

## **EXPLORING GOVERNMENT SUPPORT MEASURES AND IMPLICATIONS OF CROP INSURANCE FROM INTERNATIONAL EXPERIENCES**

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### **Abstract**

*Crop insurance is one of the major categories in the agricultural insurance. However, the features of systematic risk and asymmetric information in crop production cause that commercial insurance companies would not be able to take the risk of catastrophe loss from natural disasters. It is necessary for the government to support the market of crop insurance. We find that the market of crop insurance has significantly grown since the last decade. Meanwhile, it also shifted agricultural protective policies to the agricultural insurance in many countries. Our research suggests that the government should devote to formulating legal acts, to establishing agricultural insurance funds, and to building risk transfer systems and reinsurance mechanisms, to improving techniques on loss assessment. Especially, it is important to encourage farmers to purchase the crop insurance policy by subsidizing the premium, in addition to the insurance policy tied to agricultural credit systems and protective policies. Overall, crop insurance should be a substantial operating system based on government strong supports and massive farmers' participation. It is expected that agricultural insurance would be a mainstream in the framework of agricultural policy to replace the traditional domestic support of AMS in the future.*

*Keywords: crop insurance, climate change, premium subsidy, government support, agricultural insurance, natural disasters*

## INTRODUCTION

One of risk features for crops is production under open environment. It means exposures of any farmland to natural hazards including typhoons, floods, landslides, droughts, earthquakes, volcanic eruptions and tsunamis. These natural hazards mainly come from climate change with abnormal change in rainfall, temperature, and wind speed, which result in quantity decrease and quality variation of crop output. Furthermore, farmers' income is usually affected by natural hazard damage and result in uncertainty situation. Traditionally, production risk is a critical threat to farmers' income, especially for small farmers and marginal farmers who are weak to afford any loss arising from natural hazard damage. Under the trend of climate change, it becomes a worldwide issue to protect the farmers' income and get policy support from government.

Many countries prevail in adopting market support program and inputs subsidy to protect farmers' income. However, expenditures of these market mechanism distortion measures are incorporate into Aggregate Measures Support (AMS) that have to be eliminated under Uruguay Round Agreement on Agriculture (URAA) requirement. On the other hands, fiscal spending on agricultural insurance belongs to Green Box, which is exempted from URAA, would be a policy direction for protection farmers' income in the long-run.

In fact, more than half of countries have implemented some form of crop insurance. These countries cover developed and developing countries, big and small farmers. For instance, United States and Japan have been carrying out crop insurance since 1938, where United States even had triggered crop insurance reforms in 1994. South Korea began to implement crop insurance from 2001. China restored crop insurance in 1980s, and made strong efforts to push crop insurance scheme and create pilot insurances in 2004. The facts reveal agricultural insurance is getting more important than before in the world.

In general, insurance is a form of risk management used to hedge against a contingent loss. The conventional definition is the equitable transfer of a risk of loss from one entity to another in exchange for a premium or a guaranteed and quantifiable small loss to prevent a large and possibly devastating loss. However, crop insurance is quite different from commercial insurance in some features, including natural disaster causing damage systematic risk, asymmetry information in underwriting, production process with biological production complexity, and geographical dispersion of agricultural area. These features make difficulties in achieving adequate risk diversification for agricultural insurers and have problem of moral hazard and inverse selection in setting premiums. Crop insurance is considered as a special business line in insurance market.

It needs public support in premium subsidy, reinsurance arrangement, risk transfer, agricultural insurance acts, technical assistant in loss assessment from government. The purposes of this study are to overview crop insurance and explore some lessons from international experience for deriving policy implications for government.

The remainder of the paper is organized as follows. The next section briefly describes the growth in international crop insurance market. Section 3 introduces government support measures for crop insurance in major countries, and derives policy implications from international experience in Section 4 followed by concluding remarks in the final section.

## **GROWTH IN INTERNATIONAL AGRICULTURAL INSURANCE MARKET**

### **Premium volume**

In 2008, the World Bank conducted a survey on agricultural insurance programs in 65 countries, which accounting 75 percent of total premium in the world. Global agricultural premium increased dramatically between 2004 and 2007, rising from US\$ 8 billion to about US\$ 20 billion, US\$ 15 billion of which is captured by the World Bank survey as table 1. Almost 90 percent of global agricultural insurance premium is underwritten in high-income countries and China.

From a geographical perspective, the bulk of the premium is underwritten in the United States and Canada, with approximately 62% of the market. This is followed by Asia with 18% and Europe with 16%. The balance comprises 2% in Latin America and 1% in Oceania and Africa respectively.

This stunning increase was caused by rising agricultural commodity prices and sum insured values on which premium was paid, the expansion of agricultural insurance in China, Brazil, and Eastern Europe, and increasing government subsidy support in major countries include Brazil, China, South Korea, Turkey, and United States. In 2013, the agricultural insurance premium in China was estimated at US\$ 5 billion, making this middle-income country as the second-largest agricultural insurance market after United States which was US\$ 12 billion.

In Asia and the Pacific region, the agricultural insurance premium for the region has increased from US\$ 1.6 billion in 2005 to nearly US\$ 4.0 billion in 2009 and represents slightly over 20 percent of the total global agricultural insurance premium (FAO, 2011). In 2009, the major agricultural insurance markets in Asia and the Pacific region by premium were China (50% of total premium), Japan (31%), India (11%), Australia (4%) and South Korea (3%), and overall these five markets accounted for over 98% of the total regional premium.

Table 1. Estimated 2007 Agricultural Insurance Premiums

Development status	Number of countries	Estimated crop premiums	Estimated livestock premiums	Estimated agricultural premiums	Percentage of global agricultural premiums	Penetration
unit		\$ million	\$ million	\$ million	%	%
High-Income	21	11,869.0	1,192.3	13,061.3	86.5	2.3
Upper Middle-Income	18	872.6	40.1	912.7	6.0	0.3
Lower Middle-Income	20	789.3	334.1	1,123.5	7.4	0.2
Low-Income	6	0.2	4.8	5	0	0
All Countries	65	13,531.1	1,571.4	15,102.4	100	0.9

\* Penetration defined as premiums as a percentage of 2007 agricultural GDP.

Source: Mahul and Stutley (2010a)

In contrast, in many middle-income countries, agricultural insurance has been operating for only 5–10 years. It takes time to promote agricultural insurance. Since insurance market is developing and divisions of insurance company are not popular in rural area, most agricultural insurance schemes are depend on agricultural cooperatives and farmers association operation. If agricultural insurance schemes are connected with agricultural financial system, which ask farmers for agricultural insurance while applying credit, would be an effective way to promote agricultural insurance.

Table 1 also shows that 91 percent of the agricultural insurance business by premium comes from crop insurance. It implies that crop production risk and relative weak economic status are much more concerned than livestock insurance by most countries.

### Penetration rate

Despite this recent growth, penetration rate is still much lower than non-life insurance penetration in most countries. Agricultural insurance penetration rate is expressed as the ratio of agricultural insurance premium to agricultural GDP. However, even in developed country agricultural insurance penetration rate is only 2.3%. FAO (2011) pointed out the highest insurance penetration rates are found in countries that have large national subsidized schemes and where crop and livestock insurance is either compulsory or compulsory for crop-credit.

### Insurance products

Crop insurance products can be classified into three main groups based on the method of determining how claims are calculated: (1) yield indemnity based; (2) weather index; and (3)

revenue indemnity based. The yield indemnity based crop insurance classification is often divided into two subclasses—named peril crop insurance (NPCI) and multiple peril crop insurance (MPCI). Perils are damaging weather events. NPCI products provide indemnity against those adverse events (mainly is hail damage) that are explicitly listed in the policy. Contrast to MPCI provides insurance against all perils that affect production unless specific perils have been explicitly excluded in the contract of insurance. The most popular form of traditional indemnity-based crop insurance product is MPCI found in 53 percent of countries, followed by NPCI in 41 percent of countries. MPCI, which is underwritten mainly in the United States and Canada, accounts for 74 percent of the total agricultural insurance premiums underwritten worldwide. NPCI, which is mainly underwritten in European countries, accounts for 16 percent of the total agricultural insurance premium underwritten worldwide.

## **GOVERNMENT SUPPORTS**

### **Support measures**

One common feature of many agricultural insurance programs is government support. There are many ways of government support involvement in agricultural insurance markets. Crop insurance premium subsidy is the most common support from government. Other enabling measures are important as well, such as the legal and regulatory framework, reinsurance, technical and administrative assistance, and linkages to government extension services and credit system in agriculture.

According to the 65 countries surveyed report by World Bank in 2008. Table 2 indicates government support measures include insurance legislation, insurance premium subsidies, administrative and operational subsidies, loss assessment subsidies, public sector reinsurance, and other support (R&D, training), where insurance premium subsidies are most common support measure, which 63% of surveyed countries provide, follow by insurance legislation(51%), public sector reinsurance(32%). The percentage of all government support measures to crop insurance in high-income countries is higher than other income level countries. Half of the surveyed countries have some form of crop insurance legislation, with marked differences across regions. In Europe 71% of countries have some forms of crop insurance legislation. The figure is just 30% in Latin America and the Caribbean.

FAO (2011) presents a series of recommendations on the supporting roles governments can play in promoting the introduction of agricultural insurance. In start-up stage, governments can play a very important role in creating an agricultural insurance infrastructure, including establish an enabling legal and regulatory framework, enhance weather station infrastructure

and information systems, carry out insurance product research and development, and arrange education, training and capacity building for insurers, delivery channels and farmers.

There appears to be a positive correlation between the level of public sector support and the penetration of agricultural insurance. Public sector support is high in the United States and Canada and these countries account for 70% of the underwritten premium in the market. The governments of many European countries provide support and Europe underwrites 17% of the premium. In Africa and countries such as Australia and New Zealand where there is little or no public sector involvement, the levels of underwritten premiums are very low.

Table 2. Percentage of Government Support to Crop insurance,  
by Development Status and Region

Development status/region	Number of countries	Insurance Legislation	Insurance premium subsidies	Administrative and operational subsidies	loss assessment subsidies	Public sector reinsurance	Other support (R&D, training)
Development status							
High-income	21	67	67	24	14	52	38
Upper-middle-income	18	50	56	6	0	22	39
Lower-middle-income	19	42	74	21	5	21	53
Low-income	5	20	40	0	0	0	60
Region							
Africa	8	38	63	0	0	13	38
Asia	10	60	70	40	20	70	70
Europe	21	71	67	10	5	38	29
Latin America and the Caribbean	20	30	60	10	0	5	45
North America	2	100	100	100	50	100	100
Oceania	2	0	0	0	0	0	50
All countries	63	51	63	16	6	32	44

Source: Mahul and Stutley (2009a)

In detail, all types of government measures in major countries are described as below. Most data are cited from Mahul and Stutley (2009b). We focus on Canada, China, Japan, South

Korea, Spain, and the United States of America. They are most representative of crop insurance market in the world and different region and different farm characteristics.

### **Agricultural Insurance Legislation (Laws)**

In Canada, the federal government passed the Crop Insurance Act in 1959. Under this legislation, the federal government was prepared to enter into agreements with any province that established a crop insurance program and their own crop insurance acts. Federally, the Crop Insurance Program evolved into the Production Insurance Program and is now known as AgrilInsurance.

In China, although government has been aggressively promoting crop insurance since 2004, there is no specific agricultural insurance legislation until Agricultural Insurance Regulations were issued in 2013. The Agricultural Insurance Regulations involves important issues such as insurer's qualifications, supportive policies, catastrophe risk management, and the two chapters "agricultural insurance contracts" and "business rules" which distinguish agricultural insurance from other insurance products.

In Japan, the Crop Insurance Act was established in 1938. The Agricultural Disaster Compensation consolidates 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.

The voluntary or compulsory nature of Japanese agriculture insurance scheme depends on the type of insurance product and the farm size. Main agriculture products like 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 like livestock insurance, fruit and fruit tree insurance, field crop insurance, and greenhouse insurance are voluntary. The requirement from the Act would affect insurance penetration rate.

All crop insurance programs are voluntary in most countries. Greece and Cyprus where there is a government program of crop and fruit insurance, this insurance is compulsory. (Labudović, Todorović, 2011).

In South Korea, the Crop Insurance Program was first introduced in 2001 in an attempt to compensate farmers from possible catastrophic losses, thus stabilizing their production activities, using the insurance principle.

In the United States, the Federal Crop Insurance Act began in 1938 when Congress authorized the Federal Crop Insurance Corporation. The legislation affecting Risk Management Agency of the U.S. Department of Agriculture on crop insurance programs include the Federal Crop Insurance Act, the Farm Bill, the Agricultural Risk Protection Plan, and appropriation legislation, among others.

### Premium subsidies

Premium subsidies are used as a policy instrument to promote the widest possible voluntary uptake and adoption of agricultural insurance by farmers. The World Bank survey of 65 countries showed in table 3 that crop insurance premium subsidies cost governments US\$ 5.8 billion or 47% of global agricultural insurance premiums in 2007. Crop insurance premium volumes and premium subsidies are significant difference in different income level countries and region. Crop insurance High-income countries and North America share 91% and 75% of global agricultural insurance premiums, respectively.

Table 3. Countries with Crop Insurance Premium Subsidies, by Development Status and Region

Development status/region	Number of countries	Premium volumes (\$ million)	Premium Subsidies (\$ million)	Percent premium subsidy
<b>Development status</b>				
High-income	14	11,035.7	5,295.8	48
Upper-middle-income	10	595.1	272.6	46
Lower-middle-income	14	786.2	240.3	31
Low-income	2	0	-	0
<b>Region</b>				
Africa	5	37.3	3.9	11
Asia	7	1,260.3	468.8	37
Europe	14	1,794.6	869.1	48
Latin America and the Caribbean	13	215.4	98.0	46
North America	2	9,109.3	4,368.9	48
Oceania	0	0	0	0
<b>Total</b>	<b>40</b>	<b>12,416.9</b>	<b>5,808.7</b>	<b>47</b>

Source: Mahul and Stutley (2010a)



In 2007, the total agricultural insurance premium subsidies in Asia was estimated at US\$ 2.3 billion divided into crop insurance US\$1.26 billion (58% of total). The governments in five countries (China, India, Japan, Philippines and South Korea) provided a total of US\$ 468 million or 32% in crop insurance premium subsidies.

The top 10 providers of crop insurance premium subsidies in the world are shown as table 4. The United States is a big country in insurance market which premium volume was US\$ 8,020 million or 61% of the total surveyed countries in 2007. Federal crop insurance is often referred to as the centerpiece of the farm safety net because of its cost and broad scope for addressing natural disasters. Program cost is projected by the Congressional Budget Office to total US\$ 8.8 billion per year over the next decade. Producers pay a portion of the premium which increases as the level of coverage rises. The federal government pays the rest of the premium—62%, on average, in 2014—and covers the cost of selling and servicing the policies (Shields, 2015).

Italy and Spain have among the highest levels of premium subsidies of any agricultural insurance program in the world. In Spain, a system of differential premium subsidies applies, government provides different levels of premium subsidies for each type of insurance product (named-peril, etc.), and additional subsidies are provided for collectively purchased policies through associations, for target groups of farmers including young farmers, and for the contracting of multi-crop policies or multi-year covers. In 2006 the maximum premium subsidies available ranged from 27% to 75% for different groups insured crops. Currently, the costs of premium subsidies are shared between national and the provincial governments 74% and 26%, respectively. In Canada, the federal government also provides 60% of crop insurance premium subsidies, while the remaining 40% is provided by provincial governments.

The data was surveyed in 2007. Crop insurance has been rapidly growing since 2004 in China, it is expected over 50% premium subsidies from central and local government. The cost of premium subsidies in 2007 was estimated at CNY 1 billion (US\$132 million) for crop insurance. During the development of pilot crop insurance, subsidies have ranged from 20% to 100%, depending on the province, but typically were in the region of 50%. The premium subsidy for crops in 2007 was 25% provided by central government, plus 25% paid by provincial government, and the remaining 50% of crop premiums were payable by farmers. Central government increased its share to a 35% subsidy in 2008, thereby increasing the overall premium subsidy level to 60% for crops. The central government had spent CNY36 billion on agricultural insurance subsidies from 2007 to 2012, local governments also provided subsidies, and it brought rapid growth of agricultural insurance.

The Japanese government has a deep commitment for the development of agricultural insurance. Government support agricultural mutual relief premiums subsidies US\$ 640 million on average per year, and grants to federations US\$ 44 million on average per year. The government provides approximately 50% premium subsidies. The same percentage likes as in South Korea.

Table 4. Top 10 Providers of Crop Insurance Premium Subsidies, 2007 (millions of dollars)

	Premium volumes	Premium subsidies	Administration and Operating expense subsidies	Subsidy as percentage of total premiums (%)
United States	8,508	3,823	1,458.0	61
Canada	1,090	546	62.5	56
Spain	514	362		70
Japan	446	229	—	51
China	423	132		31
Italy	381	280		73
Russian Federation	315	156		50
Iran, Islamic Rep. of	167	82		49
Mexico	123	53		43
South Korea	59	17	16.1	56
Top 10 Countries	12,023	5,680		47
Other 55 Countries	1,508	128		8
Total	13,531	5,809	1,540.9	43

Source: Mahul and Stutley (2010a)

### Subsidies on Insurers' Administration & Operating Expenses

American federal government's subsidies have covered the companies' total operating and administrative expenses so far. These subsidies are intended to cover loss adjustment expenses as well. The subsidy paid to insurance companies to administer the federal program has ranged between 20% and 25% of total net premiums in recent years. The new Farm Bill mandates the decrease of this percentage to 18% of total. Administration and operating subsidies are a significant cost to the federal government and have increased from US\$ 0.7 billion in 2001 to US\$ 2.1 billion in 2008.

In South Korea, government subsidizes 100% of the NACF's crop insurance operational expenses. The estimated annual public cost of agricultural insurance including premium

subsidies (US\$ 27.9 million) and NACF's administrative and operating expenses (US\$ 15.5 million) are US\$ 43.4 million during the period 2003 to 2007. In Canada, subsidies on insurers' administrative & operating expenses for crop insurance around 6% of total premiums. The subsidies are not very popular as premium subsidies. There are no subsidies to the insurers for administrative costs or loss adjustment costs in China and Spain.

### **Agricultural reinsurance**

Since diversification is difficult to achieve for agricultural insurers, it is important to establish a suitable agricultural reinsurance mechanism. However, not more than twenty reinsurance companies worldwide are currently providing reinsurance capacity for agricultural risks and reinsurance companies might ask more restricted conditions for reinsurance treaties. The public sector plays a role in agricultural reinsurance through PPPs, that is, governments take responsibility where the private sector cannot offer reinsurance at affordable rates. The private sector has proven more cost effective than the public sector in providing reinsurance for other than catastrophe cover. Iturrioz (2009) points out government offer catastrophe cover effectively through the establishment and administration of catastrophe funds.

In Canada, the federal government offers a form of stop-loss coverage to provincial crop insurance agencies and many provinces purchase reinsurance in the private reinsurance sector. In China, Reinsurance (quota-share and stop-loss) is provided by the national reinsurer, China Re. Provincial governments may also act as reinsurer or co-reinsurer of last resort for specific programs, in the event that reinsurance limits are exceeded. In order to deal with catastrophe risk, China Agricultural Insurance and Reinsurance Community was set up on November 21, 2014, sponsored by 23 insurers operating agricultural insurance and China Property & Casualty Reinsurance Company Ltd.

In Japan, agricultural insurance scheme starts as the local farmers' cooperative action to establish a joint reserve fund by accumulating the contributions as premium for the purpose of making up for the loss. This is the insurance by the Agricultural Mutual Relief (AMR) Associations or municipal governments. This insurance program is operated as a device of dispersing risk, in which liabilities by the AMR Associations and the municipal governments are reinsured by their prefectural federation, and further, the federations' liabilities are re-reinsured by the national government, that is, 100% of the agricultural insurance liability is reinsured by the Japanese government.

In South Korea, NACF is reinsured on a quota-share basis with local reinsurers. Only the liability in excess of 110% local market loss ratio and up to 150% 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 150% local market loss ratio.

In the United States, private sector crop hail insurance is reinsured by commercial reinsurers. The public-sector crop insurance programs are reinsured by proportional and non-proportional reinsurance agreements provided by the government through the Federal Crop Insurance Corporation (FCIC). The Standard Reinsurance Agreement (SRA) is cooperative reinsurance agreements between the FCIC and insurance companies.

### **Operational systems of crop insurance**

Three systems for the delivery of agricultural insurance can be identified: State controlled systems, public-private partnerships and pure market systems.

#### **1. State controlled systems**

The state controlled systems are characterized by a high level of government intervention and the existence of one single insurance product which is usually commercialized by a state owned insurance monopoly.

Those systems are characteristic with a large market penetration due to the obligation and good portfolio diversification, but they mean high fiscal expenses, frequent bad service caused by monopolistic position. Some countries like as India and Philippine which agricultural insurance schemes are implemented by state-owned insurance company.

#### **2. Pure market systems**

Complete market system have low to moderate penetration and low level of risk diversification, commercial criteria dominate over technical, with the realization of competitive prices and without fiscal expenses (Manić, 2012). Practically, all in this system depends on the interests by insurer for dealing with this kind of insurance and definition of agricultural policy in one country.

Pure market systems are characterized by low government support for agricultural insurance and several insurance companies commercializing different types of products. The systems are based on market-oriented and commercially implemented by private sector in Australia and New Zealand. It is without get support in premium subsidy from government.

#### **3. Public-Private Partnerships systems**

Public-Private Partnerships (PPPs) systems are the most balanced model, both in terms of government support and product availability. Most developing countries witnessed a shift from public to market-based agricultural insurance since the 1990s. The period 1950–90 was a major growth in public sector operating multiple peril crop insurance programs (MPCI), particularly in Latin America and in Asia. FAO (2011) indicates that the public sector subsidized MPCI

schemes in Asia and the Pacific region have mostly performed very poorly and many of these schemes have either been reformed or replaced by PPPs.

PPPs are the preferred model for a successful agricultural insurance market. The current high administration and transaction costs translate into high premium levels which makes insurance unaffordable for many small providers. Public sector participation in supporting agricultural insurance is a key to developing and scaling up agricultural insurance programs, while the participation of the private sector brings skills, expertise, and innovation into the market.

PPPs have high penetration and a good diversified portfolio, technical criteria dominate over commercial, there is competition in the provision of services, and the state reinforces system stability. Also, the private sector provides the knowledge and technology, all with reasonable fiscal benefits. Since the 1990s, governments have promoted agricultural insurance through the commercial insurance sector, often under PPPs.

The typical case of PPPs is in the United States. Risk Management Agent (RMA) of government, as a regulator, it ensure the fairness of policies and set the rules. It also makes sure that policy rates are accurate and just for all large and small farmers. Working with the private sector, RMA provides innovative crop insurance products for new crops. Expanding coverage helps keep farmers and ranchers on their land by strengthening the farm safety net. Private-sector insurance companies sell and service the policies. RMA approves crop insurance premium rates, administers premium and expense subsidies, approves and supports products, and reinsures the insurance companies.

PPPs in agricultural insurance tend to improve the efficient operation and financial performance of government support agricultural insurance programs. This may be a consequence of better implementation of insurance principles, such as sound underwriting procedures and better pricing of risk, lower administrative costs, and greater financial discipline of private insurers. Most important is that the loss ratio which is defined as the ratio of loss payment to premium seems to be lower when schemes are operated by private sector.

## **POLICY IMPLICATIONS**

### **Instead of AMS**

Uruguay Round Agreement on Agriculture (URAA) of the World Trade Organization (WTO) requires government expenditures on Aggregate Measurement of Support (AMS) of agricultural products should be eliminated. All measures of AMS, including market price support and product-specific and non-product-specific payments linked to production, are incorporated into Amber Box. It is expected that AMS related measures would neither be sustainable nor effective

ways to protect farmers' income. However, in URAA, there is a Green Box, which waives payments, offering a less distortion measure to compensate farmers. Because government spending on agricultural insurance belongs to one of Green Box measures, agricultural insurance schemes are allowed rather than market price support programs to compensate farmers' loss from production risk in agricultural policy reforms. It also explains why the United States of America has been changing major spending on commodity program into agricultural insurance in farm safety net since 2004 Farm Bill, and South Korea established Crop Insurance Act in 2001.

### **Complementary to public disaster relief programs**

Public disaster relief programs intend to compensate income loss from natural disasters, which are not covered by insurance. In Japan, under this law, 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 the United States, crop insurance enrollment is a requirement for farmers to be eligible to disaster assistance. However, there is also disaster assistance for non-program crops that are not eligible for insurance. *Ad hoc* disaster payments varied considerably over years, totaling USD 2.9 billion in 2003, reducing to USD 3.1 million in 2005 and rising to USD 5 billion in 2007.

In Taiwan, the government started to offer bailout loans to farmers who suffered from the loss of natural disaster damages since 1989. In 1991, Council of Agriculture (COA) issued Natural Disaster Damage Relief Act to provide related aids and relief compensation to farmers' losses from the dedicated funds. Through the aid of relief, those farmers can then reconstruct the land and rehabilitate farming activities as soon as possible in order to keep on normal livings.

Since the beginning of natural disaster relief in 1991, the Taiwanese government has approved and delivered the relief aid US\$ 50 million per year for damage losses of agricultural production. Compared with the real damage loss averaged US\$ 300 million per year, which was caused by natural disasters in the same period, the relief aid was absolutely too short to aid farmers' income losses. Thus, the natural disaster relief is not an effective system to secure farmers' incomes under potential disaster exposures. However, it can help rehabilitation, as a complementary to crop insurance to make complete safety net of farmers' income protection.

### **Technical improvement**

Crop insurance is technically demanded. One of the many challenges to the insurance industry is to maintain the skill and expertise at levels of the underwriter, loss adjuster, and reinsurer—

not only to provide adequate levels of insurance, but also to assist the agriculture industry improve its risk management practices for production enhancement.

The loss assessment has been performed by local farmers living in rural areas, but these farmers, participating in crop insurance as the appraisers, do not possess expert knowledge on the damage assessment. To obtain the valid and reliable statistics for loss evaluation, the government needs to establish the systematic and comprehensive assessment procedures and improve loss assessment technique, including the professional training program, statistical database associated with the loss appraisal, and the monitoring system.

### **Reasonable Indemnity**

The compensation scheme for crop damages has a tendency to underestimate the value of crops because it does not reflect the market conditions. Farmers with crop insurances are not able to fully recover from financial losses. Such a problem provides some implications to policymakers. To maintain the soundness and sustainability of crop insurance, the government needs to fill the gap between the insurance market and the policy goal.

### **Establish databases**

Government should create public goods, such as agricultural and weather database for crop risk models, in order to provide domestic agricultural insurers with reliable data and quantitative tools. By doing so, insurers could better assess catastrophe risk exposure and thus design actuarially sound agricultural insurance policies.

### **Insurance supply meets demand**

There is no one single and universal insurance policy that meets all the farmers' potential demands. Each agricultural insurance policy is designed for a certain set of purposes under specific conditions. The assessment of the suitability of every agricultural insurance policy has to consider the production system, the type of asset to be covered, the key peril to which the insured is exposed, the risk location, data availability, farmer size, distribution channel, and delivery and loss adjustment needs.

### **Crop insurance is not everything**

We might consider the role of agricultural insurance as one of risk management tools. It highlights the fact that agriculture is subject to a very broad range of risks, but only some of which can be managed with a crop insurance policy. A common mistake done by policy-makers is to take agricultural insurance as a magic tool for risk management to climate adaptation and



to opt for insurance, while they usually do not systematically assess supply chain risk regardless whether agricultural insurance is the most appropriate or most cost-effective risk management tool. Supply chain risk includes weather related risks, natural disasters (including extreme weather events), biological and environmental risks, market related risks, logistical and infrastructural risks, management and operational risks, and policy and institutional risks, and etc.

### **Penetration rate**

One of the most significant problems is penetration rate still much lower than non-life insurance penetration in most countries. The government has to facilitate the insurance program by focusing on increasing the numbers of the major policies. However, the quality of the program is likely to depend more on the accurate estimation of insurance demands for the particular policies, farmers' demand, affordable insurance premium, and the scope of policies covered. Theoretically, the higher the penetration rate, the smaller the premium rate that generate sufficient premium volume to cover expected losses, administrative and operational costs. The point is that a sustainable crop insurance system relies on a high penetration rate.

### **Scaling up**

Scaling up crop insurance is to increase penetration rate. However, there are four main problems to be firstly resolved in many developing countries: lack of clarity over the respective roles of the public and private sectors, lack of the risk market infrastructure necessary to foster crop insurance, lack of technical capacity in domestic insurance providers, and lack of adequate tools and indicators to monitor and evaluate crop insurance programs. The Agricultural Insurance Development Program (AIDP) builds on World Bank experiences at agricultural insurance programs that have achieved a scale by supporting countries in implementing sustainable, cost-effective public-private partnerships in agricultural insurance that increases the financial resilience of rural households (Villalobos, 2013).

### **Premium subsidy is not an effective measure in the long-run**

The dramatic growth in crop insurance in China in recent years has most likely been achieved by the heavy subsidies on insurance premiums provided by national and provincial government. Similarly, the expansion of agricultural insurance over the past five years in South Korea has been stimulated by government decisions to introduce 50 percent premium subsidies. The high percentage of premium subsidies also applies to the rapid growth of crop weather index insurance (CWII) in India. So far, in most cases, governments have been able, 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 in 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 invest similar levels of agricultural insurance premium subsidies.

Governments might plan to use carefully selected premium subsidies to promote agricultural insurance uptake. World Bank (2009) recommended that governments should exercise extreme caution about offering open-ended premium subsidy because it would be very difficult to withdraw after subsidies provided. FAO (2011) showed that many of subsidized crop insurance schemes continued to perform very poorly at present. In contrast, most of the private crop and livestock insurance programs are operating profitably with loss ratios of less than 75 percent.

It seems a dilemma for the government to promote agricultural insurance by premium subsidy or establish a market-based agricultural insurance system. Theoretically, premium rate would decrease while penetration increases. Premium subsidy is only one of measures to promote agricultural insurance. Public sector can figure out other ways to increase penetration rates by making compulsory requirement, linking with credit system, connecting with qualification for joining price support program or inputs subsidy in order to decrease premium rate, and through collective decisions by farmer groups encourage participation, to make the implement of agricultural insurance feasible.

### **Alternatives to promote crop insurance**

Many governments in Asia and the Pacific region are unable to afford premium subsidies. The alternative ways of introducing and scaling-up of agricultural insurance need to be considered. There is 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 by 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 programs and finally, in some instances, by acting as a reinsurer as the last resort.

In countries that have very poorly developed agricultural insurance markets and a high proportion of small-scale marginal subsistence farmers, governments may need to consider alternative risk sharing and risk transfer mechanisms including improved natural disaster compensation programs and/or some form of food security or social safety net programs.

### **Affordable insurance premium**

Considering the income level of the agricultural sector and the seasonality of income stream, most of the farmers tend to perceive an insurance to be relatively high. Thus, it serves as a burden to increase a penetration rate of crop insurance. For farmers, insurance premium may be too high to afford, eventually discouraging them to participate in the program. To resolve such problem, both the government and regional states should play important roles in lowering farmers' financial burdens by increasing a share of contribution to the insurance premium.

### **Revenue insurance**

Crop losses from natural disaster are compensated under the current crop insurance, but most farmers are still exposed to the price risk, which is not covered by MPCl. From the farmers' perspectives, both the production and price risks should be simultaneously treated to stabilize their farming businesses. To achieve such a policy goal, crop insurance should further expand to cover price risk and introduce the experience of revenue insurance in the United States.

### **CONCLUSION**

Because of climate change and eliminating domestic support measures under URAA, most countries around the world have realized that crop insurance is an important instrument to protect farmers' income and manage production risk since the 1990s. However, the government subsidy on insurance premium and service related costs is one of key factors to implement crop insurance. It might cause severe financial burden for government to impede crop insurance being realized, such as the policy considerations in Taiwan. We can figure out shifting government expenditures from domestic support programs to crop insurance premium subsidy, such as the case from the United States' experience.

Crop insurance schemes are not independent of farmers' income support program. To avoid overlapped payments and risk covers, crop insurance schemes can be complementary relationship with income support programs and public disaster assistance programs. It will further establish a farm income safety net. In other words, crop insurance provides additional payment for the gap between individual expected income and government offering basic income support or relief aids.

Scaling up crop insurance is another key factor to ensure sustainable and cost-effective operation in crop insurance. Premium subsidy is not the only way to increase penetration rates. There are many ways to promote crop insurance. For instances, it can be promoted by compulsory requirements under Insurance Act, linking to credit system and qualify for domestic support programs, and public disaster assistance programs. Of course, the accurate estimation

of insurance demands for the particular insurance policies, farmers' demand, affordable insurance premium, and the scope of products covered by crop insurance. They are all important to increase penetration rates.

The resolution to secure farmers' income from disaster losses, therefore as we propose here, should be delivered by agricultural insurances. Not just for disaster damage loss coverage, agricultural insurances in fact can be used as an effective tool for risk management in the agricultural production sector. Compared with many other developing and developed countries already with agricultural insurances for crops, the pilot crop insurance scheme in Taiwan is right on the way started from 2015. The late start of a more complete agricultural safety net, however, is still expected to stabilize farmers' incomes and agricultural production in aligning with the existing natural disaster relief system operating in the recent decade.

## WAY FORWARD

Traditionally, agricultural insurance is considered as a useful tool for protecting loss from natural disaster. However, farmers' concept about insurance has difficulty in changing from relying on government price support and inputs subsidy without any payment. Thus, it would affect insurance participation rate and premium calculation. We suggest that future possible studies could focus on promoting insurance strategies and factors for premium calculation and adjustment. In addition, agricultural insurance not only covers natural disaster loss, but market price loss is also critical for farmers' income protection. We suggest that revenue insurance which covers production and price risk would be an important issue under the trend of climate change and trade liberalization.

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