agricultural insurance is an estimate and is provided for 2007. For crop insurance, it is estimated that 1 500 crop insurance policies were issued, that 5 percent of farmers are insured, and that the area insured is 10 000 ha. This figure does not include the kiwifruit sector, where collective decisions of the sector result in a single policy for the industry being issued. For livestock insurance, it is estimated that only 2 percent of farmers are insured, and this is mainly restricted to high value stud bulls. Transit of livestock is routinely insured. Data for forestry insurance are not available; but various schemes are offered for smaller investors and growers, and some corporate entities also insure.

4. Financial performance

Five-year results

Estimates are provided for the industry as a whole, including average loss ratios. For crop insurance (including forestry), premium income is estimated at NZ$15 million (US$10 million) with an average loss ratio of 50 percent. This is estimated at approximately 55 percent forestry, 10 percent cereals, 20 percent fruit (including kiwifruit), and 15 percent other, including greenhouses. TSI is estimated at NZ$500 million (US$330 million), but this figure only includes first loss limits, which are frequent in forestry policies. Total values of insured assets may be at least NZ$1.5 billion (US$1.0 billion). For livestock insurance (including both equine and livestock), premium income is also estimated at NZ$15 million (US$10 million). Of this, 70 percent is estimated as equine and 3 percent, livestock and aquaculture. TSI is estimated at NZ$500 million (US$330 million).

Cost of agricultural insurance provision

For both crop and livestock insurance, the following are estimates of cost as a percent of original gross premium (OGP):

Marketing and acquisitions (commissions)	12 percent of OGP
Insurer administration excluding loss adjustment	7 percent of OGP
Loss adjustment costs	3 percent of OGP
Total costs	22 percent of OGP

Overseas reinsurers are subject to 3.3 percent tax.

5. Public disaster assistance programmes

Nominated epidemics of diseases not known in New Zealand are compensated at market value, but only if no insurance is available. There is no form of government compensation for farmers. In the event of a major natural catastrophe, the government may contribute to low-cost loans, tax relief if livestock has to be sold because of a natural disaster, or access to low-cost labour, etc. Declaration of such measures is on a case-by-case. This is on a highly restricted basis, so farmers are largely required to manage their own risks.

Overview of agricultural insurance: Democratic People's Republic of Korea[45]

1. Agricultural insurance market review

History of agricultural insurance

A national rice and maize MPCI loss of yield programme was introduced by the state insurance company, Korea Foreign Insurance Corporation Ltd. in the mid-1980s. This programme insured nearly one million acres of rice in the mid 1990s. The programme was traditionally, partly reinsured on a quota share basis by various international reinsurers up to 1993 when the programme incurred catastrophe flood (dam burst) losses. From 1994 onwards the programme was placed on a stop loss reinsurance basis.

The current status of the rice and maize programme is not known, but it is believed that the original premium may be in the order of about US$20 million.

Agricultural insurance market structure 2010

The Korea Foreign Insurance Corporation (KFIC) has been renamed the Korea National Insurance Corporation (KNIC). KNIC is the sole or monopoly state insurer and reinsurer in the Democratic People's Republic of Korea.

Agricultural insurance products available

The KNIC rice and maize policy is an MPCI product that insures against excess rain, flood, drought, typhoon, windstorm and excess temperature. Traditionally the product carried very low average rates of about 2 percent with a 2 percent of yield deductible. However, following major reinsured flood losses in 2003, international reinsurers assisted KNIC to redesign and strengthen the cover with an increase in average rates to about 4 percent accompanied by a 20 percent loss of yield deductible. The definition of all insured perils was also carefully examined and dam burst was excluded from flood cover. Other insured perils were objectively defined in accordance with meteorological thresholds that had to be exceeded to trigger a claim and for in-field loss adjustment to be carried out.

It is understood that KNIC continues to insure the rice MPCI scheme in 2010. It is not known whether KNIC is marketing any other crop or livestock insurance products in 2010.

[45] Source of country overview information: Author and FAO Survey Survey 2010.

Table 1: Agricultural insurance available 2010

Crop insurance products available				Greenhouse	Forestry
MPCI	Named-peril	Crop revenue	Index-based		
Yes	No	No	No	No	No
Livestock insurance products available					**Aquaculture**
All risk	Accident and mortality	Epidemic disease	Other	Index-based	
No	No	No	No	No	No

Source: Author

Delivery channels

Crop and rice insurance is marketed by KNIC to the district and village level cooperative farms. All farming is conducted on a cooperative (collective) basis in Democratic People's Republic of Korea.

Voluntary versus compulsory insurance

Agricultural insurance is voluntary for the rice and maize cooperatives farms.

Agricultural reinsurance

In the early 1990s KFIC placed an annual crop quota share treaty with international reinsurers, but following the very severe dam-burst/flood losses in 2003 (loss ratio in excess of 500 percent), this was replaced by a catastrophe layered stop loss treaty that was placed with various, mainly European, reinsurers. The status of the rice and maize reinsurance programme today in 2010 is not known.

2. Public support for agricultural insurance

Types of public support for agricultural insurance

Premium subsidies

In the early 1990s the rice and maize MPCI programme carried capped premium rates of about 2 percent and as such the programmes were very heavily subsidized by the government. Between 1994 and 1996 average premium rates were increased to about 4 percent on the insistence of international stop loss reinsurers. The government, through KNIC, has traditionally assumed liability for all excess claims that it has not been able to cede to international reinsurers.

Public cost of agricultural insurance

Details are not available.

3. Agricultural insurance penetration

Insurance penetration rate

In the early 1990s the insured area of rice and maize rose from about 700 000 acres (1993) to about 950 000 acres in 1996, representing a very high proportion of the national rice and maize crops. The 2010 rice and maize coverage details are not known. The current crop insurance premium volume is understood to be about US$20 million.

4. Financial performance

In the mid to late 1990s the crop scheme incurred a series of catastrophe losses because of combined flood, drought and spring freeze (frost) events resulting in high underwriting losses. In 2003 when the programme was reinsured on a quota share reinsurance basis, international reinsurers incurred very high losses (loss ratio >500 percent).

Cost of agricultural insurance provision

No details available.

5. Public disaster assistance programmes

No details available.

Overview of agricultural insurance: Pakistan[46]

1. Agricultural insurance market review

History of agricultural insurance

Agricultural insurance is relatively undeveloped in Pakistan. Livestock insurance was first introduced on a pilot basis in 1983 by two private insurers, Adanijcer Insurance Company and the Eastern Federal Union Insurance Company. Crop insurance is new and was introduced in 2008 under a public private partnership for a national (in scope) crop loan insurance scheme.

Agricultural insurance market structure 2008

Livestock and poultry insurance has been written on a small-scale in the past by various private insurance companies

Since *rabi* season 2008/09 a group of ten insurance companies in conjunction with 20 commercial banks have been involved in the implementation of the national crop loan insurance scheme. The insurers include New Jubilee, EFU General, East West, National Insurance Company, UBL, Adamjee, United, Silver Star, Atlas and Alfalah.

Agricultural insurance products available

Livestock insurance is available on a limited basis and includes both livestock cattle, buffalo, small ruminants and poultry insurance.

Since *rabi* 2008/09 individual grower multiple peril crop insurance has been available for field cereal crops and sugar cane.

The policy adopts a unique two-trigger indemnity procedure: 1) catastrophe losses as a result of an insured peril that exceeds 50 percent of the normal average regional (e.g. block) area yield must first be declared by a competent authority, and 2) this opens the policy for a loss adjustment at the individual farmer level. Further cover details are included in Box 1.

Table 1: Agricultural insurance available 2010

Crop insurance products available				**Greenhouse**	**Forestry**
MPCI	Named-peril	Crop revenue	Index-based		
Yes	No	No	No	No	No
Livestock insurance products available					**Aquaculture**
All risk	Accident and mortality	Epidemic disease	Other	Index-based	
No	Yes	No	No	No	No

Source: FAO Survey, 2010

[46] Sources of information: Author and FAO Survey 2010.

Delivery channels

For crop insurance, the most important delivery channel is through linkage to agricultural credit for farmers through the banks.

Voluntary versus compulsory insurance

Agricultural insurance is compulsory for farmers who have taken seasonal loans from the banks.

Agricultural reinsurance

The scheme carries a maximum agreed indemnity limit of 300 percent loss ratio.

There is a stop loss reinsurance cover that is placed with international reinsurers. It is understood that on account of the very severe flooding in 2010 the stop loss reinsurance programme has incurred high losses. No further details of the stop loss treaty are available.

2. Public support for agricultural insurance

Types of public support for agricultural insurance

The crop loan insurance scheme attracts premium subsidy support from government (SBP, 2010).

Premium subsidies

According to SBP (2010), in 2008/09 the government reimbursed the banks Rs 183 million (US$2.2 million) for the cost of premium subsidies to subsistence farmers. This would be equivalent to a premium subsidy level of 58 percent.

Public cost of agricultural insurance

Details are not available.

3. Agricultural insurance penetration

Insurance penetration rate

In the first year of operation, the crop loan insurance scheme generated premium of US$3.8 million or a 2.1 percent penetration rate for the insured crops, ranging from 1.0 percent penetration rate for maize to 4.0 percent for sugar cane (Table 2).

4. Financial performance

Five-year results

The crop loan insurance scheme has only been operating for the past two years. According to SBP (2010), in 2008/09 the scheme written premium was US$3.8 million against paid claims up to December 2009 of US$0.28 million with an implied loss ratio of about 73 percent.

In 2010, Pakistan incurred devastating flooding that has destroyed much of the *kharif* 2010 crop. It is understood that the 2009/10 premium may be in the order of about US$6 to 8 million, and

that the value of crop losses resulting from these floods may be as high as between US$10 to 20 million. However, these preliminary and informal estimates need to be confirmed.

It is also understood that there have been severe flood losses in the livestock and poultry sectors in 2010 and that at least part of these losses are insured. No further details are available.

Cost of agricultural insurance provision

No details available.

5. Public disaster assistance programmes

No details available.

6. Additional tables

Table 2: 2008/09 crop loan insurance scheme penetration rates

Crops	No. of farms ('000)	Area (million acres)	Estimated cost of production (US$ million)	Estimated premium potential (US$ million)	2008/09 actual premium (US$ million)	Penetration rate (%)
wheat	5 329	23.41	4 407	88	1.4	1.6
rice	1 613	7.21	1 613	32	0.5	1.6
cotton	1 627	7.91	1 955	39	1.2	3.1
maize	1 136	2.16	508	10	0.1	1.0
sugar cane	838	2.18	771	15	0.6	4.0
Total	**10 543**	**43**	**9 254**	**185**	**3.8**	**2.1**

Table 3: Crop loan insurance scheme results 2008/09

Item	Premium	
	Pak Rs (million)	US$ (million)
wheat	119.6	1.4
cotton	105	1.2
sugar cane	52.3	0.6
rice	45.5	0.5
maize	8.5	0.1
Total premium	**330.9**	**3.8**
Premium subsidies	183	2.2
Premium subsidies		58%
Claims	23	0.28
Loss ratio	7.0 %	7.4 %
Producer premium	147.9	1.6
Producer loss ratio	81%	73%
Total sum insured	**23 000**	**280**
Premium rate	1.4 %	1.4 %

Source: SBP, 2010

Box 1: Salient features of Pakistan mandatory crop loan insurance scheme

PARTICIPATION	All commercial and private banks and insurers registered with SECP.
ELIGIBILITY	All borrowers receiving agricultural loans from banks. Cover is mandatory for loanees.
CROPS COVERED	All field crops (wheat, rice, maize, cotton, sugar cane, sunflower).
PERIOD OF INSURANCE	From time of sowing or transplanting till harvesting.
INSURED PERILS	A. Natural calamities: Excessive rain, hail, frost, flood, drought B. Crop related diseases such as viral and bacterial attacks or damage by locusts.
SUM INSURED	Sum insured is based on the per acre borrowing limits prescribed by the State Bank subject to a maximum of Rs 2 000 000 per farmer per crop season.
PREMIUM	Maximum 2% of amount insured per crop per season plus applicable levies. Bank will be responsible for collection and payment of premium to the insurer.
BASIS OF INDEMNITY	Claims for damage directly caused by the insured risks to be based on declaration of calamity by the competent authority (provincial or federal) in the area where the insured risk is located and such declaration is notified in the Gazette AND the final yield of the subject risk is less than 50 percent of the reference of that area. Indemnity is also subject to the name of farmer/borrower and the insured crop has been earlier declared.
REFERENCE YIELD	Three-year average yield of the particular area. The three years will be from the five preceding years discounting the best and worst years.
CLAIMS PAYMENT	Claims shall be payable to the banks by the insurers for credit to the insured borrower loan account. The maximum amount payable is the outstanding loan or the assessed amount, whichever is the lesser amount.
SPECIAL CONDITIONS AGGREGATE LIMIT OF LIABILITY	The maximum annual aggregate limit of liability of the scheme would be limited to 300 percent of the total premium. Insurers reserve the right for review of terms annually.
EXCLUSIONS	War, civil war, strikes, riots, terrorism etc. • Non-utilization or wrong utilization of loan. • Earthquake or volcanic eruption. • Loss before risk declaration or after harvesting. • Price fluctuations and loss of market.

Source: SBP, 2008. SBP task force report on crop loan insurance framework. Agricultural Credit Departments, State Bank of Pakistan

Reference

SPB 2008. *SBP task force report on crop loan insurance framework*. Agricultural Credit Department, State Bank of Pakistan.

Overview of agricultural insurance: Philippines[47]

1. Agricultural insurance market review

History of agricultural insurance

Crop insurance was first introduced in 1978 with the formation of the Philippines Crop Insurance Corporation (PCIC). PCIC is the sole crop insurance provider in the Philippines. PCIC was created under Presidential Decree 1467 issued on 11 June 1978. Agricultural crop insurance was introduced in May 1981 and livestock insurance in 1988. PCIC is 100 percent owned by government entities. PCIC is governed by agricultural insurance legislation and regulation, which were most recently revised in 1995 ("Revised PCIC Charter"). Livestock insurance is regulated as a commercial line of insurance.

Agricultural insurance market structure 2010

Prior to 2009, PCIC was the sole public-sector crop insurance company. With regard to livestock, the Government Service Insurance System (GSIS) is part of a pool with private insurers: the Philippine Livestock Management Services Corporation (PLMSC). GSIS provides livestock insurance for livestock owned by government institutions. PCIC was a member of this group since it started in 1988 until 2005 when it disengaged from PLMSC to gain flexibility and strengthen control on underwriting and claims adjustment and settlement. The PLMSC has 14 participating insurers.

Since 2008, MicroEnsure (an international financial intermediary that specializes in microinsurance products for small urban and rural households and has a local office in the Philippines) has been actively working with Malayan Insurance Company (the largest commercial insurer in the Philippines) to develop two pilot micro level individual farmer crop index programmes: (a) a CWII programme for rainfall deficit (drought); and (b) a separate remote sensing/satellite based typhoon index. These two pilot programmes were launched in 2009 (see Annex 1 for further details).

Agricultural insurance products available

Traditional indemnity based crop and livestock insurance products

PCIC's main insurance lines are multiple peril crop insurance (MPCI) policies for *palay* (rice) and corn. These two products account for 75 percent and 16 percent of PCIC premium income (2006), respectively. Cover includes losses for natural calamity and for pest and disease.

PCIC also offers high value commercial crop insurance for higher value crops, particularly fruits and vegetables. Greenhouse and forestry are included in the High-Value Commercial Crop (HVCC)

[47] Source of country overview information: World Bank Survey 2008 for PCIC; FAO 2010 survey; Author's communication in 2010 with MicroEnsure for micro level crop index insurance programmes.

insurance programme of PCIC. PCIC has insurance packages for the following HVCCs: abaca, ampalaya (bitter gourd), asparagus, banana, cabbage, carrot, cassava, coffee, commercial trees, cotton, garlic, ginger, mongo, onion, papaya, peanut, pineapple, sugar cane, sweet potato, tobacco, tomato, watermelon, white potato, and others.

Livestock insurance against accidental death and disease is offered by PCIC and other commercial insurers for all classes of commercial farm livestock. Livestock epidemic disease coverage is subject to additional premium loading and other conditions.

PCIC also offers life insurance and accident insurance to individuals or linked to loans from financial institutions to farmers and fisherfolk.

The main insurance lines for *palay* and corn are provided to individual farmers. Loss assessment formulas have been developed to assign damage functions and indemnity schedules related to type of damage, timing of the damage in relation to crop calendar, and other criteria. Area-based assessment of damage can occur if there are extensive events. Main causes of loss are typhoon, floods, and drought in corn, but pest and disease is also a very significant factor in claims by cause of loss. Farmers may choose between MPCI or natural disaster cover, the main difference being that the latter does not include pest and disease. The majority purchase MPCI, which is required by lending institutions.

Index based products

Since 2009 two micro level index crop insurance products have been launched on a pilot basis in the Philippines, namely a drought index cover for rice and an innovative typhoon damage index.

Table 1: Agricultural insurance available 2010

Crop insurance products available				**Greenhouse**	**Forestry**
MPCI	Named-peril	Crop revenue	Index-based		
Yes	Yes	No	Yes	Yes	Yes
Livestock insurance products available					**Aquaculture**
All risk	Accident and mortality	Epidemic disease	Other	Index-based	
Yes	Yes	Yes	No	No	No

Source: World Bank Survey, 2008 and FAO/APRACA Survey, 2010

Delivery channels

For traditional crop insurance, the most important delivery channel is through linkage to agricultural credit for farmers through the Land Bank of the Philippines (LBP). Other outlets are through sales to cooperatives, through PCIC agents and offices, and through brokers. For livestock insurance, most sales are through cooperatives and producer associations, followed by agricultural banks, and PCIC agents and brokers. There are no special organizations or programmes for small and marginal farmers. The majority of farmer clients of PCIC are small-scale and subsistence producers.

Voluntary versus compulsory insurance

The majority of formal seasonal credit for rice and corn production is through LBP, who require borrowers to insure. However, 18 percent of rice premium and 21 percent of corn premium (2005/06) was derived from non-borrowing farmers. Livestock insurance is voluntary. Financial institutions' lending for livestock production may require that insurance is taken out.

The drought and typhoon index products are being marketed on a purely voluntary basis in 2009.

Agricultural reinsurance

PCIC has been purchasing reinsurance from the private market since inception of the company. Reinsurance schemes are as follows: rice and corn crops – stop loss; high-value crops (cassava) – quota cum surplus; other high value crops – facultative; livestock – facultative; non-crop agricultural assets-quota cum surplus/facultative. Access to reinsurance has not been a significant constraint over the history of PCIC. There are many reinsurance brokers and reinsurers who are interested to participate in the reinsurance programmes of PCIC. There is no involvement of government in the reinsurance of PCIC.

The Malayan Insurance company crop index pilot programmes were reinsured on a proportional treaty basis by Paris Re in 2009 (Paris Re was acquired by Partner Re in 2010).

2. Public support for agricultural insurance

Types of public support for agricultural insurance

The government financed the start-up costs of PCIC and its main ongoing support for agricultural insurance is through premium subsidies for PCIC's main lines of rice and corn insurance. A serious constraint to PCIC has been the accumulation of arrears of subsidy that remain due from the government to the company. There is limited other involvement of government in crop insurance; however, government extension staff assist with loss assessment activities. Under Regulation 8175, a state reserve fund for catastrophic losses amounting to ₱500 million is to be provided by the government. Exemption from premium taxes is granted for subsidized rice and corn insurance.

Premium subsidies

PCIC's rice and corn MPCI insurance programme is subsidized. Premium subsidies are payable by government and vary between 48 percent and 63 percent of the original gross premium (OGP) in the case of rice insurance. For borrowing farmers, the lending institutions (banks) also make a contribution of between 16 percent and 21 percent for rice. The farmer therefore pays a variable rate according to the risk zone of only between 16 percent and 36 percent for rice. Government pays a fixed rate of subsidy as a percent of sum insured (e.g. 5.9 percent of sum insured for multi-risk cover); the farmer pays a variable rate. Borrowing farmers benefit from additional subsidies from the lending institution. Further information on rice and maize premium subsidy levels is shown in Table 1.

Insurance for livestock and commercially rated high value crops is not subsidized.

In 2009 the private commercial drought and typhoon index crop insurance programmes did not attract any premium subsidies from the government and participating farmers paid the full technically derived commercial premium rates.

Public cost of agricultural insurance

The cost of PICC premium subsidies averaged ₱48.5 million (US$970 000) between 2003 and 2006. Note that the government allocates a specific sum annually for premium subsidies, and this limits the scope of operations of PCIC. Subsidies are also in arrears (see comments below), and this constrains PCIC's overall financial and operating position. In 2008 PCIC's budget from the government for premium subsidies was PHP 113 million (about US$2.5 million at the current 2010 exchange rate). In 2009 the senate voted to increase PCIC's premium subsidy budget by PHP 70 million to PHP 183 million in total (US$4 million). This will enable the company to underwrite a larger MPCI portfolio for maize and rice growers.

3. Agricultural insurance penetration

Insurance penetration rate

Crop insurance penetration has varied during the period of PCIC's existence. It is estimated that only 2 percent of rice farmers and 1.76 percent of national rice and maize area cropped are now insured by PCIC (Table 2). The peak penetration of crop insurance was in 1991 when 15 percent of farmers were insured. In 2006, 6 837 livestock farmers were insured and in 2007 the figure was 6 273 (Table 3). The extent of penetration in the livestock sector is not available.

4. Financial performance

Five-year results

PCIC sets its gross premium rates (inclusive of farmer premium, government subsidy, and lending institutions) to cover anticipated long term loss costs, plus a margin of approximately 20 percent to cover marketing and acquisition costs and costs directly related to underwriting. PCIC does not include a margin for reserve accumulation, or administrative overheads of the company, within this rate (see below). Table 4 shows that loss ratios in the last five years have averaged 73 percent for crop insurance (rice and corn) and 57 percent for livestock insurance and 72 percent for the combined crop and livestock programmes. PCIC's updated long-term consolidated results between 1981 and 2008 are summarized by programme in Table 5.

PCIC's analysis of the main causes of loss on the national rice and maize programmes for the period 1981 to 2006 is reproduced in Figure 1. For rice, the major cause of loss has been typhoon and flood, accounting for 54 percent of the total value of claims in rice, followed by pests (19 percent of claims) and diseases (13 percent of claims) or nearly one third of claims overall. Drought has been a relatively minor cause of loss in rice (much of which is irrigated) accounting

for 13 percent of claims. In maize, drought has been the major cause of loss accounting for 42 percent of the total value of claims in this crop between 1982 and 2006. This is followed by pests and diseases, which account for a combined 31 percent of all claims, and finally typhoon and flood (26 percent of all claims in maize).

In 2009 the Malayan drought and typhoon index programmes were implemented on a very small pilot scale and both programmes were free of claims (see Appendix 1 for full details).

Cost of agricultural insurance provision

PCIC's intention is that administrative overhead costs of the company should be met out of investment income and interest on reserves. Marketing and acquisition costs (10 percent for rice and corn crop insurance, up to 30 percent for livestock and other lines) are intended to be met out of gross premium income, and this is reflected in the loss ratios being achieved. The company has been hampered in its objectives of meeting company overheads from investment income and interest by late payment of government subsidies and a declining client base, plus costs associated with an infrastructure of offices originally established to serve farmers in all regions.

Table 6 shows that overhead costs of the company (over all lines), excluding loss adjustment, represent 87 percent of OGP income. Loss adjustment costs do not exceed 12 percent of claims cost. Marketing and acquisition costs are 10 percent of gross premium for crops, 30 percent for livestock, and between 10 percent and 30 percent for other lines of business.

5. Public disaster assistance programmes

There is no scheme for financial compensation of farmers following losses. In-kind provision of seed, fertilizer, and inputs may be provided post-disaster by local and central government ad hoc. Emergency food and shelter may be supplied by the government or NGOs. Rescheduling of credit repayments or interest may be granted by financial institutions. Infrastructure rehabilitation (e.g. irrigation) is the responsibility of the government, and calamity funds or re-allocations of other funds are applied to relief and rehabilitation. However, there is no financial compensation for farmers. The National Calamity Fund was established for rehabilitation (e.g. irrigation facilities). There is an extensive system for disaster management by government organizations, under the umbrella of the National Disaster Coordinating Council (NDCC) and the Department of National Defense (DND). The Department of Budget and Management (DBM) is responsible for the budget for agricultural relief activities.

6. Additional tables

Table 1: PCIC national composite (technical) premium rates for rice and maize

(a) Rice:

	Multiple peril cover (natural + biological perils)					
	Low risk (%)	Share (%)	Medium risk (%)	Share (%)	High risk (%)	Share (%)
Farmer	1.46	15.6	2.91	26.9	4.37	35.6
Lending institution	2.00	21.4	2.00	18.5	2.00	16.3
Government	5.90	63.0	5.90	54.6	5.90	48.1
Total	9.36	100.0	10.81	100.0	12.27	100.0

(b) Maize:

	Multiple peril cover (natural + biological perils)					
	Low risk (%)	Share (%)	Medium risk (%)	Share (%)	High risk (%)	Share (%)
Farmer	2.83	17.20	5.65	29.32	8.48	38.37
Lending institution	3.00	18.24	3.00	15.57	3.00	13.57
Government	10.62	64.56	10.62	55.11	10.62	48.05
Total	16.45	100.00	19.27	100.00	22.10	100.00

Source: PCIC, 2010

Table 2: Estimated PCIC crop insurance penetration, 2003 to 2007

Year	Number of policies	Percent of farmers insured	Insured area (ha)	Percent of national crop area insured
2003	39 939	–	68 275	–
2004	46 053	–	79 194	–
2005	44 663	–	68 602	–
2006	37 243	–	61 952	–
2007	37 810	–	70 036	1.8

Source: World Bank Survey, 2008

Note: Number of policies and insured area includes rice, corn, and high value crop types. Percentage of national crop area insured includes irrigated rice and yellow corn crop areas only.

Table 3: Estimated livestock insurance penetration

Year	Number of insured cattle	Percent of national cattle herd insured	Number of insured swine	Percent of national swine herd insured	Number of insured sheep and goats	Percent of national sheep flock insured	Number of insured poultry birds	Percent of national poultry insured
2003	4 197	–	5 533	–	813	–	–	–
2004	4 030	–	5 728	–	1 096	–	–	–
2005	2 447	–	4 767	–	952	–	–	–
2006	3 543	–	7 075	–	1 421	–	–	–
2007	3 597	–	6 606	–	1 145	–	–	–

Source: World Bank Survey, 2008

Note: 6 837 livestock farmers were insured in 2006 and 6 273 livestock farmers in 2007.

Table 4: Crop and livestock insurance results, 2003 to 2007

Crops

Year	Number of policies	TSI (US$ million)	Premiums (US$ million)	Paid claims (US$ million)	Loss ratio (%)
2003	39 939	14.6	1.6	1.2	76
2004	46 053	16.2	1.9	1.3	71
2005	44 663	15.3	1.8	1.4	77
2006	37 243	15.4	1.8	1.5	83
2007	37 810	20.6	2.4	1.5	62

Livestock

Year	Number of policies	TSI (US$ million)	Premiums (US$)	Paid claims (US$)	Loss ratio (%)
2003	7 824	1.2	41 434	35 531	86
2004	7 572	1.2	68 225	31 398	46
2005	6 133	1.1	53 849	31 701	59
2006	6 837	1.6	67 043	38 005	57
2007	6 273	2.1	95 957	50 952	53

Total

Year	Number of policies	TSI (US$ million)	Premiums (US$ million)	Paid claims (US$ million)	Loss ratio (%)
2003	47 763	15.8	1.7	1.3	76
2004	53 625	17.4	2.0	1.4	70
2005	50 796	16.4	1.8	1.4	77
2006	44 080	16.9	1.9	1.6	82
2007	44 083	22.8	2.5	1.5	61

Source: World Bank Survey, 2008

Table 5: Summary of PCIC's long-term underwriting results, 1981 to 2008

Insurance programme	Period	Production			Indemnity		
		No. of farmers	Area (ha)/no. of heads/no. of policies	Amount of cover (PHP million)	No. of farmers	Area (ha)/no. of heads/no. of policies	Indemnity paid (PHP million)
Rice *(palay)*	1981 to 2008	3 085 081	5 162 261	2 894.202	864 515	1 477 475	2 059.224
Maize *(corn)*	1982 to 2008	464 632	856 538	5 209.352	192 588	364 741	628.855
HVCC	1991 to 2008	15 066	18 525	562.282	1 948	2 032	16.894
Livestock	1988 to 2008	264 361	1 844 017	2 622.541	9 137	41 121	52.340
NCI	1996 to 2008	37 625	38 585	4 006.270	31	31	10.252
TIPP	2005 to 2008	96 820	55 237	2 330.757	109	108	2.581
Total		**3 963 585**		**43 125.404**	**1 068 328**		**2 770.146**

Source: PCIC, 2010, personal communication with Author

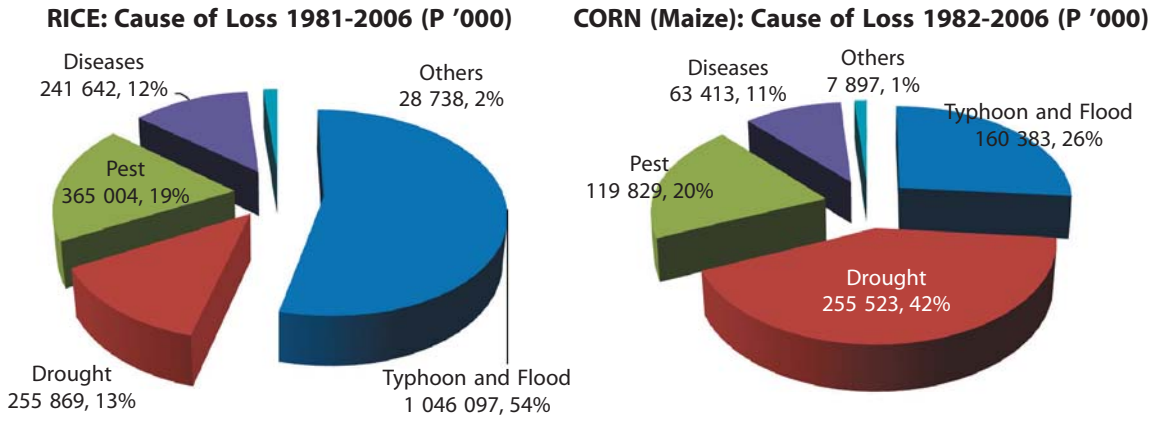
Table 6: PCIC insurers' costs as a percent of OGP

Costs	Crop	Livestock
Marketing & acquisition	10%	30%
Administration	87%	87%
Loss adjustment	≤12% of losses or claims	≤12% of losses or claims
Insurance premium taxes	5% + DST	5% + DST
Total	**–**	**Variable**

Source: World Bank Survey, 2008

Note: There are no insurance premium taxes for rice and corn. DST = Documentary stamp tax.

Figure 1: PCIC – Causes of loss in rice and maize 1981 to 2006 (PHP '000)



Source: PCIC, 2006

Appendix 1: Weather index insurance and remote sensing insurance in the Philippines

Since 2009, the Malayan Insurance Company has underwritten a pilot micro level, individual farmer CWII programme for typhoon and drought that was developed by a local financial intermediary, MicroEnsure. MicroEnsure is an international financial intermediary or broker, with offices in the Philippines, India, Ghana, Uganda and Tanzania and which is involved in the design and marketing of low cost microinsurance products in conjunction with microfinance institutions, rural banks and SACCOs, as well as working closely with insurance companies. In 2010 the Malayan Insurance Company/MicroEnsure typhoon and drought index pilot programmes were the only CWII products available in the Philippine market.

The **typhoon weather index** is a remote sensing or satellite based insurance product that was designed by MicroEnsure using typhoon data supplied by the Japanese Meteorological Authority (JMA). MicroEnsure employed the services of an international actuary to conduct a typhoon risk modelling and mapping exercise for all of the Philippines and to define homogeneous risk-rating zones (28 km grid squares) for the entire country – typhoon premium rates have been calculated for each grid according to the frequency and severity of the tropical cyclone/typhoon hazard. The product is operated by the JMA satellite tracking system for typhoons and an indemnity payment is triggered if the typhoon tracks within a defined distance (maximum of 140 kilometres) from the insured farm location(s) and according to the maximum sustained wind speed at the closest point of track: at strong tropical storm wind speeds the policy pays out 15 percent of the maximum sum insured and at "hurricane 4" wind speed, the payout is 100 percent of the sum insured. The location of each insured farm is plotted using GPS and the actual payouts are automatically calculated according to how close the farm is to the centre of the typhoon's path and the calculated wind speed at the location.[48] Further details of the typhoon product and the indemnity formula for wind speed and distance from the typhoon track are presented in Martirez (2009).[49]

[48] MicroEnsure is the world-first typhoon weather index insurance for smallholder Philippines rice farmers. For information see http://www.microensure.com.

[49] Martirez, H.W., 2009.

In 2009 the micro level typhoon index insurance cover was launched for rice farmers in Panay Island, Region VI of the Philippines. The typhoon index was approved in 2009 by the Insurance Commission. The typhoon index is underwritten by the Malayan Insurance Company with reinsurance protection from Partner Re (formerly Paris Re prior to 2010). Taytay Sa Kauswagan, Inc., the largest microfinance lending institution in the Philippines with a current outreach of over 250 000 borrowers, is providing seasonal credit to the rice producers under this pilot micro level individual farmer crop-typhoon index scheme.

In addition, Malayan Insurance Company/MicroEnsure are piloting individual farmer **micro level weather index insurance for rainfall deficit (drought) in rice** in Region VI. It is understood this is a conventional three-phase (three vegetative stages: establishment/tillering, flowering/grain formation, maturity) weather index product that makes indemnity if rainfall in each stage falls below a pre-determined level.

In 2009 the drought and typhoon index pilot programmes for rice farmers in Panay Island were free of claims. The 2009 underwriting results are summarized below. In 2009, MicroEnsure as the appointed intermediary sold 446 typhoon index policies with an insured equivalent of 647 ha of rice and TSI of PHP 8.7 million (nearly US$190 000), and the drought policy was sold to 21 farmers with insured area of 29.5 ha and TSI of PHP 0.5 million (US$109 000). The average premium rate levied on both index programmes was 10 percent generating premium on the typhoon index programme of slightly more than PHP 871 000 (US$18 900) and for the drought index programme premium of PHP 50 000 (US$1 100). Although a total of 14 typhoons were recorded in the Philippines Area of Responsibility between May and October 2009, none of the typhoons tracked within 140 km of the insured locations and therefore there were no indemnity payouts on the typhoon index programme. The drought index cover was also free of claims.

Table 7: 2009 Underwriting results, Malayan (MicroEnsure) typhoon and drought index pilot schemes

Details	Typhoon	Drought
No. of farmers	446	21
Farm area	647.04 hectares	29.50 hectares
Premium production	PHP 871 170.89	PHP 50 000.00
Sum insured	PHP 8 711 708.85	PHP 500 000.00
2009 registered typhoons in Philippines Area of Responsibility (PAR) – during product piloting	14 Typhoons – 2 in May, 1 in June, 2 in July, 2 in August, 4 in September; 3 in October	
Claims payout	PHP 0.00	PHP 0.00
Location of farms	Panay Island – Antique, Central and Northern Iloilo	Panay Island – Dumangas

Source: Martirez, 2009

References

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PCIC 2006. Agricultural insurance: The Philippines experience. Paper presented to the Asia-Pacific Organization Conference, New Delhi, 15 October 2006.

Overview of agricultural insurance: Republic of Korea[50]

1. Agricultural insurance market review

History of agricultural insurance

Agricultural insurance was introduced in the Republic of Korea in order to compensate farmers affected by natural disasters. The agricultural insurance scheme in this country is managed by the National Agricultural Cooperative Federation (NACF). This cooperative has reinsurance support on a quota share basis from a group of domestic reinsurers, including Korean Re and a group of private insurance companies. The federal government, through the Ministry of Agriculture, plays an active direct role in the NACF scheme and also participates as reinsurer of last resort through a catastrophic stop loss protection in excess of a 180 percent loss ratio. The NACF, jointly with the Ministry of Agriculture, introduced crop insurance. Initially the coverage was limited to apple, pear, and peach plantations against possible loss or damage caused by hail or typhoon.

Livestock mortality insurance was introduced in 1997 in order to facilitate livestock management as well as to guarantee livestock farmers' income in the event of fire and/or natural disasters.

Agricultural insurance market structure

The agricultural insurance scheme is managed by the NACF. This cooperative has reinsurance support on a quota share basis from a group of domestic reinsurers, including Korean Re and a group of private insurance companies.

Agricultural insurance products available

Livestock insurance is offered for cattle, sheep, pigs, horses, poultry and deer. Basic coverage includes accidental death plus emergency slaughter. As an extension of the basic coverage, the insurance could also protect sheds against damages as a direct result of fire (including lightning), snow damage, typhoon, twister, windstorm, rainstorm, flood and tidal wave and electronic equipment interruption could also be insured.

The livestock insurance programme is comprehensive. Cattle, sheep, pigs, horses, poultry and deer can be covered. Basic coverage includes accidental death and emergency slaughter. Animal sheds can also be covered against damages as a direct result of fire (including lightning), snow damage, typhoon, twister, windstorm, rainstorm, flood and tidal wave.

[50] Source of country overview information: World Bank Survey 2008 and FAO Survey 2010.

Crop insurance is offered through named-peril and multiple peril crop insurance (MPCI) policies. The crop insurance programme is based on two types of policy wordings: named-peril policy and MPCI policy. Apple, pear, peach, grape, sweet persimmon, tangerine and astringent persimmon plantations are covered through the named-peril policy. Basic risks covered under this policy are hail and typhoon. In addition, farmers have the option to purchase insurance for spring frost and freezing, fall frost and freezing, excessive rain (torrential rain) and fruit tree damage. In 2007, NACF introduced an MPCI coverage for chestnuts, kiwifruits, and prunes on a pilot basis.

The Ministry of Agriculture and the NACF are continuously improving the scheme in terms of coverage and crops. Currently, both institutions are working on a pilot programme for soybean, potato, watermelon, onion and red pepper crops, and they are performing a feasibility study for rice crops and vegetables.

Table 1: Agricultural insurance available 2008

Crop insurance products available				**Greenhouse**	**Forestry**
MPCI	Named-peril	Crop revenue	Index-based		
Yes	Yes	No	No	No	No
Livestock insurance products available					**Aquaculture**
All risk	Accident and mortality	Epidemic disease	Other	Index-based	
No	Yes	Yes	No	No	No

Source: World Bank Survey, 2008

Delivery channels

The delivery channel in the Republic of Korea is through the NACF. There is no specific delivery channel for small and marginal farmers.

Voluntary versus compulsory insurance

Crop and livestock insurance is voluntary in the Republic of Korea.

Agricultural reinsurance

According to the information collected from the international agricultural reinsurance market, agricultural insurance in the Republic of Korea does not face constraints in terms of reinsurance. The NACF is reinsured on a quota share basis with local reinsurers. Only the liability in excess of 110 percent local market loss ratio and up to 180 percent local market loss ratio is transferred to the international reinsurance market. The government acts as a reinsurer of last resort for all the liability in excess of a 180 percent local market loss ratio.

2. Public support for agricultural insurance

Types of public support for agricultural insurance

Agricultural insurance in the Republic of Korea is heavily supported by the public sector in four different ways:

(i) The federal government provides 50 percent premium subsidies for crops and livestock;

(ii) the federal government also acts as a reinsurer of last resort for the liability in excess of 180 percent local market loss ratio;

(iii) 100 percent of the NACF's crop insurance operational expenses and 50 percent of livestock insurance operational expenses are subsidized by federal government budget; and

(iv) The federal government, through the Ministry of Agriculture, has an active participation in product research and development.

Premium subsidies

The estimated volume of crop premium subsidies for the whole market on average for the period 2003 to 2007 was US$28 million.

Public cost of agricultural insurance

The estimated public cost of agricultural crop insurance in the Republic of Korea for the period 2003 to 2007 is as follows:

(i) Premium subsidies	US$28.0 million
(ii) NACF's administrative and operating expenses	US$15.6 million
Agricultural insurance annual average public cost	***US$43.4 million***

Federal government catastrophic protection was introduced in 2005 and had not been triggered yet as of end 2008. Nevertheless, an "as if" analysis shows that this protection would have been triggered in 2003 as a result of the occurrence of Typhoon Maemi and would have generated a loss for the Republic of Korean government estimated at US$15.3 million.

3. Agricultural insurance penetration

Insurance penetration rate

Crop insurance penetration rates are high for fruit tree insurance (see Table 5). About 38 000 policies were written in 2007, representing about 1.1 percent of the total number of farmers. It is important to mention that crop insurance is only offered for some types of fruits, and crop insurance is currently not available for cereals. In 2006, 7.1 percent of the national cattle herd, 67 percent of the swine population, and 40 percent of the poultry farms were insured.

4. Financial performance

Five-year results

The average loss ratio for the crop and livestock insurance market for the period 2003 to 2007 was 73 percent. Crop insurance performed worse than livestock insurance with 75 percent versus 70 percent average loss ratio, respectively (see Table 4).

Cost of agricultural insurance provision

It is estimated that the aggregate costs of agricultural insurance provision are 25 percent of OGP for crop insurance and 30 percent of OGP for livestock insurance.

5. Public disaster assistance programmes

The Agricultural and Fishery Disasters Act of 1995 stipulates financial support against disasters affecting agriculture and fishery, such as damage from disease, harmful pests, and drought.

6. Additional tables

Table 2: Premium subsidies, 2003 to 2007

Year	Insurance premium subsidies (US$ million)	A&O expense subsidies (US$ million)	Total subsidies (US$ million)
2003	17.0	6.7	23.7
2004	23.7	11.5	35.2
2005	30.5	19.2	49.7
2006	38.3	21.6	59.9
2007	29.9	18.7	48.6
Average	27.9	15.5	43.4

Source: World Bank Survey, 2008

Table 3: Livestock insurance penetration, 2003 to 2007

Year	Livestock							
	Number of insured cattle	Percent of national cattle herd insured	Number of insured swine (million)	Percent of national swine herd insured	Number of insured sheep and goats	Percent of national sheep flock insured	Number of insured poultry birds (million)	Percent of national poultry insured
2003	141 000	7.1	4.0	43	–	–	17.2	17
2004	156 000	7.2	4.4	48	–	–	23.8	24
2005	158 000	6.9	5.1	57	–	–	40.6	37
2006	176 000	7.1	6.3	67	–	–	46.9	39
2007	–	–	–	–	–	–	–	–

Table 4: Crop and livestock insurance results, 2003 to 2007

Crops

Year	Number of policies	TSI (US$ million)	Premiums (US$ million)	Paid claims (US$ million)	Average sum insured (US$)	Average premium (US$)	Average rate (%)	Loss ratio (%)
2003	–	232.6	15.1	42.5	–	–	6.5	282
2004	–	456.2	31.3	13.4	–	–	6.9	43
2005	–	571.8	57.0	24.8	–	–	10.0	43
2006	–	721.5	61.5	22.5	–	–	8.5	36
2007	37 849	891.4	58.7	65.1	23 552	1 550	6.6	111
Average	–	574.7	44.7	33.6	–	–	7.8	75

Livestock

2003	–	266.3	18.9	20.6	–	–	7.1	109
2004	–	346.9	24.7	19.0	–	–	7.1	77
2005	4 751	437.0	31.1	24.0	91 991	6 545	7.1	77
2006	10 920	548.6	39.0	32.4	50 237	3 574	7.1	83
2007	11 645	482.6	34.3	7.9	41 442	2 948	7.1	23
Average	–	416.3	29.6	20.8	–	–	7.1	70

Total

2003	–	498.8	34.0	63.1	–	–	6.8	186
2004	–	803.1	56.0	32.4	–	–	7.0	58
2005	–	1 008.9	88.1	48.8	–	–	8.7	55
2006	–	1 270.0	100.6	54.9	–	–	7.9	55
2007	49 494	1 374.0	93.0	72.9	27 761	1 879	6.8	78
Average	–	991.0	74.3	54.4	–	–	7.5	73

Source: World Bank Survey, 2008

Table 5: Crop insurance penetration rates 2009 (fruit trees)

Type	Sum insured (KRW billion)	Area (ha)	No. of policies	Premium (KRW billion)	Penetration rate
Apple	547 277	11 999	14 527	32 288	68.3%
Pear	380 062	8 684	10 445	18 896	58.5%
Peach	30 132	916	1 567	841	13.7%
Grape	22 628	641	1 636	1 768	5.1%
Tangerine	9 378	479	720	44	2.7%
Sweet persimmon	61 030	3 054	3 038	2 869	30.0%
Astringent persimmon	15 902	615	1 037	525	14.4%
Total	1 066 409	26 388	32 970	57 231	31.4%

Source: Kim B. Jun, 2010

Table 6: Crop insurance results 2001 to 2009 (Korean Won million)

Year	Risk premium	Claims	Loss ratio	Main loss event
2001	3 998	1 367	34.2%	
2002	8 006	34 780	434.4%	Typhoon Rusa
2003	17 646	49 814	282.3%	Typhoon Maemi
2004	32 197	13 758	42.7%	
2005	54 847	23 854	43.5%	Typhoon Nabi
2006	57 663	21 043	36.5%	
2007	55 401	61 446	110.9%	Hail
2008	55 423	24 044	43.4%	
2009	57 231	61 500	107.5%	Hail
Total	342 412	291 606	85.2%	

Source: NACF, 2010

Table 7: Pilot programmes introduced in 2009

Insured crops: Rice, sweet potato, garlic, Japanese apricot

Year	Risk premium	Claims	Loss ratio
2009	3 835	2 378	62%

Source: NACF, 2010

Table 8: Livestock insurance results 2005 to 2008 (US$)

Year	Premium	Claims	Loss ratio
2005	29 014 812	22 435 267	77%
2006	38 032 750	31 615 706	83%
2007	48 600 000	45 033 695	93%
2008	54 000 000	38 573 280	71%
Total	169 647 563	137 657 947	81%

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NACF 2010. Introduction of Korean crop insurance programme.

Overview of agricultural insurance: Sri Lanka[51]

1. Agricultural insurance market review

History of agricultural insurance

Public sector crop insurance in Sri Lanka dates back to 1958 when a pilot paddy rice insurance scheme under the Department of Agricultural Services was established.

In 1973 legislation was passed under the Agricultural Insurance Law No. 27 (1973) to create the Agricultural Insurance Board and then under the Act No. 20, 1999 it was renamed the Agricultural and Agrarian Insurance Board (AAIB), a specialist insurance division of the Ministry of Agricultural Development and Agrarian Services (MADAS). Since 1999 AAIB (a public insurance company) has been the main agricultural insurer in Sri Lanka and it has offered a wide range of crop (including cereals, perennial crops, medicinal plants), fisheries, livestock and forestry insurance products, farm package insurances including machinery and equipment cover, post-harvest grain storage insurance, as well as farmer's and fishermen's pension and social security benefit schemes, medical insurance cover and, most recently, life insurance products.

It is understood that some private commercial insurance companies have also offered traditional indemnity-based crop insurance for rice in the past, but it is not known if these companies are still offering these products in 2010.

In 2009, the SANASA Insurance Company Limited (SICL) entered into an agreement with BASIX, a Hyderabad based MFI that specializes in crop weather index insurance (WII). The purpose of this agreement was to conduct a feasibility study for the design and implementation of WII in Sri Lanka. The project is being managed by Development International Desjardins (DID) a Canadian microfinance and microinsurance specialist, with funding from ILO and the Canadian International Development Agency (CIDA). It is understood that the pilot crop WII programme will be launched in 2011.

Agricultural insurance market structure

AAIB, is the main agricultural insurer in Sri Lanka with a network of 26 district offices in Sri Lanka plus 550 individual service centres serving about 15 000 villages. AAIB agricultural crop insurance is linked to bank loans and other inputs and services that are provided through the service centres by MADAS.

SICL was formed in 2003 as a life insurance company and since 2005 it has also offered general insurance products.

[51] Source of country overview information: Author and FAO survey 2010.

Agricultural insurance products available

AAIB's field row crop policy is an individual grower loss of yield MPCI crop insurance cover. The most important insured crop is paddy rice: the terms of coverage for rice are shown in Table 3 and Table 4 in terms of insured perils, insurance period, sum insured and premium rates according to irrigation status and risk zone/soil type. The company also provides named peril crop insurance and livestock mortality insurance. Key details of their livestock cover and rates for cattle, sheep and goat mortality cover are presented in Table 5.

Loss assessment is carried out by in-field yield loss assessment using either visual (eye) estimation methods or by sample crop-cutting experiments (CCEs). A three to four man team is involved in loss assessment including an AAIB agricultural insurance agent, the local agricultural officer and a member of the farmer's organization. Each crop carries a first loss excess, which is borne by the farmer. The excess levels are: paddy, 20 percent; other food row crops, 10 percent; big onions, 10 percent; coconut, 10 percent; tea, 5 percent; flowers, 10 percent; export crops, 10 percent.

Table 1: Agricultural insurance available 2008

Crop insurance products available				**Greenhouse**	**Forestry**
MPCI	Named-peril	Crop revenue	Index-based		
Yes	Yes	No	No (under research and development)	No	No
Livestock insurance products available					**Aquaculture**
All risk	Accident and mortality	Epidemic disease	Other	Index-based	
No	Yes	Yes	No	No	No

Source: FAO/APRACA Survey, 2010

Delivery channels

AAIB's crop and livestock insurance products and services are marketed through its network of 26 regional offices and 550 agricultural service centres. Where farmers access subsidized bank loans, crop insurance is mandatory.

SICL is part of the SANASA Group, which has one of the most important cooperative networks in Sri Lanka comprising more than 8 400 community-based financial institutions operating at the village level. SANASA has more than 850 000 members and 300 000 customers, of which approximately 400 000 members/customers are involved in agriculture. It is proposed to distribute the crop WII products through the SANASA cooperative network.

Voluntary versus compulsory insurance

AAIB crop insurance is voluntary save where a farmer borrows seasonal crop credit from a national bank, in which case cover is compulsory.

Agricultural reinsurance

The AAIB crop and livestock insurance programmes have not been reinsured.

2. Public support for agricultural insurance

Types of public support for agricultural insurance

AAIB is a public sector insurer and excess losses are borne by the company and therefore by government.

Premium subsidies

It is understood that government provides crop-credit insurance through AAIB at subsidized credit interest rates.

It is understood that AAIB does not offer premium subsidies, but its average rates are believed to be below the technically required (and higher levels) to cover actual claims and A&O expenses.

Public cost of agricultural insurance

AAIB's administration and operational expenses are not known.

3. Agricultural insurance penetration

Insurance penetration rate

According to one report, AAIB currently insures about 45 000 acres of paddy, but this only represents about 2 percent of the potential land to be covered.[52]

4. Financial performance

Five-year results

AAIB's crop and livestock insurance results are attached in Table 6 and show a long-term loss ratio for crops of 44 percent, for livestock of 57 percent and an overall programme long-term loss ratio of 49 percent. These underwriting results are sound. It is, however, apparent that the programme is currently very small with an annual premium of only about US$150 000 on average.

Cost of agricultural insurance provision

Details not known.

[52] Desjardins Development International. 2009.

5. Public disaster assistance programmes

Details not known.

6. Additional tables

Table 2: Sri Lanka – AAIB insurance programmes

Paddy insurance scheme
Chilli crop insurance scheme
Big onions insurance scheme
Maize insurance scheme
Coconut cultivation insurance scheme
Sugar cane insurance scheme
Export crops and perennial crops insurance scheme
Flower insurance scheme
Plantation crop insurance scheme (tea)
Potatoes insurance scheme
Stores insurance scheme
Agricultural equipment insurance scheme
Health insurance scheme
Livestock insurance scheme

Source: AAIB, 2007

Table 3: AAIB sums insured and premium rates for paddy rice insurance according to risk region and irrigation status (Rs)

Land class	Low risk		Medium risk		High risk	
	Coverage per acre Rs	Premium (per acre) 5% of the coverage	Coverage per acre Rs	Premium (per acre) 7.5% of the coverage	Coverage per acre Rs	Premium (per acre) 10% of the coverage
Major irrigation	6 000 4 400	300 220	3 600 2 600	270 195	2 400 1 700	240 170
Minor irrigation	5 000 3 700	250 185	3 000 2 200	225 165	2 000 1 400	200 140
Rain field	4 000 2 800	200 140	2 300 1 600	175 120	1 500 1 000	150 100

Source: AAIB, 2007

Table 4: Paddy sums insured and premium rates

Insured perils	Insurance period	Sum insured (Rs/acre)	Premium (Rs/acre) (rate)
Drought	From sowing/ transplanting to harvesting	15 000 (Major irrigation)	750 (5%)
Flood		12 000 (Minor irrigation)	600 (5%)
Lack of water		8 000 (Rain fed)	480 (6%)
Excess of water			
Pests			
Diseases			
Wild animals			

Source: AAIB, 2007

Table 5: AAIB livestock terms and conditions

Class of insured animal	Insured perils	Insurance age (years)	Sum insured (Rs)	Premium rates
Cattle	Death and disablement	2 to 12	50 000 (maximum according to age)	6%
Goats	Death and disablement	1 to 6	7 500 to 10 000 (maximum)	6%
Sheep	Death and disablement	1 to 6	5 000 (maximum)	4%

Source: AAIB, 2007

Table 6: AAIB crop and livestock insurance results 2004 to 2007

Crop

	Rupees (million)			US dollars		
Year	**Premium**	**Claims**	**Loss ratio**	**Premium**	**Claims**	**Loss ratio**
2004	5.86	4.24	72%	57 194	41 382	72%
2005	6.88	2.37	34%	68 662	23 653	34%
2006	6.09	1.51	25%	58 464	14 496	25%
2007	10.32	4.66	45%	92 570	41 800	45%
Total	**29.15**	**12.78**	**44%**	**276 890**	**121 331**	**44%**

Livestock

	Rupees (million)			US dollars		
Year	**Premium**	**Claims**	**Loss ratio**	**Premium**	**Claims**	**Loss ratio**
2004	3.5	2.1	60%	34 160	20 496	60%
2005	4.7	2.2	47%	46 906	21 956	47%
2006	4.8	3.4	71%	46 080	32 640	71%
2007	8.7	4.6	53%	78 039	41 262	53%
Total	**21.7**	**12.3**	**57%**	**205 185**	**116 354**	**57%**

Total crop plus livestock

	Rupees (million)			US dollars		
Year	**Premium**	**Claims**	**Loss ratio**	**Premium**	**Claims**	**Loss ratio**
2004	9.36	6.34	68%	91 354	61 878	68%
2005	11.58	4.57	39%	115 568	45 609	39%
2006	10.89	4.91	45%	104 544	47 136	45%
2007	19.02	9.26	49%	170 609	83 062	49%
Total	**50.85**	**25.08**	**49%**	**482 075**	**237 685**	**49%**

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Overview of agricultural insurance: Thailand[53]

1. Agricultural insurance market review

History of agricultural insurance

A crop insurance programme operated in Thailand between 1978 and 1990. The programme was a multiple peril crop insurance (MPCI) product covering cotton, maize, and soybeans, and was closed principally because of high administrative and loss adjustments. Livestock insurance was available for dairy cows during 1979/80, but the programme was discontinued and currently there is no livestock insurance in Thailand.[54] In 2006 a weather index insurance (WII) pilot was developed with technical assistance from the World Bank. The programme was introduced in 2006 without insurance contracts and implemented on a small pilot scale with insurance contracts in 2007. It expanded further between 2008 and 2010. In addition, since 2009 a rice WII scheme has been piloted tested in Thailand.

Agricultural insurance market structure 2008

The maize weather index insurance programme (2006–2010) was underwritten by a co-insurance pool of nine insurance companies and the Thai Reinsurance Public Company Ltd. The General Insurance Association of Thailand is an important stakeholder and acted as market coordinator when the programme was introduced. The Department of Insurance is involved as regulator. The Bank of Agriculture and Agricultural Cooperatives (BAAC) is the distribution channel for weather index insurance.

Since 2009 the Japanese Bank for International Cooperation (JBIC), in conjunction with Sompo Japan Insurance (Thailand) Company Ltd. (SJIT) has been pilot testing a separate cumulative season rainfall deficit WII product for rice. BAAC is again acting as the distributer and main implementing agency for this pilot rice WII programme.

Agricultural insurance products available

The maize weather index insurance product is a conventional three-vegetative rainfall deficit cover that carries an average premium rate of about 10 percent. In 2007 it was introduced in one province and now in 2010 has been expanded into seven provinces.

The SJIT insured rice WII product is a simplified cumulative season (July to September) rainfall deficit cover that carries a premium rate of slightly less than 5 percent and which has two indemnity payout thresholds: (a) drought with an indemnity of 15 percent of the principle; and (b) severe drought with an indemnity of 40 percent of the principle.

[53] Source of country overview information: World Bank Survey 2008, updated to 2010 by Author under FAO Survey 2010.

[54] Agra-CEAS, 2007.

Thailand is one of the most flood prone countries in the world (flood ranking 6th). Currently flood insurance is not available for agriculture, but research is being conducted into remote sensing applications to flood insurance.

Table 1: Agricultural insurance available 2008

Crop insurance products available				Greenhouse	Forestry
MPCI	Named-peril	Crop revenue	Index-based		
No	No	No	Yes	No	No
Livestock insurance products available					**Aquaculture**
All risk	Accident and mortality	Epidemic disease	Other	Index-based	
No	No	No	No	No	No

Source: World Bank Survey 2008; and FAO Survey, 2010

Delivery channels

For weather index insurance, the sole delivery channel at present is BAAC, which has been an instrumental stakeholder in the development of both the maize and the rice WII programmes. BAAC has a major outreach to farmers, as an agricultural bank, throughout the country, and has been involved in many extension activities to educate and enrol farmers in the weather index programme. BAAC was also involved in the earlier crop insurance programme in the 1980s. There are no special delivery channels or programmes for small and emerging farmers in Thailand, as the majority of farmers are small-scale producers.

Voluntary versus compulsory insurance

The maize and rice weather index programmes are voluntary. Insurance has not been made a pre-condition for access to loans by BAAC.

Agricultural reinsurance

Prior to 2010, the maize WII programme was considered too small to need a specific reinsurance programme, and capacity was provided by the pool of nine (seven today) insurers and one reinsurer operating under a co-insurance arrangement. Beginning in 2010 the maize WII pool co-insurers have placed a quota share treaty with leading international reinsurers of this class of business. It is not known whether the separate rice WII scheme is protected by reinsurance, but currently the scheme is very small.

2. Public support for agricultural insurance

Types of public support for agricultural insurance

There is no direct public support for a pilot weather index programme in Thailand, but there is indirect support in that the programme development costs are being carried by BAAC (a public

company) as well as by the private sector insurance companies. The programme overheads are not yet economically sustainable from the premium generated.

The government of Thailand has, however, since 2009, operated a minimum price guarantee programme for rice, maize and tapioca (cassava), which is administered through BAAC. Features of this minimum price guarantee programme are reviewed at the end of this country report.

Premium subsidies

In 2010 there was no premium subsidy on agricultural insurance in Thailand.

Public cost of agricultural insurance

There is no direct cost to the government in support of agricultural insurance.

3. Agricultural insurance penetration

Insurance penetration rate

The pilot maize weather index insurance programme has now been operating for four full years. In 2010 BAAC and the insurers have made major attempts to scale up the programme with the result that 3 182 maize farmers purchased voluntary WII cover on a total of 60 594 rai (nearly 10 000 hectares), equivalent to an insurance penetration rate of nearly 1 percent of the national maize crop area.

Table 2: Maize WII uptake (2007 to 2010)

Year	Number of farmers insured	Insured area (ha)	National maize area (ha)#	Percent of national crop area insured
2007	35	154	989 992	0.02%
2008	324	1 070.24	1 042 826	0.10%
2009	817	2 152.64	1 104 870	0.19%
2010	3 182	9 695.04	1 045 896	0.93%

Source: GIA, 12 July 2010 (FAO/APRACA survey 2010)[55]

FAO maize area statistics

In 2008 the programme was scaled up to four weather stations in four provinces, and then in 2009 this was further increased to eight trigger stations in five provinces and finally in 2010 the programme was expanded to cover 15 weather stations in seven provinces.

The SJIT rice seasonal rainfall deficit scheme started on a pilot basis in 2009 with 276 farmers in five districts of Khon Kaen Province and then in 2010 this was expanded to 1 122 farmers in 25 districts of Khon Kaen Province.[56]

[55] General Insurance Association (GIA), Thailand: Maize WII results at 12 July 2010.

[56] Yimlamai, 2010.

4. Financial performance

Five-year results

In 2007 the maize WII pilot programme was very small with reported TSI of US$41 622 and premium of US$2 782 and the policy was free of claims. The updated figures for 2008 to 2010 are reported in Table 3 with overall loss ratio of 63 percent. The programme is still too small to be commercially attractive to the stakeholders and premium is inadequate to cover the A&O costs.

Table 3: Maize WII underwriting results 2007 to 2010

Year	Premium (baht)	Claims (baht)	Loss ratio	Premium (US$)	Claims (US$)	Loss ratio
2008	769 120	0	0%	22 827	0	0%
2009	1 345 400	817 103	61%	39 313	23 876	61%
2010	6 059 400	4 326 452	71%	186 024	132 822	71%
Total	8 173 920	5 143 555	63%	248 164	156 698	63%

Source: GIA, 12 July 2010; and FAO/APRACA survey, 2010

In 2010 the SJIT rice WII pilot programme generated a total premium of US$22 500. It is not known whether the programme incurred any claims in 2010.

Cost of agricultural insurance provision

The weather index insurance programmes are currently in an early phase of implementation. As with any new product, a heavy investment is required, and such investment costs are not able to be supported by the initial low premium income volumes. At present the cost structure (percentage of premium income) of a mature programme cannot yet be stated. During this initial phase, it was agreed by stakeholders that the percentage of premium to be deducted as overhead expenses would be set at 5 percent of premium income, payable to insurers, and for marketing and distribution, 5 percent, payable to BAAC. The premium tax is 7.43 percent of premium income.

5. Public disaster assistance programmes

A system of financial compensation is operated in Thailand by the Ministry of Agriculture and Cooperatives. This programme provides compensation to farmers on an ad hoc basis for losses caused by drought and floods. The existence of this compensation scheme, which has operated for several years, operates in parallel with weather index insurance.

6. Government minimum price guarantee programme for rice, maize and tapioca farmers

Traditionally the Government of Thailand (GoT) has provided a price pledging or price support programme for rice farmers under which the government would purchase large quantities of rice at above market prices and to then store the rice – this practice often lead to major oversupply and very high costs to government of holding surplus rice stocks.

For the past two years the GoT has operated an alternative Price Guarantee Scheme (PGS) for three commodities, rice, maize and cassava. This programme is also known as a Farmers' Income Guarantee Scheme.

Under the PGS, farmers are required to register with the BAAC and to enter into a minimum price guarantee contract for that crop. During the price guarantee period, if the actual market prices of the crop are lower than the contract minimum guarantee price, then BAAC pays the difference directly to the farmer's account with the bank. In contrast, if actual market prices are higher than the minimum price guarantee the farmers are free to sell their produce in the market at the higher price. The programme is financed by GoT and farmers do not pay any fee for the minimum price coverage they receive. As such, this is a crop price guarantee scheme and not a crop price insurance scheme.

In 2009/10 the PGS was taken up by over 4.25 million farmers (mainly rice growers) and the scheme compensated over 3.9 million farmers for price shortfall below the guaranteed minimum prices for their rice, maize and cassava with total compensation of over 36 billion baht (Figures at July 2010, see Table 4 for details).

Table 4: Results from farmers price (income) guarantee scheme (2009/10)

Crop	No. of farmers registered	No. of farmers receiving price compensation	No. of contracts compensated	Value of compensation (baht million)
Maize	398 395	379 361	466 548	5 633
Cassava	445 776	380 294	428 853	2 432
Rice	3 411 777	3 193 201	4 816 016	28 372
Total	**4 255 948**	**3 952 856**	**5 711 417**	**36 438**

Source: Yimlamai, 2010

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Overview of agricultural insurance: Viet Nam[57]

1. Agricultural insurance market review

History of agricultural insurance

Agriculture is a very important sector in Viet Nam accounting for 22 percent of 2008 GDP and nearly three quarters of the population are based in rural areas. The country is very exposed to typhoons and excess rain leading to flooding, landslides, seasonal drought and also, in the south, to storm surge and coastal flooding.

The history of agricultural insurance dates back to 1982 when the former national insurance company Bao Viet Insurance Company launched a pilot MPCI individual farmer insurance scheme for rice farmers in Vu Ban and Nam Ninh districts of Nam Dinh Province. The programme was not a success and was discontinued in 1983. Between 1993 and 1997 Bao Viet mounted a further crop insurance scheme in 12 provinces. Currently (in 2009/10) Bao Viet does not insure crops and underwrites a small forestry and livestock portfolio. Groupama, the French mutual agricultural insurance company, was registered in Viet Nam in 2001 to underwrite crop and livestock insurance business.

Agricultural insurance market structure 2010

In 2008 there were 27 registered non-life insurance companies in the Vietnamese insurance market and one national reinsurance company Vina Re, with total non-life premium volume of VND11 813 billion or US$713 million or 0.8 percent of GDP. According to the Association of Vietnamese Insurers, in 2008 total agricultural insurance premiums amounted to VND1.68 billion (US$0.1 million) or less than 0.014 percent of total non-life premium. In 2008, four non-life companies underwrote agricultural insurance including: Bao Viet (99 percent share of total agricultural insurance premium), Groupama (<1 percent share premium), Bao Minh (<0.0 percent share) and Bao Tin (<0.0 percent share).

In 2010 only Bao Viet and Groupama were underwriting very small agricultural insurance portfolios. There is, however, an ambitious new public-private partnership initiative to introduce subsidized crop and livestock insurance into Viet Nam in 2011 (see Box 1 for further details).

Agricultural insurance products available

In 2010, Bao Viet was offering limited forestry (standing timber) insurance cover for forestry, rubber and sandalwood trees and traditional livestock mortality insurance cover. Groupama commenced underwriting agriculture in the Mekong Delta area in 2001 and offered a range of products

[57] This report draws on two main sources: 1) Word Bank. 2010. *Weathering the storm: Options for disaster risk financing in Viet Nam*, GFDRR, The World Bank, Washington, DC; and 2) N. Quang Hung. 2010. *Agricultural insurance in Viet Nam: Current situation and the pilot project,* presented at Aon_Benfield 2010 conference Beijing.

including traditional MPCI cover for rice, livestock insurance and also aquaculture insurance for shrimps. On account of poor uptake of their crop insurance products and anti-selection the company incurred high losses in 2005 and has subsequently ceased offering crop insurance. In 2010 the company is underwriting a very small livestock portfolio.

In addition, there has been extensive research and development into weather index insurance in Viet Nam over the past three or four years including a mesolevel flood river-gauge insurance scheme aimed at rice farmers located in the lower tracts of the Mekong River Delta who receive seasonal production loans from VIBARD, the major agricultural credit bank, and coffee drought index cover for individual farmers.

Table 1: Agricultural insurance available 2010

Crop insurance products available				**Greenhouse**	**Forestry**
MPCI	Named-peril	Crop revenue	Index-based		
No	No	No	Yes (but not implemented)	No	Yes (limited for rubber)
Livestock insurance products available					**Aquaculture**
All risk	Accident and mortality	Epidemic disease	Other	Index-based	
No	Yes	No	No	No	Yes (Pilot)

Source: FAO/APRACA Survey, 2010

Delivery channels

The main delivery channels include agricultural banks and farmers cooperatives.

Voluntary versus compulsory insurance

Currently, agricultural insurance in Viet Nam is voluntary.

Agricultural reinsurance

Vina Re, the former national reinsurer, which is now privatized (and which includes Swiss Re as a majority shareholder) is the main reinsurer for all non-life business including agriculture.

2. Public support for agricultural insurance

Types of public support for agricultural insurance

Premium subsidies

In 2010, there is no premium subsidy on agricultural insurance in Viet Nam. However, under the proposed PPPs 2011–2013, it is anticipated that the Government of Viet Nam will provide premium subsidies of between 50 percent and 100 percent of premium according to the type of farmer (see further details in Box 1).

Public cost of agricultural insurance

In 2010 the government does not provide any financial support to agricultural insurance. According to Quang Hung (2010), the subsidized premiums may be in the order of VND1 358 billion (US$70 million) for the crop, livestock and aquaculture insurance pilot programme 2011–2013.

3. Agricultural insurance penetration

Insurance penetration rate

In 2010 there is no crop insurance at all and livestock and forestry insurance is insignificant.

4. Financial performance

Five-year results

The agricultural insurance premium volume has been very small over the period 2004 to 2008 and is currently in the order of about US$100 000 per year. The five-year loss ratio is 92 percent with very high losses reported in 2005 (loss ratio 267 percent).

Table 2: Viet Nam – Agricultural insurance results 2004 to 2008

Year	Gross written premium (VND million)	Gross written premium (US$)	Claims (VND million)	Claims (US$)	Loss ratio (%)
2004	3 267	207 060	3 635	230 384	111
2005	454	28 553	1 211	76 163	267
2006	737	47 888	535	34 762	73
2007	833	52 936	647	41 115	78
2008	1 677	98 241	349	20 398	21
Total	**6 968**	**434 678**	**6 377**	**402 822**	**92**

Source: Quang Hung, 2010

Cost of agricultural insurance provision

Details are not known.

5. Public disaster assistance programmes

Viet Nam has an extremely well developed natural disaster management system and post-disaster emergency relief and reconstruction scheme that is partly funded by central government and local government (provincial and district-level governments). Under the State Budget Law of 2002, the central and local governments are required to allocate between 2 percent and 5 percent of their total planned budgeted for capital and recurrent expenditures to a contingency budget to meet contingent spending on preventing, combating and overcoming natural disasters (e.g. typhoon,

flood, landslide, drought). In 2008 the total central and local contingency budgets were in the order of VND9 050 billion (US$650 million).[58] Following major typhoon and flood events, farmers receive compensation payments usually in the form of seeds and fertilizers or small animals to replaced lost livestock.

Box 1: Viet Nam – Government subsidized pilot agricultural insurance programme 2011to 2013

According to the Ministry of Agriculture and Rural Development MARD and the Ministry of Finance (MOF) a ***new pilot agricultural insurance programme*** will be launched by the government in conjunction with the insurance sector from 2011 and 2013. The objectives of the pilot programme are to protect rural livelihoods, to improve the efficiency of the insurance market and to enable farmers to recover (get back into production) more quickly following natural disasters and or epidemic disease outbreaks.

Insured classes

The pilot programme will include the following classes:

- crop insurance: rice
- livestock insurance: cattle and pigs
- poultry insurance
- aquaculture insurance: fin fish and prawns and shrimps.

Pilot provinces:

The pilot crop insurance programme for rice will be implemented in Nam Dinh, Thai Binh, Nghe An, Ha Tinh, Binh Tuan, An Giang, Dong Thap provinces.

The pilot livestock and poultry insurance programmes will be implemented in Bac Ninh, Nghe An, Dong Nai, Vinh Phuc, Hai Phong, Thanh Hoa, Binh Dinh, Binh Duong and Hanoi provinces.

Insured perils:

Crop insurance will cover catastrophe perils such as typhoon (wind storm) and flood, drought and frost and also specific pests and disease of rice (e.g. brown plant hopper disease).

Livestock insurance will cover epidemic diseases in cattle and pigs such as blue-ear disease and foot and mouth disease (FMD).

Poultry insurance will cover epidemic diseases including avian flu.

Aquaculture insurance will cover natural perils such as storm and flood and diseases of fish and prawns.

Premium subsidies:

The following premium subsidy levels are proposed in the draft:

- poor rural farming households, premium subsidies of 90 percent to 100 percent
- other farmers, premium subsidies of 60 percent to 70 percent
- agricultural production organizations, premium subsidies of 50 percent.

Source: MOF draft decision by the Prime Minister's Office posted on MARD's Web site 9 September 2010

[58] World Bank, 2010a.

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