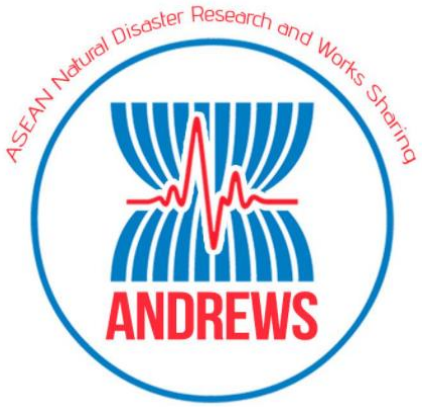
AGRICULTURAL INSURANCE IN ASEAN



ASEAN NATURAL DISASTER RESEARCH WORKS SHARING

ASEAN INSURANCE COUNCIL

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FOREWORD

Since 2019 Asean Insurance Council (AIC) meeting in Myanmar, all ANDREWS (Asean Natural Disasters Research and Works Sharing) delegates of Asean Member States agreed to put back ANDREWS into the intention why it was established that is to create research and work programs for the benefits of all members. Therefore three programs were agreed, i.e. Agricultural Insurance in ASEAN, Sovereign Catatsrophe Management in ASEAN and collaboration between ANDREWS and ARWC (Asean Reinsurance Working Committee). During the course of the preparation years ahead, two revisions have been made, such as discontinuing the third program, i.e. collaboration of ANDREWS and ARWC and creating sub-committee under ANDREWS to focus in handling agriculture insurance program as the members tought it was very important as rice is the most consumed food in ASEAN and the world is facing climate change.

Out of ten countries in ASEAN, only Singapore and Laos PDR do not submit the write-ups for some reasons.

We dedicate this Agricultural Insurance in ASEAN write-up for all country members so that this write-up can be shared. In the future, we will review and revise this write-up in relation with the conditions.

With the Spirit of ONE ASEAN.



Heddy Agus Pritasa
ANDREWS Chairman

CHAPTER I
INTRODUCTION

Human activities such as extensive burning of fossil fuels, transportation and cutting down of forests has substantially increased the amount of greenhouse gases in the atmosphere, raising the earth global temperature, causing global warming at the level much higher than previous decades and giving rise to climate change. According to recent report from the Intergovernmental Panel on Climate Change, from the period of 1850-1900 to the period of 2006-2015 the mean land surface air temperature has increased by 1.53^{o}C. The UN defines climate change as a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Climate change affects processes involved in land degradation (soil erosion, vegetation loss, wildfire), desertification (water scarcity) and food security (crop yield and food supply). It is one of the major challenges of our generation, it threatens the cleanliness of air, depletes water sources and limits food supply. Climate change affects all regions of the world. Ice shields on the north and south poles are melting and the sea level is rising. Extreme weather events and rainfall are becoming more common in some regions, while other regions are experiencing more extreme heat waves and drought.

Climate change is a serious risk to poverty reduction and threatens to undo decades of development efforts. As the Johannesburg Declaration on Sustainable Development states, “the adverse effects of climate change are already evident, natural disasters are more frequent and more devastating and developing countries more vulnerable.” While climate change is a global phenomenon, its negative impacts are more severely felt by poor people and poor countries. They are more vulnerable because of their high dependence on natural resources, and their limited capacity to cope with climate variability and extremes.

Agriculture is one of key sectors in Southeast Asia region, accounting for a substantial share of the region’s GDP and more importantly employing an important part of the workforce. The region diverse market include some of the world’s largest agricultural exporters as well as innovative centrs for research and development. Agriculture can help reduce poverty, raise incomes, and improve food security for people living in rural areas and working mainly in farming. Agriculture however, is vulnerable to the effects of natural disaster such as droughts and floods caused by climate change.

Agriculture insurance is an important risk management tool to help addressing the impacts of natural disaster on food security. It helps the farmers to purchase production inputs and pay the workforce in time of crop failure due to natural calamities. However, it should be

applied together with other risk management measures, as the World Bank stated: Agriculture insurance is an important component of risk management in agriculture, but does not replace good risk management techniques, sound production methods and investments in up to date technology. When coupled with these factors, agricultural insurance enhances the wellbeing of rural community and enhances the security of production (World Bank, 2009, Agricultural Insurance, Primer Series on Insurance).

CHAPTER II
AGRICULTURAL PROFILE OF ASEAN COUNTRIES

2.1. Brunei Darussalam

2.1.1. Climate

The climate of Brunei is generally hot and wet throughout the year with high humidity rates and periodic monsoon rains. The average monthly rainfall indicates seasonal patterns with two maxima (December being the wettest) and two minima (February being the lowest minimum) Hazard experienced by Brunei mainly consist of 1) Flooding, 2) Landslides, and 3) Forest Fire [2].

2.1.2. Population

Brunei has a land area of 5,765 KM^2 with 453,600 total population (circa. 2020). The Country's main industry sector is led by the Oil and Gas Sector which contributed 44.8% to the GVA of Q4 2020.

2.1.3. Agriculture Profile

The Agriculture, Forestry and Fishery sector saw an overall increase of 27.5% and contributed 1.3% to the total GVA in Q4 2020. The general overview of the agriculture sector is illustrated in table 2.1. as follows:

Table 2.1. Agricultural Sector in Brunei Darussalam

Gross Domestic Product (GDP) 2020 in B$ Million	
Crops (Vegetable, Fruits & other agriculture	22.15
Livestock	69.21
Developed Agriculture Land	
Livestock	4,778.53 ha
Crops	5,252.20 ha
Gross Output of Agriculture Production (in B$ million)	
Livestock	267.17
Crop	53.46
Agri-food Processing	150.23

Agriculture Labour Force	
Livestock	2,055
Crop	1,835
Agri-food Processing	4,294

Figure 2.1.

Rate of Self-Sufficiency 2020 (Source: Brunei Darussalam Agriculture and Agri-food Statistic by MPRT Brunei)



2.2. CAMBODIA

2.2.1. Contribution of Agriculture Sector in the National Economy

Agricultural sector contributed to approximately 21% (current price) of the Gross Domestic Product (GDP) in 2019. Anyway, industrial sector contributed to around 32.3%, and service sectorwas about 39.1%. It was noted that the share of agricultural sector fluctuated from 26.6% - 21% between 2015 - 2019 due to the growth of industry and construction sectors. However, if we look at the Agricultural Gross Value Added-GVA, we see the increase every year. Total Agricultural Gross Value Added-GVA increased from 15 938 000 million Riels in 2009 to 19 470 000 millionRiels in 2014 and continued to increase from 22,786,000 million Riels in 2019.

In 2019, contribution of agriculture sub-sector in the GDP including 53.67% for crops, 11.11% forlivestock and poultry, 24.30% for fisheries and 6.91% for forestry. It is noted that crop and fisheryproductions are the leading sub-sectors in agricultural production. Livestock and poultry production are another important element to supply domestic needs and exports, which need intensive work to develop it further.

Rate of labor force in agriculture sector compared to total labor force dropped from 48.7% in 2013to 37% in 2017. Agricultural mechanization replaced the loss of labor force. In 2019, the land preparation by using agriculture machinery was about 98% (only 91% in 2016 and 93.6% in 2017),and harvest by using machinery was about 70%.

2.2.2. Rice Crop Production

In 2019, the total rice cultivated area in the whole country was 3.328 million ha (115%), 2.731 million ha of which were rice cultivated area in rainy season, and 0.597 of which were the ones indry season. The total rice cultivated area decreased about 0.21% compared to the total cultivated area in 2018. The harvested area was approximately 3.263 million ha, 2.671 million ha of which were the harvested area in rainy season, and 0.592 million ha of which were in dry season. Total rice production was around 10.884 million tons similar to last year. Of all, the production was around 8.269 million tons in rainy season, and 2.616 million tons in dry season. The rice surplus was about 5.76 million tons equivalent to 3.69 million tons as milled rice. Annual average rice yield was about 3.335 tons/ha, which decreased about 0.54% (equivalent to 18Kg/ha) compared to last year. Of all, rice yield was around 3.095 tons/ha in rainy season, and 4.418 tons/ha in dry season. The results showed that the situation of the rice production in 2019-2020 is still in good condition, ensuring the food security, and rice surplus for exports despite the affected climate change such as drought in early season and late rainy season, lacks of water in the dry season, floods affecting decrease of the total cultivated area, annual average yield, and total rice productioncompared to 2018-2019.

2.2.3. Horticulture Crop Production

In 2019, horticultural crop production area covered 94,541 ha (about 11% higher than last year); of which, 56,915 ha were wet season production and 37,626 ha were dry season production. Totalproduction was 879, 696 tons, with 82,137 tons higher than last year; of which, 512 701 tons for wet season horticultural crop production and 367,120 tons for dry season production. Main crop was vegetable which was grown on 57,262 ha and the total production was 682,012 tons. Other main horticultural crops that its production has increased significantly were mango occupied 124,319 ha with 1,448,677 tons of production; Pailin longan of 14,422 ha with production of 144,762 tons; banana of 35,111 ha with 615,478 tons of production, and dragon fruit grown on 799 ha producing 10,574 tons. Currently, vegetable production has been changing dramatically through the inclusion of modern techniques into the production system such as drip irrigation system, sprinkler and net house to improve the system more challenging both quality and safety. (See: MAFF Annual Report 2020).

2.2.4 Industrial Crop Production

The industrial crop production area was around 965,647 ha, 885,373 ha of which was in rainy season, and 79,274 ha was in dry season. Total industrial crop production was approximately 15,139,672 tons less than 708,131 tons compared to last year. Of total industrial crop production,there were around 14,277 tons in rainy season, and 861,751 tons in dry season. It was noted that total cassava cultivated area was around 656,868 ha with total production of around 13,512,755 tons; cashew, 228,308 ha with total production of around 208,769 tons; red corn, 200,036 ha withtotal production of 895,436 tons; for domestic demands and exports.

2.2.5 Animal Production

The promotion of animal production and increase of productivity is a priority for animal trades. Over the last five years, the commercial animal production has increased remarkably, from 8.26 million heads in 2015 to 13.81 million heads in 2019. In the year of 2019, commercial animal production increased by 37.6%; of which commercial pig production increased by 42.1%, and poultry production grew by 37.1%. The growing rate of the commercial models reflects positive changes in production type that leads to improving productivity and economic efficiency.(See: MAFF Annual Report 2020).

2.2.6. Fishing and Fisheries

Inland fisheries in 2016 achieved 509,350 tons which considered of

- Dai fisheries achieved 13,950 tons equal to 116,25% of 12,000 tons in the

plan andincreasing 524 tons in comparation with the same duration,

- Family fishing in fisheries domain in 2016 achieved 348,600 tons equaling to 101.34% of344,000 tons in the plan increasing 9,331 tons in comparation with the same duration,
- Family fishing in rice fields in 2016 achieved 146,800 tons equaling to 101,94% of 144,000tons in the plan increasing 11,590 tons in comparation with the same duration. (See: MAFF Annual Report 2017).

2.2.7 Export of Agricultural Crop Products

In 2019, Cambodia exported agricultural product of around 6.9 million tons in total, equivalent toUS 1,950 million dollars. Anyway, the official agricultural product export in 2019 (recorded by National SPS system) was around 4,876,953 tons, which increased around 13.20% compared to 2018. The export of milled rice in 2019 was approximately 620,106 tons to 59 countries includingChina, as the top exporting country, around 248,105 tons (40.73%); EU (25 countries), 202,990 tons (32%); ASEAN region (6 countries), 83,164 tons (13.4%); and other 27 countries, 85,847 tons (13.84%); of the total milled rice export.

Key product exports other than rice include dried sliced cassava of around 1,626,165 tons, fresh cassava of around 1,608,450 tons, cassava flour of around 56,874 tons, cashew nut of around 202,318 tons, fresh banana of around 157,812 tons, corn nut of around 119,993 tons, bean of around 9,370 tons, soy bean of around 57,250 tons, fresh chili of about 55,513 tons, pepper of approximately 3,693 tons, and fresh mango of about 58,162 tons, and mango lime of around 2,712tons. (See: MAFF Annual Report 2020).

2.2.8. Cambodia's Agriculture Sector Amid COVID-19

Agriculture has been considered as the backbone of the national economy. Of the total population,76% were living in rural areas and agriculture provided 31.2% of total employment and contributed20.7% to Gross Domestic Product (GDP) in 2019. However, the global pandemic caused by COVID-19 has made the world economy including the Cambodian economy move backward.According to the ADB report, Cambodia will experience a loss of more than US$ 390 million, which is equivalent to 1.15% of the country's GDP.

The agricultural sector is less affected but remains weak and it cannot offset the job losses in the tourism sector. COVID-19 has severely affected the services sector, especially the hospitality, tourism, and industry sectors which employ 620,000 people. Although the health of Cambodian farmers was less directly affected by COVID-19, there were still challenges facing the farming economy. Due to the limited development of agricultural markets and the fall in harvest prices, some farmers have had difficulty repaying debts from microfinance institutions and some have been forced to sell their land or sell their products

cheaply to pay off their debts, while 29.2% havetaken out new loans to pay off old debts. According to the World Farmers' Organization (WFO), during the COVID-19 period, poor farmers faced challenges in allocating income to buy health products, coupled with fewer brokers and a lack of transportation to take agricultural products to markets. Another effect of COVID-19 is border restrictions or closures and their impact on supplies in the market. According to one rapid assessment of the impact of the COVID- 19 outbreak on agriculture and food security in Cambodia, the supply of agricultural products in the market has declined due to import restrictions. In 2020, the domestic vegetable supply was expected to meet only 68% of the local demand, the local meat supply to meet about 82% of the local demand, while the domestic supply of fish and rice meets domestic demand and there is surplus for export. (See: Open Development Cambodia).

2.3. INDONESIA

2.3.1. Climate and Agriculture

Indonesia with 270 million population is the fourth most populated country in the world after China, India and US, and is a major producer of agricultural products. Most of the population is located on the island of Java and Bali. The island of Java and Bali account for only 7% of Indonesia's total land area, but account for 60% of the population.

The major food crops based on the area harvested are rice, maize, cassava, soybean and peanuts. Indonesia is also one of the largest producers of rubber, palm oil, coffee, cocoa and spices.

Agriculture's contribution to GDP is declining over the years. In 2018, agriculture contribution reduced by 0.35% compared with 2017. In 2019, agriculture contribution further reduced by 0.09% from 12.81% in 2018 to become 12.72% in 2019. However, it remains critical to the economy of Indonesia. Agriculture still absorbs biggest portion of labour force. Contribution of agriculture to Gross Domestic Product in 2019 is (in %):

Table 2.2. Contribution of Agricultural Sector to GDP in 2019

No.	Category	2015	2016	2017	2018	2019*
1	Food crops	3.45	3.43	3.23	3.03	2.82
2	Horticulture crops	1.51	1.51	1.45	1.47	1.51
3	Estate crops	3.52	3.46	3.47	3.30	3.27
4	Livestock	1.60	1.62	1.57	1.57	1.62
5	Agri services	0.20	0.20	0.19	0.19	0.19
6	Forestry	0.71	0.71	0.67	0.66	0.66
7	Fisheries	2.51	2.56	2.57	2.60	2.65
	Total	13.49	13.48	13.16	12.81	12.72

Note: * estimates ; Source: Central Agency on Statistics

Details of the subsectors are as follows:

1. Food crops
   Rice, maize, cassava, soybean, peanut, etc.

2. Horticulture crops
   Vegetable such as shallot, garlic, chilli, spinach, green and red bean, potato, cucumber, cabbage, tomato, carrot etc. Fruits such as banana, orange, mango, avocado, apple, starfruit, durian, guava, pineapple, papaya etc. There are also medicinal and ornamental plants included under this subsector.

3. Estate crops
   Rubber, coconut, palm oil, coffee, tea, sugar cane, clove and tobacco

4. Livestock
   Beef meat, buffalo meat, chicken meat, egg, fresh milk, mutton and pork

5. Fisheries
   Aqua culture fisheries and capture fisheries

6. Forestry
   Log and fire wood

As with other majority of ASEAN countries, the staple food for Indonesia is rice, hence rice farmland occupies the biggest land area compared with other food crops. There are in total 10.6 million hectares rice farmland in Indonesia, producing a total of 54.6 million ton of rice. However, Indonesia still needs to import rice from overseas to provide food for the population.

Maize farmland in Indonesia is 5.5 million hectares, which produces 24.9 million ton of maize which is mainly taken by industry.

On horticulture, the first important commodity is shallot. In 2020, the total production is 1.82 million ton. The production is increased from year to year. Peak production was reached in the month of December 2020 with 203,000 ton shallot from 21,370 hectares of harvested area. Second commodity is chilli which was produced at 2.8 million ton in 2020. Peak production was on August 2020 with 280,780 ton of chilli from 73,700 hectares of harvested area. There are two other type of chilli that is red chilli and cayenne chilli each produced 1.26 million ton and 1.51 million ton respectively in the year 2020

On fruits, the main commodities are bananas, orange, mango etc. Medicinal plants are stuff like ginger and turmeric. One last thing under horticulture is ornamental plants.

2.4. MALAYSIA

2.4.1. Agriculture Contribution to GDP

Agriculture sector was one of the economic pillars to the country's economy in its early stage of development with a share of 28.8% in 1970 and 22.9% in 1980. Nevertheless, in 1990 the share of Agriculture sector (16.3%) was overtaken by the Manufacturing sector (24.6%) following the advancement of Manufacturing sector that reflected the success of Malaysia's Industrial Master Plan – Phase 1. Although the services sector is now taking over the manufacturing sector as a contributor to economic growth, agriculture is still important because it can increase the income of farmers, fishermen, agro-based industries and ensure the nation's food supply remain sufficient.

In 2018, agriculture contribution decreased by 0.9% compared with 2017. In 2019, agriculture contribution further declined by 0.2% from 7.3% in 2018 to 7.1% in 2019. As of 2020, the share of Agriculture stood at 7.4% to overall country Gross Domestic Product (GDP). In the recent years, the share of Malaysia's Agriculture sector to the economy is comparatively small compared to our neighbouring countries such as Indonesia (13.7%) and Thailand (8.6%).In percentage (%), the contribution of agriculture to Gross Domestic Product (GDP) from 2015 to 2019 can be seen from the table below:

Table. 2.3. Agriculture contribution to GDP

Year	2015	2016	2017	2018	2019
GDP Contribution (%)	8.9	8.1	8.2	7.3	7.1

2.4.2. Agriculture Profile

Below is table 2.4. showing the profile of agriculture in Malaysia ranging from Palm Oil to Others:

Table 2.4. Agriculture Profile in Malaysia

No	Category	2015	2016	2017	2018	2019
1	Palm Oil	46.9	43.1	46.6	37.9	37.7
2	Livestock	10.7	11.6	11.4	14.9	15.3
3	Fisheries	10.7	11.5	10.5	12.5	12.0

4	Forestry/ Logging	6.9	7.2	5.6	6.9	6.3
5	Rubber	7.2	7.1	7.3	2.8	3.0
6	Others	17.7	19.5	18.6	25.1	25.9

Source: Department of Statistics Malaysia (DOSM)

Details of the Livestock and Fishing are as follows:

a. Livestock
Cattle, Buffalo, Goat, Sheep, Chicken and Pork

b. Fisheries
Marine Fish, Freshwater Aquaculture and Brackishwater Aquaculture

Although, the palm oil contribution is decreasing from year to year, palm oil is still the major contributor to the value added of agriculture sector. In 2018, palm oil contribution decreased by 8.7% compared with 2017 and further decreased by 0.2% in 2019. Other agriculture category is the second contribution followed by livestock, fisheries, forestry & logging and rubber category.

The production of main commodity crops namely oil palm (fresh fruit bunches) and natural rubber increase by 646.0 thousand tonnes (0.7%) and 36.5 thousand tonnes (6.1%) respectively in 2019 as compared to the previous year. According to FAOSTAT, for 2019, Malaysia is the second largest of palm oil producer in the world. On the contrary, the production of paddy declined by 11.0% from 2,639.2 thousand tonnes to 2,348.9 thousand tonnes for the same period.

Exports of agriculture sector in 2019 amounted to RM115.5 billion as compared to RM114.5 billion in 2018, increased by 0.9 per cent. Total imports was valued at RM93.5 billion as compared to 2018 at RM93.3 billion with an increase of 0.2 per cent. Trade balance of this sector rose by 4.1 per cent from RM21.1 billion in 2018 to RM22.0 billion in 2019.

2.5. MYANMAR

2.5.1. Profile

The landscape of Myanmar is diverse. Bangladesh and India are in the north, China, Laos and Thailand in the east, and the Indian Ocean in the west and south. Myanmar, that are protected by a mountain horseshoe going up to more than 3000 meters. The region is the second largest country in Southeast Asia. North of the delta lies the Irrawaddy basin and the arid plains of central. The Irrawaddy River flows across the middle of the country and creates a delta to the south.

Myanmar has a tropical monsoon climate with three seasons: winter between November and February is warm to warm during the day and the air is relatively dry. The summer of March through May is hot in most of the country. The monsoon, from June to October, brings the heavy rainfall required for the farming season.

A unimodal system occurs from May to October in the Irrawaddy Delta. A bimodal system starts in June with two precipitation peaks in July and September and a trough around the middle of August and a slowdown in October. Much of the central dry zone undergoes this bi-modal pattern of precipitation. From June to August, monsoon rains may be constant for long periods, particularly on the coast of the Bay of Bengal, in Yangon and in the Irrawaddy Delta. In September and October, the rainfall is less intense and with more sunlight. In winter and summer, however, it rains very little. Thus, any farming during this period is irrigated or selected crops grow only with residual soil moisture (i.e. black gram).

Myanmar Population is around 53 million and a national gross domestic product (GDP) of US$ 52.43 billion (89,147,341 million Kyat) according to major economic indicators of Ministry of Planning and Finance, 2018-19.

2.5.2. Agriculture Profile

Agriculture is critical for the economy, the sector accounts for 38% of GDP and employs 61.2% of the labour force (source of *Ministry of Agriculture Livestock and Irrigation*, 2015). Most of the population, approximately 70%, live in rural areas that rely on them for their livelihoods, agriculture is directly and indirectly involved.

In recent years, Myanmar has also been seriously affected by extreme weather conditions. According to the 2017 Global Climatic Risk Index, Myanmar is also the second most affected nation in the world change – floods, storms, droughts and hurricanes are predicted to increase in the coming decades.

Monsoon flooding and the risk of cyclones have caused extensive loss and damage. In 2015, approximately 1.4 million acres of agricultural land were reportedly impacted by flooding, of which 520,000 acres out of 1.4 million were completely damaged (IMF, 2015). In

2016, 100,000 people in five regions were relocated due to flooding, more than 400,000 acres of agricultural land were flooded, and 60,000 acres were completely damaged (IFRC, 2016). The major seasonal crops in Myanmar are as follows.

- Commercial rice is cultivated during the monsoon in the Delta region in summer.
- Monsoon and winter seasons, sesame, peanut, and green grams are cultivated in the central dry zone.
- Corn, commercial rice, and hybrids are also grown during the monsoon and summer seasons.

Myanmar is the 6th largest rice producer worldwide and as a major rice exporter, exporting a total of about 28 million MT in the 2014/2015 season. Rice is the country's largest crop and is grown on over 19.7 million acres, or more than half of its cropland.. Rice is grown in differing agro-ecological zones. Nearly 60% of the delta, including the Irrawaddy, Bago, and Yangon region of lower Myanmar, is cultivated with rain-fed rice.

The major risks to rice growers in this area tend to be flooded, salinity, and pests and diseases due to lack of space and drainage. On the other hand, the central dry zone is the driest with less precipitation, so irrigation is essential. There is considerable variation in access to water for irrigation. The uplands, a region where rice is often grown, includes Mandalay, Sagging, and Shan States.

The risk profile of Myanmar's rice farmers varies considerably depending on the location, the variety of rice planted, the proximity of water sources and the available labour force. According to the information from Myanmar farmers in 2015, 2016 and 2017, the most common risks identified by farmers were:

- Drought during transplanting, germination, and flowering.
- Excess rainfall at dry and harvest stage.
- Flooding in certain areas near the river.
- Labor shortage
- Market price exposure.
- Pests, specifically the brown hopper.
- Post-harvest losses

2.6. PHILIPPINES

2.6.1. Introduction

The Philippines is an archipelagic country in Southeast Asia. It is situated in the western Pacific Ocean, and consists of about 7,640 islands, that are broadly categorized under three main geographical divisions from north to south: Luzon, Visayas and Mindanao. The current population of the Philippines is 111,284,985* as of Friday, September 3, 2021, in 2018, the total land area used for agricultural crop cultivation in the Philippines was around 13.5 million hectares. In the previous year, the real gross domestic product growth of the agriculture sector was 3.9 percent.

The leading crops are rice, maize, sugarcane, coconut, banana, mango, pineapple, cassava, coffee, sweet potato, and eggplant. In terms of harvest area, the most extensively grown crops are rice, coconut, maize, sugarcane, banana, cassava, coffee, mango, sweet potato, and Manila hemp.

**Based on Worldometer elaboration of the latest United Nations data.*

2.6.2. Declines in Livestock brings down Agriculture, Forestry and Fishing

The Philippine Statistics Authority (PSA) and the National Economic Development Authority (NEDA) reported a 9.5% contraction in GDP growth for 2020. Among the three major economic sectors, agriculture contracted by a minuscule 0.02%, while the services and industry dipped by 5.5% and 4%, respectively.

In 2020, the agriculture sector logged in a 0.3% contraction during the first quarter (Q1), and managed to grow 1.6% and 1.2%, respectively, during Q2 and Q3. However, the sector contracted by 2.5% in Q4 of 2020, pulling down the full-year growth rate to -1.2%.

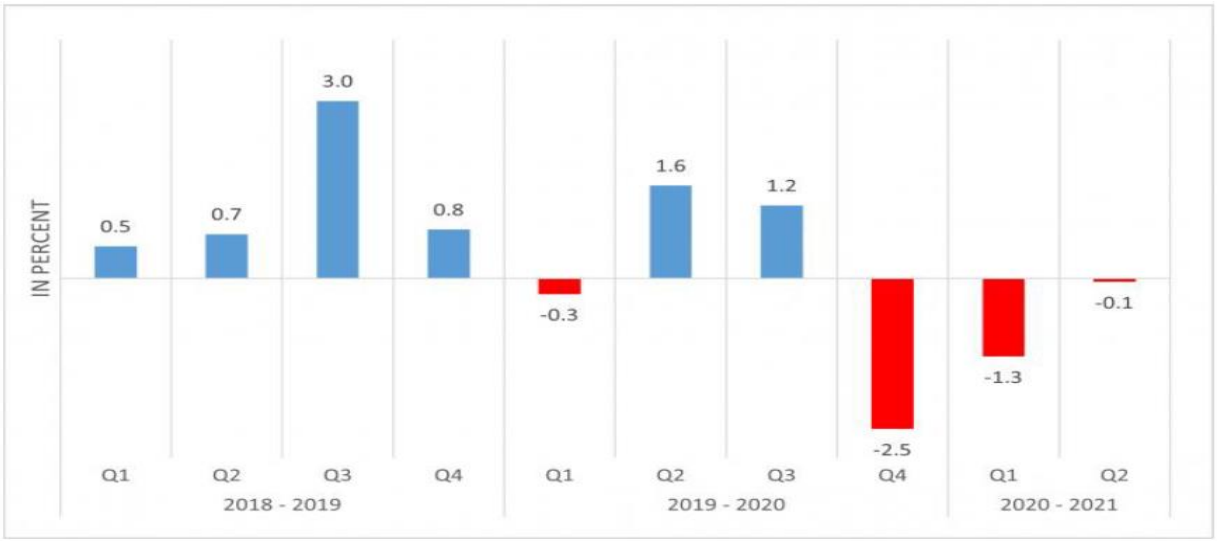
2.6.3. Gross National Income & Gross Domestic Product - 2nd Quarter 2021

Agriculture, forestry, and fishing (AFF) dropped by -0.1 percent in the second quarter of 2021, the third consecutive quarter of decline since its upward growth in the third quarter of 2020. The decline was due to the contraction of Livestock, -19.5 percent; Fishing and aquaculture, -1.0 percent; Cassava, by -4.4 percent; Mango, -0.5 percent; and Tobacco, -2.2 percent.

On the other hand, the top contributors to growth of AFF were Sugarcane, 32.2 percent; Support activities to agriculture, forestry and fishing, 4.7 percent; Other agricultural crops, n.e.c., 4.7 percent; Corn, 6.3 percent; and Palay, 1.2 percent.

Among the three major economic sectors, AFF shared the least to total GDP with 9.0 percent in the second quarter 2021.

Fig. 2.2. Agriculture, Forestry, and Fishing, Q1 2019 to Q2 2021
Growth Rate At constant 2018 prices



Source: Philippine Statistics Authority- 2nd Quarter Report 2021

Value of Agricultural Production. The value of agricultural production at constant 2018 prices posted a -1.2 percent contraction in 2020. Livestock, poultry, and fisheries recorded production declines. Crops, which recovered from the previous year's negative performance, registered a 1.5 percent growth in production. Increases in production were recorded in palay which came up with 19.29 million metric tons and corn at 8.12 million metric tons in 2020. Sugarcane posted a higher production level at 24.40 million metric tons. Production increments were also exhibited in mango, sweet potato, onion, coffee, tobacco, cabbage, mongo, and cacao. On the other hand, production declines were reported in banana, coconut, pineapple, cassava, rubber, eggplant, abaca, tomato, potato, ampalaya, and calamansi. Livestock production decreased by - 7.4 percent. In 2020, all the livestock components, except dairy, exhibited production losses. Similarly, poultry production was down by -3.5 percent. Chicken and duck recorded reductions in production while production increases were posted for chicken eggs and duck eggs. Fisheries production contracted by -1.3 percent during the period. Decreases in production were observed in many species such as skipjack, yellowfin tuna, fimbriated sardines, tilapia, and tiger prawn in 2020.

Table 2.5. Value of Production in Agriculture and Fisheries, Philippines, 2016-2020 (Value at constant 2018 prices)

Item	2016	2017	2018	2019R	2020
Value of Production					
lion pesos)	1,722,414	1,796,333	1,806,368	1,810,914	1,788,762
Growth Rate (%)	-1.5	4.3	0.6	0.3	-1.2
Crops (million pesos)	922,169	984,654	977,945	968,111	982,552
Growth Rate (%)	-3.3	6.8	-0.7	-1.0	1.5
Livestock (million pesos)	321,830	325,319	331,420	328,107	303,676
Growth Rate (%)	4.5	1.1	1.9	-1.0	-7.4
Poultry (million pesos)	209,362	219,044	231,655	245,281	236,710
Growth Rate (%)	1.4	4.6	5.8	5.9	-3.5
Fisheries (million pesos)	269,054	267,316	265,349	269,415	265,824
Growth Rate (%)	-3.9	-0.6	-0.7	1.5	-1.3

Source: Philippine Statistics Authority 2021 Selected Statistics on Agriculture

2.7. THAILAND

2.7.1. Agricultural Profile

Agriculture has long been a crucial production sector for the Thai population. Thailand has been an agricultural country since ancient times thanks to its location in the monsoon zone of Southeast Asia, whose topography, resources, environment, and climate have always been favorable for agriculture. The majority of the population has been engaged in agricultural or related activities since the Sukhothai period (1230 -1350 A.D.). Thailand had a national policy to promote agriculture and people were free to choose the jobs they preferred. Those who built houses and utilized the land would earn the land ownership, which would then be passed on to their descendants. Archaeologists assumed that Sukhothai had good irrigation and drainage system, enabling farmers to grow crops in large plots of land. Later in the Ayutthaya period (1350 -1767 A.D.), the country was under the governance of Chatusadom (Four Ministries), consisting of Krom Vieng (Police Bureau), Kromma Vang (Ministry of Palatial Affairs), Krom Klang (Ministry of Treasury and Taxation), and Krom Na (Ministry of Agriculture). Krom Na was responsible for farming and service animals. The Krom Na also promoted the utilization of wasteland, managed irrigation system, collected lean paddy rice as tax, and stored it in a state barn. This implies that agriculture had progressed in this era. The expansion of Krom Na proved that rice became an important crop that was widely cultivated during the Ayutthaya period. In addition to rice, major exports included foraged items, animal skins, aromatic wood, and fruits. When people rowed their boats through Thonburi, a border city in those days, they could see many large and small fruit orchards neatly planted along the way.

From past to present, the Thai agricultural sector has undergone significant structural changes. Like other parts of the world, Thailand relies on less manpower and increasingly replaces it with machinery and advanced technology. We can see that the agricultural sector's growth pattern has changed. Previously, it focused on quantitative expansion, such as expanding farming areas and using more production factors. The sector is now focusing on qualitative growth or productivity. Currently, Thailand is one of the major global exporters of rice and other agricultural products, such as fish and fish products, cassava, rubber, grains, and sugar. (With the total area of holdings of around 112.8 million rais or about 35.1% of the total area of country. For the regional area, Northeastern region occupied the largest area of holdings with 52.4 million rais (46.5%). It was followed by northern region and central region (23.7% and 16.9% respectively) and southern region had the smallest number of holdings with 14.6 million rais (12.9%).) and the survey result found that, the majority of holdings in Thailand (48.5%) use their land cultivating rice, followed by the number of holdings use their land cultivating field crops (21.7%), para rubber trees (13.2%) and permanent crop/forest (11.4%). Others usage (15.6%) and pen (10.0%).

Agriculture in Thailand can be divided into four main categories as follows:

2.7.1.1. Crops

This most common category is divided into different segments based on the suitability of the areas as follows:

1. **Farm crops**

   Rice is an economic crop with an extremely high demand from trading partners each year, particularly “jasmine rice” and some others, such as glutinous rice, fragrant rice, and white rice with high amylose content. The most exported varieties are white rice with high amylose content, accounting for nearly 50% of other varieties. Major trading partners that import Thai rice include China and the United States.

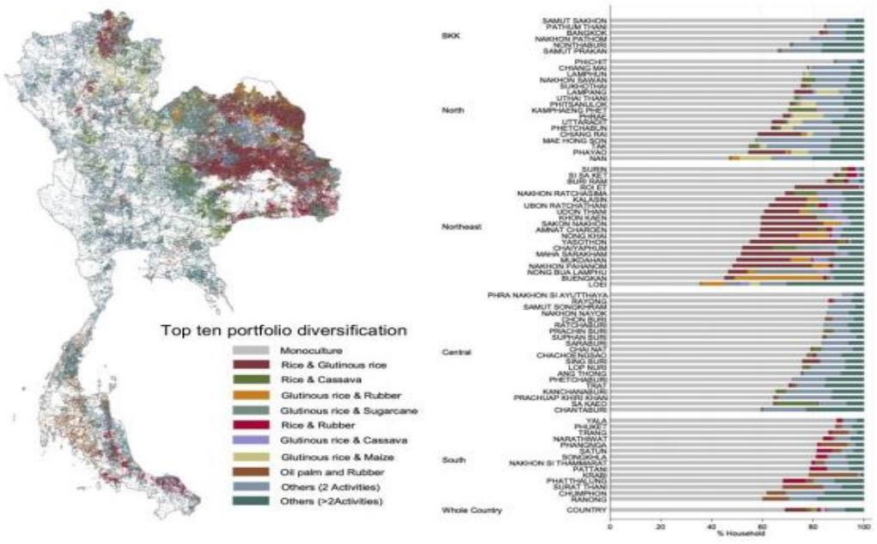
2. **Field crops**

   Field crops are essential for both domestic consumption and exports. Dominating sizeable cultivating areas, field crops grow quickly and require low maintenance. The crops are categorized into grains, oil crops, sugar crops, fiber crops, tuber crops, forage crops, and psychedelic crops.

3. **Horticultural crops**

   These diverse economic crops consist of vegetables, fruit, flower, and ornamental plants. Most farmers still grow horticultural crops, as shown in Figure 2.3.

Figure 2.3. Nature of Horticultural Crop Cultivation in Thailand



Source: Bank of Thailand

2.7.1.2. Livestock

Currently, the number of livestock farming is increasing, its benefits have been expanded beyond labor use and are categorized as follows:

1. Food

   This type of livestock farming raises animals for food (direct consumption), namely swine, cattle, chicken, and fish farming.

2. Beauty

   This type of farming is often called “breeding” because farmers breed beautiful animals, such as birds, dogs, and cats, to increase their values.

3. Labor Use

   This farming raises animals for labor usage, such as horse, dairy, and elephant farming. The main purpose of this animal farming is not for consumption or breeding but instead, they will be used for other purposes, such as milk from dairy cows.

2.7.1.3. Fishery

As Thailand is blessed with water resources where farmers can earn their livings, fishery has become another important and prevalent occupation among population living by the water. The fishery can be divided into fish farming and traditional fisheries. Fish farming can be divided into freshwater fish farming (including breeding and nursing aquatic animals), namely raising freshwater fish. Including fancy fishes and sea creatures, shrimp and other kinds of freshwater sea creatures such as frog, soft-shelled turtle, crocodile, etc. (including brackish-water creatures raised in freshwater area such as giant tiger prawn, snapper, etc.)

2.7.2. Sustainable Agriculture

1. Refer to farming using the principles of ecology that studies the relationship between living things and the environment.
2. 6 type of sustainable agriculture characterization such as organic farming, agroforestry, unintegrated farming, new theory agriculture, natural farming and other rotational farming system etc.
3. An integrated system of practices in crop production and animal production that is applied only to specified location that will last for a long time.

2.7.3. The Agriculture’s Contribution to the Country GDP

The agricultural sector contributes greatly to Thailand’s economic growth because it serves as the country's primary production and employment resources. This sector's gross domestic product (GDP) comes from agricultural activities, namely crop farming, livestock

farming, fishery, agricultural services, and forestry. It is calculated by deducting the sum of agricultural products and services with the cost of production (cost of seeds, animals, fertilizers, chemicals, animal feed, fuel, and lubricants, excluding labor costs). This GDP in agricultural sector will then reflect the farmers' overall economic condition. However, to precisely analyze farmers' well-being and income distribution, more factors must be taken into account, such as average income per capita, debt to asset ratio, poverty incidence, and inequality. That is because the environmental factors, including infrastructure, in each area and each household vary.

In addition, low yields or low market price in a given year will impact the overall national GDP. For example, in 2019, rice suffered lower yields because of delayed rainfall at the beginning of the planting season. That was why some areas faced water shortages for cultivation and were left barren. Furthermore, delayed rainfall and the Tropical Storm Podul further damaged rice, leading to fewer yields. The drought and insufficient water obstructed full development of rice grains and caused lower productivity (per rai: 400 sqm). Maize yields also declined due to the infestation of the Fall Armyworm and delayed rainfall, which hindered the full growth of maize. Furthermore, some farming areas were damaged by the flood. As a result, the price of rice rose due to its lower production yields, despite its constant market demand. The price of maize also increased because of lower production yields, while market demand from animal farming to use maize as raw material still remained strong.

2.7.4. In Percentage (%), the Contribution of Agriculture to Gross Domestic Product in 2019

The economy in 2019Q41[1] measured by gross domestic product increased by 1.6%, compared to a rise of 2.6% in 2019Q3. For production, the agricultural sector decreased due mainly to a reduction in main crop yields. Non-agricultural sector decelerated as a result of a drop in the industrial sector, while the services sector continuously increased. For expenditure, private final consumption expenditure still increased at slower rate, while gross fixed capital formation decelerated due to a fall in public investment. Meanwhile, government final consumption expenditure and exports and imports of goods and services declined.

Production Side Agricultural production decreased by 1.6%, in contrast to a rise of 2.7% in 2019Q3. The main factors are lower yields of main crops; namely paddy, sugarcane, oil palm, and maize due to drought. The production of livestock increased led by an expansion in swine production according to higher external demand, despite a drop in hen eggs production. Fishery production grew by 1.4% in Figure 2.5.

[1] Read more: Office of the National Economic and Social Development Council

Figure 2.4: Real GDP Growth Rates (%) in Thailand

	2018p	2019p1	2018p				2019p1			
			Q1r	Q2r	Q3r	Q4r	Q1r	Q2r	Q3r	Q4
GDP (YoY)	4.2	2.4	5.0	4.6	3.2	3.8	2.9	2.4	2.6	1.6
Agriculture	5.5	0.1	8.3	10.4	2.9	1.3	1.7	-1.4	2.7	-1.6
Non-agriculture	4.0	2.6	4.7	4.1	3.2	4.1	3.0	2.8	2.5	2.0
GDP (QoQ) Seasonally Adjusted			1.7	0.8	-0.1	1.3	0.8	0.4	0.2	0.2

Source: Office of the National Economic and Social Development Council

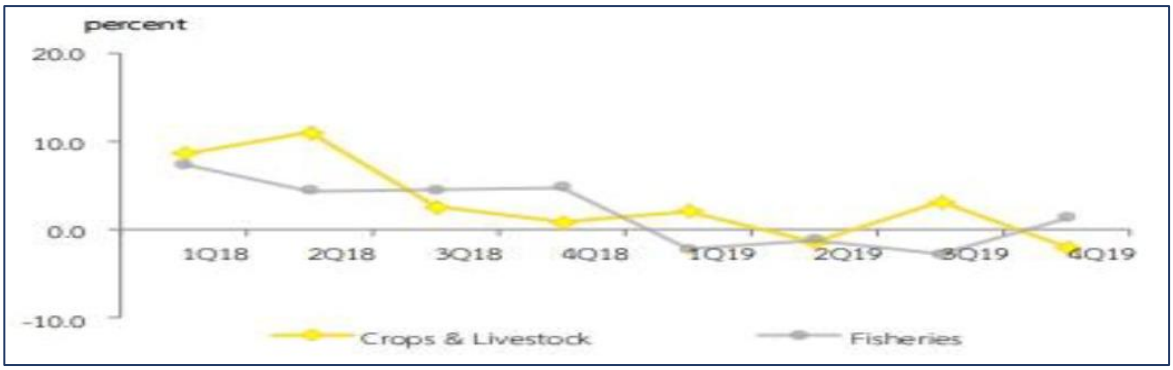
PRODUCTION APPROACH

Gross domestic product in 2019Q4 increased by 1.6%, slowed from 2.6% in the previous quarter. Agricultural production decreased by 1.6%, in response to lower yields of major crops. On the contrary, non-agricultural production increased by 2.0%, lower than a rise of 2.5% in the previous quarter. The slowdown reflected a negative contribution from the industrial sector with a contraction of 1.9%, due mainly to lower production in manufacturing production, despite a 4.1% increase in the service sector, higher than 3.9% in the previous quarter. Consequently, real GDP in 2019 grew by 2.4%, decelerating from 4.2% in 2018.

Agricultural, forestry, and fishing decreased by 1.6%, in contrast to a rise of 2.7% in the previous quarter contributed by reduced yields of paddy, sugarcane, oil palm, and maize due partly to drought. Despite a decreased production of hen eggs, that of swine increased in response to strengthened external demand. Fishing and aquaculture rose by 1.4%.

The implicit price deflator of agricultural products increased by 2.1%, as a result of increases in prices of paddy, especially glutinous paddy, fruits and oil palm, propelled by government policy related to alternative energy, however prices of cassava and rubber decreased. The prices of livestock, namely swine, chicken, and hen eggs increased. Moreover, fishing prices continually increased in Figure 2.3.

Figure 2.5. Growth rate of real GDP in agricultural sector (YoY)

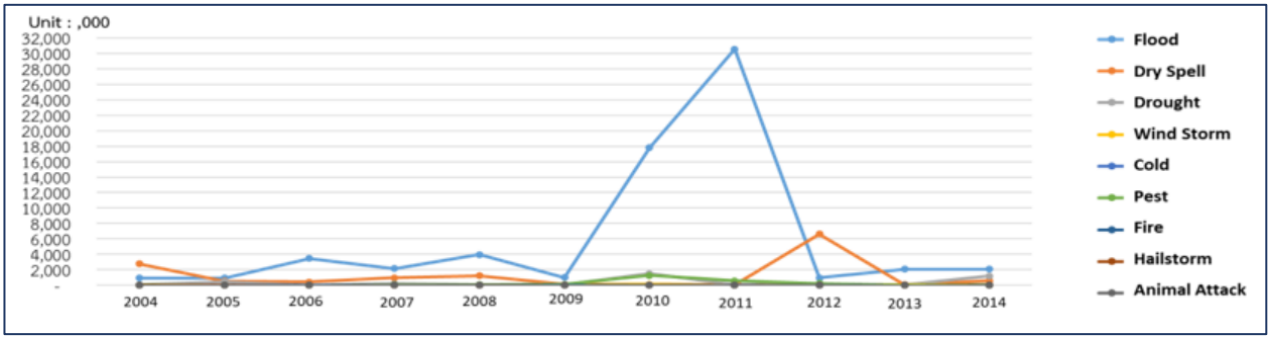


Source: Office of the National Economic and Social Development Council

As for the overview of the agricultural economy in 2019, crops were particularly affected by extreme heat and drought, including unusually low water in most reservoirs and natural water sources. As a result, water was insufficient for cultivation. In addition, some areas suffered from pest infestation, leading to shrinking agricultural service sector. Furthermore, climate change resulted in declining marine fisheries despite key supporting factors from the government's continuous agricultural policies, including proper water resources management and production planning. Figure 2.4. shows that the natural disaster that mainly caused the slowdown in the agricultural sector in 2019 was “drought”.

Figure 2.6.: Financial aids for natural disaster relief in Thailand from 2011 to 2021

Government Disaster Relief Budget during 2004 - 2014



Source: Office of the National Economic and Social Development Council

Despite its slowdown due to natural disasters, the agricultural sector still plays a critical role in Thailand's economy and society. It was recognized as the Thai economy's backbone, although its economic contribution in overall GDP has been declining over the past decade. Therefore, the government's risk management and agricultural policies are crucial role because they significantly affect the country's GDP. Without proper risk management, farmers may suffer bankruptcy when encountering severe disasters; they will run out of funding to ever

start another cultivation cycle again. This is also known as not being able to get back on one’s feet.

CHAPTER 3

AGRICULTURAL INSURANCE IN ASEAN

3.1. BRUNEI DARUSSALAM

Agriculture Insurance/Takaful

Currently, agriculture insurance/Takaful is not being offered by the registered insurers in Brunei.

3.2. Cambodia

3.2.1. Agriculture Sector

Agriculture sector is important to economic growth, but it needs to move away from its reliance on “production only” to value-added creation within the country. Agricultural insurance is an additional risk management tool which is increasingly being considered as important to support the resilience of farmers in developing countries. There below is a brief of summary of the initiative related to agricultural insurance undergoing in Cambodia.

3.2.2. The Crop Insurance Implementation Experiences of Forte Insurance Company

Forte Insurance has been the first company to implement agricultural insurance in Cambodia. Forte Insurance’s pilot test s started in 2015-2017 in Pursat and Battambang province with a Weather Index Crop Insurance (WICI) scheme for rice production. The data used to structure the weather indices were collected by weather stations that had been installed by Forte Insurance in fourteen communes in 3 districts (Bakan district of Pusat province, and Banan and Bavel districts of Battambang Provinces). The WICI scheme initially covered excessive and deficit rainfall and a dry-day index was subsequently added. AMK micro finance institute and Whether Risk company also joined partnership in implementing the schemes.

Given the challenges of operating WICI with weather station data (in particular the cost of installation and maintenance of the weather stations, and the reliability of data collected), in 2018and 2019, Forte Insurance transitioned to soil moisture index insurance. The project area was extended to five more districts in two provinces (Pouk, Sonikum and Chikreng districts of Siem Reap province, and Kampong Svay and Barey districts of Kampong Thom province). The numberof insured farmers, across all seasons, was 447 farmers (838 hectares).

Currently in 2021, Forte have been implementing a pilot test of WICI scheme for rice productionin wet season in three provinces (Battambang, Kampong Thom and Prey Veng). The WICI Schemeis under Rice-SDP is to reduce vulnerability of farming communities to extreme weather events, contribute to food security, crop diversification and enhance growth and competitiveness of the agriculture sector besides protecting farmers from production risks. Ministry of Economic and Finance (MEF), as the Executing Agency, has established a Project Management Office (PMO) tocoordinate, oversee and monitor the implementation of Rice-SDP.

The WICI Scheme have been providing insurance coverage to Rice Production of the Insured against excess and drought conditions (deficit rainfall and a dry day) that damage the crop and result in low yields which normally started from May to October 2021 in the wet season period.

The premium subsidy is 50% from the scheme to contribute the insured farmers. Based on the closed sale period of the scheme is being insured; the scheme achieved a small number of insured(665 farmers with 875 hectares) if against to the plan 100,000 hectares. This challenge is due to the outbreak of Covid-19 pandemic. However, during the scheme's promotion, 31,258 farmers (19,426 females) were attended the meeting of the product knowledge. The scheme also involvedAgri-input supplier and agriculture cooperative to the scheme as they are aggregators to support and involve the targeted farmers to participate the pilot scheme.

With the pilot testing scheme, 2020-2021, Forte Insurance have joined partnership of the RIICE project phase III with Ministry of Agriculture Forestry and Fishery (MAFF), Swiss Agency for Development and Cooperation (SDC), Syngenta foundation for Sustainable Agriculture (SFSA), agriculture cooperative and Agri-Input supplier to implement pilot testing as a dry test of area yieldindex insurance (AYII) using shadow policies (a fully designed insurance product that is shown tofarmers for their feedback but is not actually sold to them, thus, there is no contractual obligationbetween the insurance company and the farmer) for the wet season in 20 communes of four provinces (Prey Veng, Takeo, Pursat and Battambang). The insurance products and damage/loss assessment methods are based on the RIICE technology. the lesson learnt from the scheme will beconsidered and decided the commercial pilot testing and the ways of national agricultural insurance strategy.

Possibility of agriculture insurance in Cambodia, Forte Insurance have been participating the feasibility studies and financial education project on other crops, cassava and maize with SFSA and MFI micro finance institute 2018-2021 and the product scaling up for crop pilot testing on WICI for maize and cassava and AYII for rice in three provinces, (Pursat, Battambang and Pailin).

With this study, Forte Insurance also joined partnership with World Vision International (Cash Project) and SFSA to understand the potential risks causing by various biotic and abiotic factors and develop suitable index insurance products to support the aquaculture sector. The study on possibility of Aquaculture insurance is in 7 targeted provinces of Cambodia (Battambang, Kandal,Kampong Cham, KampongThom, Phnom Penh, Pursat and Siem Reap). The three organizations have developed an implementation strategy and plan to start from May 2021 to October 2022.

3.2.3. The ADB feasibility study and Implementing weather index crop insurance (WICI)

The Asian Development Bank (ADB) has set up the "Climate Resilient Rice Commercialization Sector Development Program", in short "Rice-SDP", to help Cambodia

transform the predominantly subsistence rice sector into a commercially oriented industry. The project is implemented in the largest rice-producing provinces of Battambang, Kampong Thom, and Prey Veng.

In the framework of the Rice-SDP initiative, a feasibility study on “Weather Index Crop Insurance”(WICI) was carried out between 2017 and 2018. The report on the feasibility study was published and provided a comprehensive analysis of issues such as demand for agricultural insurance, awareness and education, institutional frameworks, monitoring and evaluation, structure and costs of the WICI product, budget required and financing, and another implementation features of a WICI program.

The ADB report recommends the implementation of WICI products based on data collected through weather stations. The feasibility study team designed and analyzed prototype WICI products aimed at insuring the cost of production of rice cultivation. Insurance premiums for the WICI products were estimated to be in the range of USD 20-23/ha in the targeted areas, which is roughly equivalent to 10% of the value of productions costs. The demand assessment carried out by the feasibility study team highlighted that farmers expect the Royal Government of Cambodia(RGC) to subsidize the cost of the insurance policies.

According to the ADB report, the projected growth of the WICI scheme should increase from 500households insured in the starting year to roughly 100,000 households insured after 8 years of implementation. For the scheme to function and reach scale the report suggests investing in a) infrastructure (weather stations at commune level); b) insurance awareness; c) premium subsidies (suggested rate of 50%); and d) technical assistance. (See: eGen consultant, 2018).

On the basis of the recommendations presented in the feasibility study, ADB has decided to moveahead with project implementation; the WICI scheme are targeted to start its pilot commercial testing in wet season of year 2020, but during the COVID-19 were spreading, the project was extended to 2021. Forte Insurance plays role as lead consortium insurer in implementing WICI scheme.

3.2.4. The RIICE activities on remote sensing for agricultural insurance

The RIICE project developed an innovative earth observation-based service for the provision of comprehensive information on rice crop production. Such information includes the stage of growth cycle, identification of losses due to flood and drought, as well as yield forecasts. RIICE’s target is to reduce vulnerability of smallholder farmers engaged in rice production in two ways: 1) bettermanaging of domestic rice production and distribution; 2) make agricultural insurancesolutions more efficient and transparent.

In Phases I and II (2012-2017), the RIICE project has been monitoring rice production on thirteen demonstration test sites across six countries: Cambodia, India, Indonesia,

Philippines, Thailand and Vietnam. During Phase II RIICE managed to scale up to a monitoring coverage of more than15 million hectares per season. According to the RIICE documentation, accuracy assessments ofthe mapped rice area and yield lie mainly between 80% and 93% across the different countries. These results would demonstrate that RIICE technology can capture a substantial amount of the variability in yield across countries, seasons and environments, at a level of detail equal to or betterthan what is available from statistical offices.

In phase III (2019-2021), The RIICE Project have the form of a dry test of area yield index insurance (AYII) using shadow policies (a fully designed insurance product that is shown to farmers for their feedback but is not actually sold to them, thus, there is no contractual obligationbetween the insurance company and the farmer) for the monsoon season 2020-2021 in 20communes of four provinces (Prey Veng, Takeo, Pursat and Battambang). The insurance products and damage/loss assessment methods are based on the RIICE technology. The dry test of AYII isimplemented with involved partners such as Ministry of Agriculture Forestry and Fisheries (MAFF), Swiss Agency for Development and Cooperation (SDC), Forte Insurance Company, andSyngenta foundation for Sustainable Agriculture.

3.2.5. The Syngenta Foundation feasibility study for exploring agriculture insurance

The Cambodian government acknowledges the vital role of agricultural insurance in de-risking weather-related threats to farming communities. However, financial institutions and insurance companies have so far been reluctant to invest in this area. The reasons are insufficient experience, design, and implementation capacity and a lack of relevant infrastructure and the necessary data.

Joining the government to support and promote the growth of Cambodian agriculture, Syngenta Foundation for Sustainable Agriculture (SFSA) started an insurance market development programin 2018. After an in-depth feasibility study, we launched an index-based crop insurance scheme linked with financial education. The initiative is funded by the Swiss Capacity Building Facility involved Forte Insurance and AMK MFI as partners.

Aiming to launch three commercial index-based crop insurance schemes, we are now implementing a project that runs from August 2021 to July 2023. It focuses on rice, maize, and cassava in the provinces of Pursat, Battambang, and Pailin. The project focuses on the following:

1. Area Yield Index Insurance (AYII). This scheme covers yield losses for rice farmers from drought and dry spells, flooding, storms, and cyclones. Yield data are satellite-generated. Payouts are based on the average yield of the commune in question.

2. Weather Index Insurance (WII) protecting cassava farmers against drought and excess rainfall. The scheme uses ‘CHIRPS 5 km’ data and automatic weather stations.

3. WII for maize farmers facing drought or excess rainfall. This scheme uses the same data sources as the cassava WII.

3.2.6. The World Vision feasibility study for aquaculture insurance

The CAST Project, funded by the U.S. Department of Agriculture's Food for Progress program, aims to accelerate the growth and development of freshwater aquaculture in Cambodia. CAST aligns with the Royal Government of Cambodia's Strategic Plan for Aquaculture Development inpromoting increased access to improved Cambodian inputs, such as "seed" and feed. The project will strengthen all links in the value chain: hatcheries, fish producers and buyers/distributors. Cambodian producers will benefit from increased access to, and confidence in, high quality fish grown in Cambodia, produced and handled with proper standards.

WVI-C, FORTE, and SFSA carried out the pre-feasibility study project on freshwater aquacultureinsurance to explore the possibilities of insurance offering to aquafarmers. After this study, we decide to continue our research as feasibility study. This feasibility study aims to understand the potential risks causing by various biotic and abiotic factors and develop suitable index insurance products to support the aquaculture sector in Cambodia. It is expected that the outcomes from this study will provide valuable information on the current risk management practices by aquafarmersand the tools required for better risk management. The three organizations have agreed to sign a Memorandum of Agreement (MoA) to implement the feasibility study and pilot project. The threeorganizations have developed an implementation strategy and plan to start from May 2021 to October 2022. (See: World Vision-CASH project).

3.2.7. IFAD's "INSURED" initiative

The International Fund for Agricultural Development (IFAD) is implementing "INSURED", a technical assistance programme on climate insurance funded by the Swedish International Development Cooperation Agency (SIDA). The programme's overall goal is to increase resilience,capacity to manage risks, and improve livelihoods of poor rural households. The objective is to protect incomes and promote investments in the development of smallholder agriculture. In practice, INSURED assists governments and decision makers to define areas of climate insurance investment as part of rural development/agricultural risk management strategies; provides technical assistance for the design and implementation of climate insurance linked to IFAD's portfolio; builds capacity of local public and private partner institutions, and shares lessons for scaling up. Insurance Facility of the International Labour Organization (ILO) and are seen as a crucial step to developing sustainable and scalable climate insurance markets so rural poor peoplecan continue to benefit in the long-term. They

help inform governments where they should invest,the role of other players including the private sector, and the approaches needed. For Cambodia the activities of the Country Assessment have started with an initial scoping mission carried out inNovember 2018.

The feasibility study is financed by the Insurance for Rural Resilience and Economic DevelopmentProgramme (INSURED). The International Fund for Agricultural Development (IFAD), throughthe multi-donor Platform for Agricultural Risk Management (PARM), manages the INSURED programme, a technical assistance programme funded by the Swedish International Development Cooperation Agency (Sida). The INSURED programme has the overall goal to increase resilience,the capacity to manage risks, and improve livelihoods of poor rural households. INSURED worksat different levels to help develop agricultural and climate risk insurance for poor rural people andincrease their resilience. INSURED builds on IFAD's over 10 years of experience in developing innovative insurance solutions to drive and protect the development of rural livelihoods and agricultural value chains. It has learned that agricultural insurance and climate risk insurance aretools that work best as part of a holistic, strategic approach to agricultural risk management and rural development, and this is the approach advocated by IFAD and PARM. Holistic agricultural risk management assesses the categories and sources of risks, prioritizes the risks to be tackled forsmallholder agriculture, and selects the tools to be used or combined to address them. (See IFAD."INSURED. Mission Report – Cambodia". 11 December 2018).

3.3. INDONESIA

3.3.1. Rice Crop Insurance

Implementation of Indonesia rice crop insurance program commenced in October 2015. There are currently some 27 rice growing provinces participating in the program with a total of approximately 1 million hectares rice farmland.

In Indonesia, agricultural insurance is normally grouped under micro insurance. It is not yet developed very well due to its risk complexities and less developed technology to create risk modelling to understand the effect of a long drought to crops for example. Rice farm is very much affected by weather variation arising from climate change. Given the risk in agricultural sector, it has rarely been considered as potential market by insurers.

Farmers and their rice farmland spread all over Indonesia across rural areas, requiring mobilization of resources to reach their location in order to increase farmers' participation in the program. The challenge is to open up their mind about risk mitigation and raising their awareness on insurance. These are problems inherent to rice crop insurance business.
Insurers are faced with difficult situation when on one side insurer has to be prudent and carry out careful risk selection, but since this is a government initiative, insurer has to cover as much farmers as possible and insurer is expected to accept the risks whatever the situation is.

3.3.2. Implementation of Rice Crop Insurance 2015-2019

In order to protect the farmers from the risk of rice crops loss, the Ministry of Agriculture opt to use risk transfer mechanism. Law No. 19 year 2013 allows the implementation of rice crop insurance which commenced on 1 October 2015. State owned insurance company, Jasindo, was appointed as the insurer and Jasindo then created working unit of rice crop insurance in head office and in branch offices.

3.3.3. The Insurance Program and Underwriting Performance

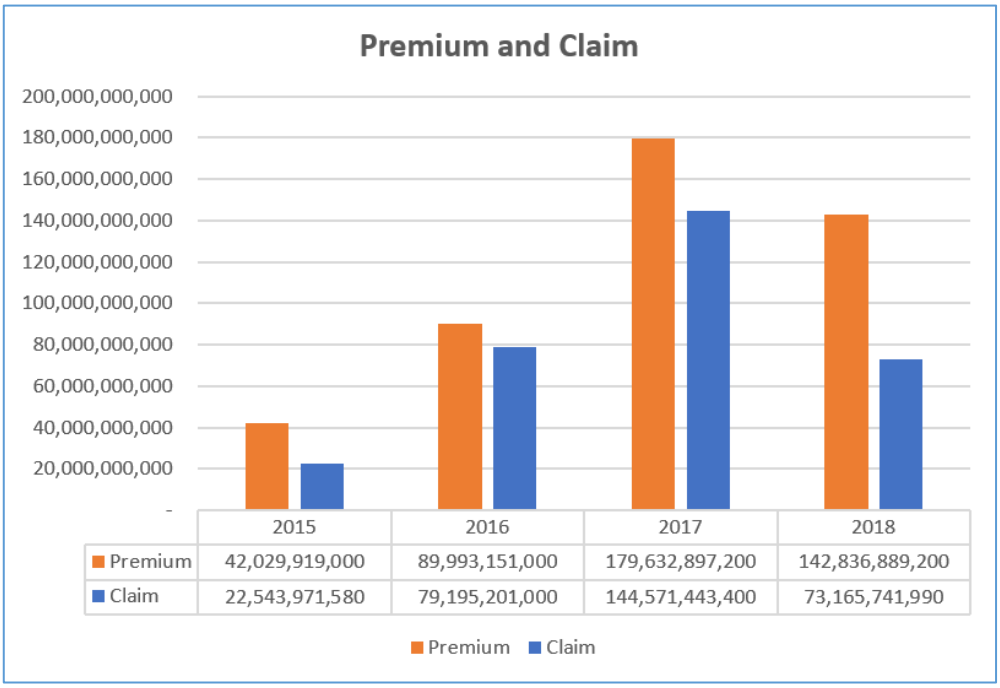
The insurance is based on indemnity which is determined on the basis of the national average cost of rice crop production of Rp. 6,000,000/hectare rice farm (approx. USD 414). The calculation of indemnity in the event of loss or damage to rice farm is based on the following: (a) light damage; (b) medium damage; (c) severe damage; (d) total damage.

The premium rate is 3%, given the sum insured of Rp. 6,000,000/hectare, the premium amount to be paid is Rp. 180,000/hectare. Under the subsidy scheme, farmers pay 20% or Rp. 36,000/hectare (or approx. USD 2.5/hectare), while government subsidise the remaining 80% or Rp. 144,000/hectare (approx. USD 10/hectare).

In the event of loss, the insured should inform the insurer through the appointed intermediary or agent. The agent and/or staff of insurance company visit the concerned location to inspect the damage. If land area suffering loss is more than 8 hectares, loss adjuster is appointed.

Underwriting results at the initial years were not satisfactory. At underwriting year 2016 and 2017 when the portfolio is 998,000 hectares, the loss ratio was 87% and 79% respectively. On top of it is the cost for administration, operation, research and margin which form 35% of the gross premium, hence the insurer suffered underwriting loss. Reinsurance for this rice crop insurance program is arranged on quota share basis.

Table 3.1. Premium vs Claim (2018 data not yet completed)



	2015	2016	2017	2018
Premium	42,029,919,000	89,993,151,000	179,632,897,200	142,836,889,200
Claim	22,543,971,580	79,195,201,000	144,571,443,400	73,165,741,990

3.3.4. Lesson Learned

During its implementation for the first 4 yeast there were some issues and challenges as follow:

- <u>Perception on Insurance</u>

  Most farmers considered insurance is not their primary needs, they are not sure about the benefit of insurance and whether it can meet their expectations. There are still misunderstanding about the objective of insurance. For farmers, the main issues remain production cost, pest and crops price.

- Purchasing Power

  80% of the premium is subsidized by government, but most farmers consider their 20% share (approx. USD 2.5) of insurance premium for each hectare site is costly. Farmers are reluctant to pay premium after they have spent money for production. Farmers suggest various reasons to avoid insurance participation.

- Local Cultures

  Farmers have different cultures, social strata and agro ecosystem, hence they have different views and attitudes. A different approach is required for each region to meet their expectation. Local wisdom should be taken into account and we should not apply only one approach to the entire farmers.

- Scale and costs

  Low participation is related with supply and demand. On insurer side, there is limitation to reach them and on farmer side there is limitation on the financial literacy. Limited understanding and reluctance have been a barrier in the efforts to increase farmers' participation in many regions.

- Administrative Challenges

  Decentralization of authority through regional autonomy affects the quality of cooperation and coordination between central government and the provinces. This has produced complexities that causes slow process on insurance administration and claim processes. Successful coordination and cooperation between all parties in provinces in all stages is an important factor for a successful agriculture insurance program

- Risk Selection

  The program is targeted to reach farmers in Indonesia as much as possible. This objective has hindered insurer to make risk selection. It is difficult to implement prudent underwriting against the need to cover as much farmers as possible. The challenge is how to keep a business portfolio that should not be exposed too much to loss due to adverse selection.

- Expectation Gap

  The program is designed to protect farmers from loss of their rice crops. It was agreed that the program is intended to cover farmers who implement *Good Agricultural Practices* (GAP), so that insurer truly bear the risk from external causes, and the risk is really sudden and unforeseen, not because of poor agricultural practices. However during

implementation it is not easy to apply this. In fact, some farmers who insure their risks know they have quite strong possibility of production failure in certain season. During season when the risk is low, farmers do not insure their risks. This is because the program is voluntary.

- Business Sustainability

  The government provides premium subsidy and it becomes a question how sustainable the program is. This affects the insurer willingness to fully deploy all resources to increase farmers' participation. Insurer as a commercial entity need certainty as the basis for capitalization and deployment of resources in the context of long term investment. Therefore, insurer acts cautiously in the dissemination, promotion and marketing of the program and do not have much flexibility as in case of normal business practice.

- Stand-alone Program

  Agriculture insurance can normally be bundled with other agriculture program. The most common one is bundling with agricultural credits. Farmers utilizing agriculture credit must insure their risk to protect the credit from failure of repayment due to loss to the crops. At the moment the insurance program is still stand alone, consequently the penetration process which includes introduction and dissemination takes longer time and it is challenged with operational, policy and cultural issues. However, farmers can see and understand insurance better since the insurance is not hidden under the credit bundling program.

3.3.5. SWOT Analysis

From the viewpoint of the insurer as a state-owned company, it is useful to see the SWOT analysis as below:

Figure 3.1. SWOT Analyses



3.3.6. Implementation of Rice Crop Insurance In Indonesia

Insurance Scheme:

Rice crop insurance in Indonesia has the following features:

a. Insurance subject is the individual farmer
b. Insurance object is farmer's rice farmland
c. Sum insured is the agreed production cost
d. The trigger are certain agreed perils
e. The indemnity is a certain agreed amount
f. Claim is classified as per loss intensity

As a model, the Indemnity based Named Perils Rice Crop Insurance in Indonesia has the following characteristics:

The regulation applied by the MOA

a. Maximum rice farm area is 2 hectares
b. Assistance to farmers is based on certain criteria (candidate farmer and candidate location)
c. Judgement on loss intensity is made by a certain team (POPT) using a method to classify the loss (light, medium, severe and total damage)
d. Judgement on extensity by MOA
e. Claim applicable only one time at each season

The program has covered up to 27 provinces in 2018. Since the farm locations spread all over Indonesia, the operating and administration cost is high. According to one survey by Mahul dan Stutley (2010), the cost for implementing indemnity based named perils rice crop insurance is 29% of gross premium. The cost comprises of (a) marketing and acquisition, (b) administration and operation and (c) inspection and claim assessment.

1. Government Support

   Successful rice crop insurance program depends on government support especially at the initial stage of the program. Mahul and Stutley (2010) mentioned that government intervention is justified in order to put market practice in order. Government intervention can be in the form of premium subsidy direct to the farmers. Some conditions that justify government interventions in rice crop insurance:

   a. Lack of Information

      Insurers are reluctant to enter agricultural insurance in the absence of land data and adequate past loss information needed to measure the risk and for premium pricing

   b. High cost

      Startup cost is high since the farmland are spread all over the country. A lot of resources is required to reach the farmers.

   c. Reinsurance Support

      Insurance companies have difficulties to get reinsurance support since the risk of crop failure is unavoidable at almost every season. When reinsurers give reinsurance capacity, it is usually due to commercial consideration based on profitability on the other lines of business.

   d. High Administration Costs

      Rice crop insurance is similar with other micro insurance product, the value is small and the volume is high and spread out. This means higher administration cost. In other countries, the government bear some of the administration and operation costs.

   e. Premium Affordability

      Majority of farmers have only small area of farmland, they are unable to pay insurance premium, hence government needs to provide premium subsidy.

      From the above facts, at the initial stage of rice crop insurance the program should be carried out by state-owned insurance company since it is in line with its mission as a development agent. Government provides premium subsidy, bearing part of administration cost, claim handling, reinsurance premium and event back up the insurer for any catastrophe event.

2. Insurance Premium Subsidy

Based on experience from other countries, premium should be subsidized by the government. Rice crop insurance is a government initiative and the benefits are not only for farmers but also for national economic development. It will be difficult to success if premium for rice crop insurance is not subsidized.

Premium subsidy is justified to encourage insurers entering the business hence developing healthy competition among insurers and the formation of market infrastructure such as data, research and development and regulatory framework. Premium subsidy however is not always proportional with farmers' participation in the program. Participation and program expansion is not only affected by the amount of the subsidy, some countries do implement rice crop insurance without premium subsidy.

3. Investment and Cost Structure

In risk management context, the selection of insurance company has to take into account 3 factors: (a) Security, (b) Services, and (c) Cost.

Security refers to the financial capabilities of the insurance company in fulfilling its promises at the right time. Security depends on several variables mainly (a) shareholders' surplus ratio-capital and surplus including contingency reserves against liabilities, (b) business volume and business portfolio, (c) asset and liabilities, (d) operating profit, (e) business stability, (f) premium rating method, (g) management capacity and capabilities, (h) underwriting policies, and (i) reinsurance support.

Service includes (a) assessment and risk evaluation services, (b) provision of insurance cover in line with insured's requirements, (c) risk management program assistance, (d) fairness in claim processing, and (e) flexibility in insurance premium payment.

Cost refers to insurance premium that has to be paid by the insured according to the insurance contract to justify claim payment.

Insurance premium obtained from multiplication of premium rate to sum insured. There are some cost components contained within insurance premium:

a. Cost to meet insurer obligation to provide normal claim payment;
b. Cost as a catastrophe claim reserve (loss above the annual average yearly loss) in the form of reinsurance;
c. Cost as a capital in the form profit margin;
d. Cost to place capital in the form of premium and claim reserves;
e. Cost reflecting inaccuracies on data used as the basis for premium rating;
f. Other costs

3.3.7. Risk Management

1. Challenges requiring solutions

Agriculture insurance is an important aspect in risk management for food security to cope with natural catastrophe event. Farmers are the main actor in production and they have to manage the risks they are facing. They cannot do it alone and it is essential for the government to create policies, law, regulations and investments to support the farmers and support the agriculture insurance program. However, lack of coordination between central government and local government, insurance company and farmer organizations has reduced the effectivity of development and implementation of rice crop insurance.
In risk management context, implementation of rice crop insurance will be more effective if carried out together with good agricultural practice and efforts to cope with losses based on farmer's own ability and traditions.

In relation with variation of problem in implementation of rice crop insurance nationwide in various country for the last 10 to 15 years, it was found that farmers have low interest in insurance. The objective of rice crop insurance is challenged by complexities on site:Lack of coordination between government and organization or groups involved

- Lack of involvement from private sectors
- Lack of cooperation with the farmers or farmer groups
- Inconsistency on holistic approach to agriculture risk management
- Lack of coordination and less developed programs, rice crop financing and agriculture development, including coordination between government ministries

2. Premium Adequacy

The establishment of premium rate of 3% for the rice crop insurance program is based on available data of loss due to flood, drought, pest and disease for 10 years during period 2003 – 2012 to arrive at pure risk premium. Then it is adjusted with (a) loading for data inaccuracy; (b) loss adjustment expense to arrive at total risk premium. Then it is added with (a) acquisition cost; (b) administration cost; (c) other costs. The 3% rate has been reviewed by internal and independent actuaries.

Based on experience on the implementation of the program, it is noted that while the 3% premium appears adequate, there are other costs that should be taken into account such as research and development, IT infrastructure and also profit margin. The current rate should certainly be reviewed and evaluated.

3. Risk Identification and Mitigation

Agriculture insurance is one of important factors in risk management to cope with the effects of weather and natural disaster in order to achieve food security. However, it should be applied together with good agricultural practice and risk mitigation based on farmers experience and capabilities.

Farmers have their own unique informal ways in managing risks on individual or community basis and formal ways based on risk management scheme provided by government or other institutions. Following is the risk management strategies:

Figure 3.2. Risk Management

Informal Strategy for Managing Risks		
	Risk Mitigation by Farmer	Risk Sharing (Farmers Group)
Ex Ante	Saving Reserving Business Diversification Cultivation pattern Production Techniques	Exchanging crops Resources management Cooperation Rolling fund
Ex Post	Selling assets Workforce realocation Reducing consumption Getting loans from families	Selling assets Removal from network assistance
Formal Strategy for Managing Risks		
	Market Sharing	Government Assistance
Ex Ante	Marketing contract Traditional agriculture insurance Weather index insurance Contingency fund	Pest management Food provision Price stabilization Subsidy in agriculture inputs Government agriculture insurance
Ex Post	Saving Credits	Disaster assistance Social fund Cash fund Loan relief

Risk management from traditional or informal ways could not protect farmers from loss of high severity even though at low frequency such as flood or drought. In such condition, farmers were forced to sell their assets to allow production. Similar occasions may reoccur, consequently farmers get trapped in poverty, leading to the selling of the farmland and the need to migrate. This is where agriculture insurance play its role as one form of social safety net.

4. Social Safety Net

As a form of risk transfer, agriculture insurance plays an important role for individual farmer and widely for the country:

- Protecting rural societies from poverty by providing support during tough times
- Protecting production capacity, small and micro business and farmer families
- Protecting financial business from loss due to non-performing loan
- Financial facility for helping farmers from natural disaster support the formation of a structured social safety net

Agriculture insurance allow farmers to stay credit worthy, even during disaster years in agriculture sector and avoid farmers from poverty. Insurance allows farmers to try cultivating crops that have higher risk but with more profitable results, by using loan to buy technology that increases production (IFAD and WFD, 2010).

Agriculture insurance allows farmers to have access to financing. Experience in other countries shows that financial institutions prefer insurance policy as a guarantee than traditional collaterals.

Summary of this write ups is quotes and free translation of writings of Hiroshi Konuma, RAP Publication 2011/12 “Agricultural Insurance in Asia Pacific Region”, Food and Agricultural Organization of the United Nations Regional Office for Asia and the Pacific, Bangkok 2011, FAO 2011 which summarises several options for government in Asia Pacific region to consider promoting the development of agriculture, animal farming, forestry and aquaculture within their country.

- Public Private Partnership

  International experience shows that agriculture insurance will be efficient and effective if it is carried out by private commercial agriculture insurance sector (Hazell, 1992 and Mahul and Stutley, 2010). However, when market condition and infrastructure is not yet well developed, government has important role in promoting agriculture insurance, especially at initial stages of a new agriculture insurance program

- Law and Regulatory Framework

  One of the most important function for the government in facilitating agriculture insurance market is to set the right law and regulation framework, and where necessary establish certain agriculture insurance act.

- Data and Information System Improvement

  Time series data and information related with crop production and weather is very important to design and establish premium tariff for traditional agriculture insurance product or weather index insurance. Government can provide very good services by creating national data base and this data base is made available for all insurance companies freely or with concession

- Product Research and Development

  Among the main initial costs of agriculture insurance is program design (including draft procedure for claim adjustment), establishment of premium rate of the insurance product and testing of the product. Since the cost is quite significant, it is justified for government to provide financial support

- Education, Training, and Capacity Development

  Government can play an important role in agriculture insurance by raising farmer awareness and developing education, seminar, capacity development and technical training program to agriculture insurance field personnel.

- Financing Catastrophe Event

  Agriculture insurance often has to protect farmers from flood, drought, pest and wind. Most of insurance companies are unable to bear the risk exposure of a catastrophe event hence they must purchase reinsurance. In the case where insurance company do not have sufficient information on previous losses, reinsurance price will be quite expensive. Government may step in to provide support.

- Premium Subsidy

  Premium subsidy is a form of government support that is provided for agriculture insurance in more than two third of countries implementing agriculture insurance. Government justified premium subsidy in order to make insurance more affordable to farmers, especially for marginal smallholder farmers, so that it will increase farmers participation. However there are few drawbacks from premium subsidy, it gives more benefit to big scale farmers than to smallholder farmers. By having the subsidy, big scale farmers tend to have increased moral hazard by cultivating crops in high risk areas.

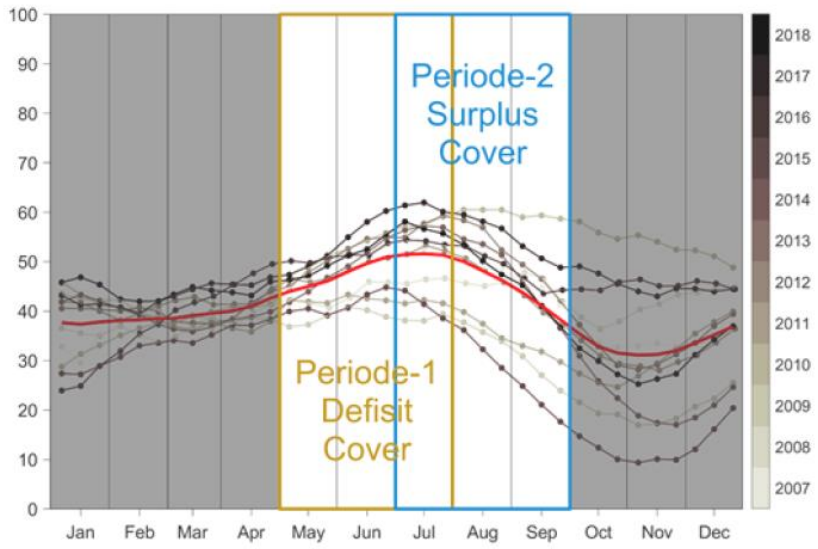
Besides bundling with credits, bundling with other support program for seed, fertilizer and soil management can be a good alternative. The benefit of bundling program is that farmer can get what their need in one package at one time. Bundling is also good for insurer to avoid adverse selection and to get better acquisition and bigger premium volume.

3.3.9. SOIL MOISTURE INDEX INSURANCE FOR COCOA FARMERS

To provide protection for Indonesian cocoa farmers, the Indonesian General Insurance Association (AAUI) is keen to develop a new parametric agricultural insurance called Soil Moisture Index Insurance.

The object of the insurance is cacao plant which is normally grown in tropical region. Many cacao regions in the world is affected by the acceleration of climate change. This can be in the form of uncertain period of season to extreme weather condition.

Figure 3.3. *Soil Water Index Data in Sulawesi (2007 – 2018)*



Based on 12 years soil water index data (2007 – 2018), we can get the mean value (red line) and the anomalies. Each line represent one particular year.

The increase of earth temperature affects the evapotranspiration and this changes the rain pattern. Cacao plant is quite sensitive to water, the soil should have a good drainage to prevent inundation, but at the same time the area should have 1,250 mm rainfall well distributed throughout the year to allow optimum plant growth. Dried soil due to drought or

extreme weather condition will have adverse effect to plant growth. Flood can be another problem that may happens in low lying areas or areas with high rainfall like Indonesia.

Beside the direct relationship between weather and cacao plant, there is also indirect relationship in the form of pests. Temperature increase which is followed by moisture increase will improve the development of pests such as bacteria and fungi.

In designing the product, soil water index (SWI) is used as parameter to determine cacao productivity. The SWI is provided for public by European Space Agency (ESA) under Copernicus Global Land program. Copernicus has a resolution of 12.5 km x 12.5 km. The data is the result of water balance equation, it is free and has been provided since 2007. To allow for easy access to the data by the farmers or any interested parties, AAUI plans to provide the data in its website.

Data provided in the design is SWI-Copernicus at 60 cm depth. The product is designed for two periods applicable is Sulawesi, Indonesia, which is:

- May – July : for deficit of soil moisture (dry season)
- July – September : for excess of soil moisture (rainy season)

The product is to be offered to cocoa farmers in Sulawesi which is the main production area of cocoa in Indonesia.

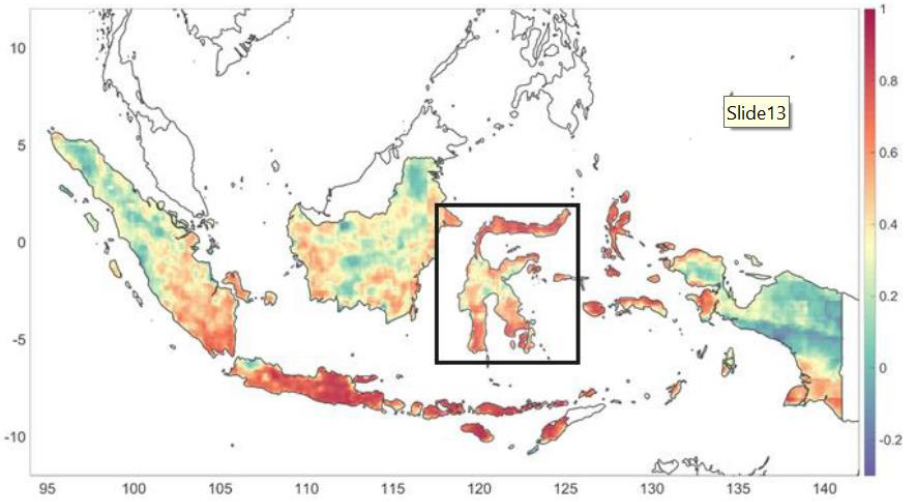


Figure 3.4. Sulawesi: Indonesia Main Cocoa Production

In 2020, total land area for cocoa farm in Indonesia is 713,000 hectares. The island of Sulawesi alone has 427,000 hectares of cocoa farm.

Cocoa companies need a constant supply of cocoa from farmers. On the other hand, farmers are faced with various risks in their agricultural process and farmers have limited resources to fund their operation should there be any loss to their crops.

The target for this product is some 14,000 cocoa farmers in Sulawesi who has cooperation with Mars Incorporated, a global chocolate company. The farmers have been receiving technical support from Mars for a number of years and the farmers voluntarily sell cocoa to Mars. Farmers can sell their product to anyone else, but since the cocoa price offered by Marsh generally follows international market price, the farmers tend to sell the cocoa to Mars.

The benefit of parametric insurance is it provides fast claim process because there is no need to carry out loss assessment by independent party as what normally happens in the traditional indemnity insurance products. To determine the liability of the policy, the insured farmers can check the soil water index. The amount of claim payout is provided in a predetermined formula as stated on the policy. The claim payout is simply calculated based on multiplication of sum insured with the payout percentage.

At this stage, the product has been filed to the Financial Services Authority to get their approval. Once approved, the product will be disseminated and offered to cocoa farmers and this will be assisted by Marsh Incorporated which is the farmers' main off taker.

3.4. MALAYSIA

3.4.1. Introduction

Currently, there is no Crop Insurance scheme available in Malaysia. However, there was a roadmap towards it beginning in 2009 when Ministry of Agriculture and Agro-based industry, mooted the idea to introduce an insurance scheme for breeders and farmers. In the early phase, the proposal is for the scheme to be targeted and be made available only to paddy farmers, but it will be expanded to other agricultural crops eventually. However, there was no detailed information on how the insurance program will be managed.

Presently, the only available option of insuring crops in Malaysia is through the Insurance of Growing Trees which is via Revised Fire Tariff. Insurers are allowed to underwrite the risk on their net capacity. It is mainly on a small scale and as an extension of a fire policy. The coverage is for the growing trees against loss or damage by fire or lightning and extended perils. The perils covered are fire, lightning, animal damage, flood, windstorm, riot, strike, malicious damage and aircraft damage. Cover can be extended to include deliberate burning of undergrowth, plants or trees within the estate. The cover is only applicable to the industrial crops which are rubber, cocoa and palm oil trees. However, Malaysia also produces other important crops and plantation products which also contribute to the overall country GDP such as rice, tea, tobacco and pineapple.

In 2020, total Gross Direct Premiums (GDP) for the Growing Trees is MYR 14,000,000[1] which the policy count is less than 1000 policy.

3.4.2. Crop Insurance in Malaysia

As the Insurance for Growing Trees only covers industrial crops (rubber, cocoa and palm oil), there were some views that there is a need for an insurance scheme to cover the other crops, most importantly is paddy. Paddy is a staple food crop in Malaysia and typically grown in areas which are vulnerable to floods. In the past 30 years, floods have caused the worst damage to Malaysian economy. At the same time, various initiatives and agenda have been planned by

Agriculture and Food Industries Ministry (MAFI) throughout the year to boost the industry and ensure the survival industry players including farmers, livestock breeders and fishermen.

[1] Data from ISM Market Performance 2020

This included an effort[2] to introduce agricultural insurance protection schemes to the target groups nationwide. The protection scheme would provide several protection options to contributors affected by disasters, disease attacks and weather uncertainties which caused a drop in production and affected income. Hence, the need for a comprehensive crop and plantation insurance scheme is crucial, taking into account the impact of natural perils that caused substantial economic loss to the country.

Table 3.2. Loss and Compensation in the Agriculture Sector in the Malaysia Peninsula 2006-2007

Loss and compensation in the agriculture sector in the Malaysia Peninsula, 2006–2007.

State	Size of land (HA)		No of affected Farmers		Estimated Losses (USD million)		Compensation Paid (USD million)		Coverage of the compensation Paid for the losses (%)	
	Flood in 2006	Flood in 2007	Flood in 2006	Flood in 2007	Flood in 2006	Flood in 2007	Flood in 2006	Flood in 2007	Flood in 2006	Flood in 2007
Johor	4544	2791	3360	1843	14.8	2.5	1.2	0.7	8%	28%
Kedah	–	5621	–	4099	–	6.4	–	4.1	–	63%
Pahang	2728	5034	2445	5362	2.2	5.4	0.8	2.2	34%	41%
Melaka	930	–	790	–	1.7	–	0.5	–	29%	–
Negeri Sembilan	120	271	202	516	0.2	2.1	0.1	0.3	33%	14%
Kelantan	–	3791	–	4228	–	1.8	–	1.2	–	65%
Terengganu	–	41	–	47	–	0.1	–	0.02	–	17%
Perlis	–	8	–	25	–	0.01	–	0.01	–	97%
Total	8322	17,556	6797	16,075	18.9	18.4	2.5	8.5	13%	46%

Source: Promoting risk financing in the Asia pacific region: lessons from agriculture insurance in Malaysia, Philippines and Vietnam. Institute for global environmental strategies (IGES), Hayama, Japan, Available at: www.asiapacificadapt.net, 2013, 1.

We understand that the Malaysia's government had allocated RM80 million under the Agrofood Disaster Relief Fund to help paddy growers, farmers and livestock breeders who lost their produce due to natural disasters under the 12 Malaysia Plan (12MP)[3]. The fund is used to help and ease the burden of those who face crop damages due to natural disasters. The amount borne by the government every year is huge.

3.4.3. Issues/Challenges Faced In Implementing Crop Insurance

Some of the issues and challenges faced in implementing crop insurance are as follows:

1. Low Purchasing Power

   Small farmers have very thin profit margin. Barely enough to spend on insurance.

   High costs to have the risk-classification and monitoring systems.

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2 Agricultural insurance to be introduced for farmers, livestock breeders, fishermen in Malaysia, says minister, Malay Mail, 11 March 2021

3 Agricultural insurance to be introduced for farmers, livestock breeders, fishermen in Malaysia, says minister, Malay Mail, 11 March 2021

2. Awareness

   Potential buyers' awareness of available option is very low. Some farmers lacked knowledge on procedures for buying insurance, claims settlement and the appropriate channel to address their grievances.

3. Contractual Obligation

   Finance Company not imposing compulsory insurance.

4. Government Driven

   Small farmers only rely on government initiative and driven insurance scheme. Some of the farmers are satisfied with the amount provided by the government.

3.4.4. Other Considerations

1. Product

   Must be comprehensive enough to address the coverage requirements of various crop and plantation communities in Malaysia. It should tackle the common perils faced by the farmers, such drought, crop disease, climatic changes, pest outbreak, reduced rainfall, variability of crop production, loss of harvest and landslide.

2. Promotion

   More promotion to all parties within the crop and plantation insurance chain, most importantly the end users, i.e. the farmers and breeders.

3. Distribution

   The marketing channels must be technically sound and capable to assess the risks and requirements of the prospective buyers. They must be able to persuade the farmers to purchase crop insurance as a risk transfer mechanism.

3.5. MYANMAR

3.5.1. Introduction

1. Despite the fact that Myanma insurance, the government enterprise created in 1952, did not apply agricultural insurance since 2019. The private sector started in 2012 and is still in its infancy, with less than 0.01 percent of the population having access to any form of formal insurance.
2. Regulations on agricultural insurance are now in force. The yield-based category "Crop Insurance" developed by the private sector, Global World Insurance Co., Ltd., and Implementation of “Weather Index Insurance“ has been first presented by Myanmar Insurance.

3.5.2. The yield-based category Crop Insurance

A.1 GWI innovated the title of “Crop Insurance” in Myanmar in 2016. Insurance Business Regulatory Board (“IBRB”) allowed Global World Insurance Co., Ltd on 31 January 2018 as 2 years of pilot projects in Yangon Region, Mandalay Region, Irrawaddy Region and Magway Region. Category of crop insurance.

A.2 This type is a simple insurance system in which the insurance is based on yield per acre and the compensation will be made according to the current price if the output decreases or the crops are perished because of climate aberration while the amount of productivity is insured.

A.3 This crop insurance is a simple coverage based on climate change and abnormalities. The climate abnormalities are as follows:

(1) Flooding caused by heavy rainfall.

(2) Drought brought on by less rain.

(3) Storm

Acceptances

A.4 2018 During the rainy season, 200.28 acres of monsoon paddy will be planted in Irrawaddy Region. Pathein, Kan Gyi Daung Vacation Tested and accepted in Hinthada townships which are in Delta region.

A.5 The following is the list of crop insurance coverage of Irrawaddy Delta, mentioned as Ayeyarwaddy, Yangon Region and Mandalay Region in 2018, 2019 & 2020.at floods sinking, droughts, storms and various divisions).

Accepted Insurance Policies during 2 Years of Pilot Project													
Sr.	Year	Region	Township	Number of Farmer	Rainy Paddy (acre)	Spring Paddy (acre)	Insurance Warranty		Premium	Claim	Yield Per Acre (Tin)	One Tin Price (MMK)	Amount (MMK)
							From	To					
1	2018	Ayeyarwaddy	Labutta	8	100.28	-	17.8.2018	17.8.2019	2%	-	50	5,000	501,400
2			Hinthada	17	50	-	17.8.2018	17.8.2019	2%	-	50	5,000	250,000
3			Pathein	2	25	-	17.8.2018	17.8.2019	2%	-	50	5,000	125,000
4			Kangyidaunt	10	25	-	17.8.2018	17.8.2019	2%	-	50	5,000	125,000
2018 Total				**37**	**200.28**	**-**	-	-	-	-	-	-	**1,001,400**
5	2019	Yangon	Hlegu	1	-	10	4.1.2019	4.1.2020	2%	-	100	5,000	100,000
6		Mandalay	Amarapura	1	-	7	8.2.2019	8.2.2020	2%	-	50	5,000	35,000
7		Ayeyarwaddy	Pathein	3	27.17	-	25.7.2019	25.7.2020	2%	-	50	5,000	135,850
8			MawKyunn	18	100	-	14.8.2019	14.8.2020	2%	-	50	5,000	500,000
2019 Total				**23**	**127.17**	**-**	-	-	-	-	-	-	**770,850**
9	2020	Ayeyarwaddy	MawKyunn	136	1011	-	31.1.2020	31.1.2021	2%	-	50	5,000	5,055,000
2020 Total				**136**	**1011**	**-**	-	-	-	-	-	-	**5,055,000**
All Year Total				**196**	**1,338.45**	**17**	-	-	-	-	-	-	**6,827,250**

Table 3.3. Crop Insurance Coverage of Irrawaddy Delta

A.6 Benefits

Eligible to receive benefits if the crop yields reduce due to pests and change climate (mean th2018 on January 31, a crop insurance trial was launched in Yangon Region, Mandalay Region, Magway Region and Irrawaddy Delta. Region have been allowed to operate for two years as probationary periods Implemented from the day.

A.7 Non-Benefits

Birds, hailstorm, terrorists, war and unrest led militarized loss with little damage, postharvest of damages caused, events dishonest claims of fraud, Damage occurred on incorrect description, Natural disasters, pests sentence indignation of forest fires the moment are known in advance and because of people will not be compensate and eligible the loss in the urine.

A.8 Significant problem in this Crop Insurance in Myanmar.

- Must be organized at national level "Crop Insurance Committee"
- Draw up crop insurance legislation.

3.5.3. Weather Index-based Crop Insurance

3.5.3.1. Introduction

The implementation of weather index insurance was first initiated by Myanmar Insurance Company in July 2019 with the help of Sompo Japan Nipponkoa Insurance Inc. The Myanmar Agricultural Development Bank (MADB) jointly launched a pilot project for a weather index-based crop insurance system in two regions: Pyay Township and Shaw Bo Township. Index insurance is a relatively new tool that farmers can use to help manage risk. The compensation is paid based on indexes such as rainfall measured by local weather stations or satellites, not based on other weather consequences (such as farmers' crop yields). In Myanmar, Myanma Insurance collect rainfall data from satellites with the help of Sompo Japan Nipponkoa Insurance Inc. This is an insurance product that can be purchased by any farmer, over 18 years old, and has obtained a loan from the Agricultural Bank of Myanmar.

3.5.3.2. Implementation

The pilot project aims to partially help farmers who cannot repay their agricultural loans due to crop losses caused by drought through the crop insurance system. The one-year pilot project was carried out in Pyay Township in Bago District and Shwebo Township in Sagaing District. During the pilot project, the system applies to rice only. The premium rate is also fixed. If the actual rainfall is less than the regional rainfall, Myanmar Insurance, state-own insurance company, provides compensation to the insured farmers.

3.5.3.3. Product Design

The insurance compensates rice farmer's loss due to severe drought based on rainfall amount. Compensation will be paid when the "Rainfall Index' during observation period matches the predefined conditions. The insurance period is from 1st July to 31st October. There are 4 months, divided into the first observation period (July-August) and the second observation period (September-October). Myanma Insurance collect and analyze rainfall data from the satellite during the observation period. When the index is below the threshold, they proceed with the payment process. Myanma Insurance set the first threshold at 271mm and the second threshold at 185mm. As compensation, we pay 30,000 kyats per acre, which is 20% of the loan principal for the first drought event, and 45,000 kyat per acre, which is 30% of

the loan principal. The premium is 3,000 kyats per acre, which is only 2.0% of the loan principal. (The principal of the loan is 150,000 kyats per acre.)

3.5.3.4. Insured Area

In two areas, Pyay Township and Shwe Bo Township, Pyay Township has about 75,000 acres of paddy fields but the insured area is only 143 acres Whereas Shwe Bo Township has about over 1 million acres of paddy fields but the insured area is only 264 acres.

3.5.3.5. Underwriting process

The insurance is sold with Myanmar Agricultural Development Bank (MADB)'s seasonal loan .Those who want to purchase the insurance will fill in an exclusive application form and submit it with MADB's seasonal loan (monsoon) application to the MADB by end of May. Insurance premium are deducted from loan principal, so farmers receive subtracted loan amount from MADB.

3.5.3.6. How to receive "Compensation"

If "Rainfall Index" matches predefined condition, the insurance company provides the amount of insurance payout to MADB (*Myanma Agriculture Development Bank)*
In effect, a part of farmer's repaying loan principal and interest is automatically reduced by the insurance payout amount.

3.5.3.7. Premium and Claim Payment

No	Year	Premium (USD, Million)	Claim (USD, Million)
1	2018 - 2019	1.137	0
2	2019 - 2020	1.002	11.88
Total		2.139	11.88

3.5.3.8. Challenges

Since our country is a developing country, the insurance industry is still developing vigorously. During the pilot process, Myanmar Insurance encountered some problems and challenges.

3.5.3.8.1. Insurance awareness

Insurance awareness plays a key role in the protection of insured persons and the development of the insurance business. The facts have shown that lack of awareness of insurance is one of the impediments to insure penetration across the country. Most farmers are not familiar with the idea of insurance and the benefits of insurance. The government

negotiates and makes other departments in the company with and the support of Myanma Assurance. As a result, farmers will be provided with insurance education and practice.

3.5.3.8.2. Technology

Technology is also a major problem. The latest technological advancements can help insurers boost their revenues and profitability. They can also help businesses secure and manage their insurance policies efficiently and mitigate claims. Since Myanma Insurance use satellite precipitation data and the data cover every region of the city, they cannot measure detailed data for a particular region. As a result, Myanmar Insurance had to compensate all insured areas with rainfall data below the threshold. Furthermore, Sompo Japan Nipponkoa Insurance Inc was only able to provide rainfall data for two regions mentioned above. This means that farmers are not satisfied. In fact, Myanma insurance would be more successful if they could sell and protect the other townships of Pyay and the Shwe Bo district.

3.6. PHILIPPINES

3.6.1. Current Situation

The Philippines is one of the most catastrophe exposed countries. Share of agricultural output as a percentage of GDP had been declining and 40% of the workforce belong to the agriculture sector and Agricultural workers are amongst the poorest, children of farmers had been abandoning farming for other industries. Ensuring the strength of the agricultural sector is critical to the country food security.

Lack of access to the agricultural financing drives farmers to depend on non-institutional lenders that charge usurious rates and prejudicial terms thus keeping then in perpetual indebtedness. Uncertainty of production output due to the climate and other hazards prevent farmers from access to institutional financing. Agriculture insurance is a critical requisite for farmers to gain access to agricultural financing in order to increase their productivity and financial resilience.

Agricultural insurance in the Philippines is a government program – Recognizing the need to improve the financial resilience of farmers, the government created the PCIC to provide agriculture insurance protection to farmers against losses due to natural calamities, plant pests and disease and/or other perils. The Philippine Crop Insurance Corporation (PCIC) is directly responsible for its implementation (per PD 1467 amended by PD 1733 and RA 8175) mandated to provide crop insurance to small farmers, particularly those who are cultivating land that are 7 ha and below. PCIC provides multi-peril crop insurance for various types of agricultural commodities (e.g., rice, corn, high-value commercial crops (HVCC), livestock and fishery). Multi-peril crop insurance covers losses due to weather, natural calamities, pests, and diseases. More recently, PCIC also provided term life and accident insurance to farmers and non-crop agricultural asset insurance. PCIC has also undertaken pilots offering index-based weather insurance and hybrid insurance (MPCI and index based) in some areas.

Agriculture insurance development around the world is dependent on collaboration with government through premium subsidies and regulatory support mechanism. While the law provides for PCIC to provide premium subsidies to farmers, due to the low financial literacy there has been resistance from farmers to the share in the cost of insurance thus resulting to PCIC's having to subsidize up to 100% of the premiums. Current regulation does not allow for the transfer of government premium subsidies to private companies.

As mandated by law, PCIC's insurance coverage includes the following: cost of production inputs; value of farmer's own labor, the members of his household engaged in Agri production; and the value of hired farm workers. Under the regular program, rice and corn farmers pay only 50% of the insurance premium while those insured under the other programs (i.e., High Value Crops (HVCC), Non-Crop Agriculture Asset (NCAA), livestock) pay the regular

premium. Under its mandate, the PCIC Board may decide to include in the insurance coverage at most 20% of the value of the expected yield. At present, the regular insurance programs of PCIC have the following coverage:

Table 3.4. Coverage Under PCIC Products	
Line of Business	**Average Amount of Coverage (per hectare)**
Crop Insurance	
Palay	P41,000 for inbred and 50,000 for hybrid rice
Corn	P40,000 for hybrid corn and P25,000 for open pollinated varieties
HVCC	Amount of cover is equivalent to the cost of production inputs as agreed between the PCIC and the insured. A portion of the value of the expectedyield (not to exceed 20%) may be included.
Livestock*	A max of P10,000 per farmer or a max of P15,000 per head for non-commercial mortality insurance A min of P110,000 for commercial mortality insurance
Fisheries	Amount of cover shall include the cost of production and the value of the fisherfolk's own labor and those of the members of his household and thefarm workers hired.
NCI	Amount of cover depends on the property being insured and the peril/s covered
Term Insurance Package	
Accident and Dismemberment Security Scheme	Minimum of 15,000 to a maximum aggregate amount of 100,000
Agricultural Producers' Protection Plan	Minimum of 15,000 to a maximum of 50,000.

**- Farmers with less than 10 heads of livestock (less than 25 heads for goats and sheep) are considered non-commercial.*

As the key implementer of government credit programs, PCIC partners with the lending centers of the Land Bank of the Philippines (LBP) in distributing agriculture insurance. Other partners are rural banks, cooperative rural banks, microfinance institutions, farmers' cooperatives, irrigators associations, agrarian reform beneficiaries' organizations, and local government units. These partners assist PCIC in the marketing and distribution of agriculture insurance. They receive service fees as an incentive. In some cases, these partners also form part of the team of adjusters prior to claims payment.

Despite the various types of Agri-insurance products offered and the government premium subsidies provided, insurance coverage among farmers is still low. From the 2016 list of farmers in the RSBSA, only 30.3% of the listed rice farmers and 15.2% of listed corn farmers were insured. In terms of area planted, insurance penetration rate (ratio of total area insured to total area planted) from 2013 to 2017 ranged at only 8 to 14 percent for rice and only 2 to 6 percent for corn. In 2018, PCIC reported that of the 13 million small farmers listed in the RSBSA*, only about 2.3 million farmers were covered by crop insurance.

**- The Registry System for Basic Sector in Agriculture (RSBSA) is a list of farmers, farm workers and fisherfolk in the 75 provinces of the country excluding ARMM and NCR. This is currently used by the Department of Budget and Management to target*

beneficiaries of the various government agencies implementing agricultural support programs, and as a basis for issuing allocated budgets for these programs.

In recent years, PCIC implemented several special programs where government provided full premium subsidy to target farmer beneficiaries. These programs are:

Table 3.5. PCIC Programs with Full Premium Subsidy		
Name of Program	**Target Farmers**	**Year Started**
DA Rice Program		
Sikat Saka	Borrowing Rice Farmers who are members of NIAcertified irrigators association	2012
NIA Third Cropping	Self-financed Rice Farmers who are members of NIA certified irrigators association Irrigated	2012
Weather Adverse Rice Areas (WARA)	Rice Farmers in Flood Prone Areas	2012
Agrarian Reform Beneficiaries (ARB)-Agriculture Insurance Program	ARBs or household members of ARBs who are beneficiaries of DAR's credit and capacity building programs (APCP and CAP-PBD programs)	2013
Agriculture Insurance for Farmers registered under the Registry System for Basic Sectors in Agriculture (RSBSA)	All farmers listed in the RSBSA	2015

Source: Reyes, et al, 2015

To enable PCIC to implement the special programs, PCIC was given budgetary allocation to cover the premium subsidies given to small farmers. The allocation for premium subsidies provided to PCIC from 2013 to 2018 is shown in the table below. Starting 2013, PCIC was given the mandate to provide full premium subsidy to all farmers listed in the Registry System for Basic Sector in Agriculture (RSBSA). Considering the number of listed farmers in the RSBSA, the allocated amount is deemed not sufficient.

Table 3.6. Government Premium Subsidies	
Year	**Amount of Premium Subsidy Allocated (in P Billion)**
2013	1.184
2014	1.184
2015	1.3
2016	1.6
2017	2.5
2018	3.5

The Registry System for Basic Sector in Agriculture (RSBSA) is a list of farmers, farm workers and fisherfolk in the 75 provinces of the country excluding ARMM and NCR. This is currently used by the Department of Budget and

3.6.1.1. Philippine Crop Insurance Corporation (PCIC) Annual Report 2019 - Highlights of Operations

Key performance indicators of their insurance operations reach new highs in 2019. The number of farmers and fisherfolks covered by insurance protection topped the Three-millionth mat to 3,146,866.

The amount of cover provided reached P112.11 billion. Premium income reached P5.73 billion. The total size of active farmlands insured reached 2,378,925 hectares.

Table 3.7. Comparative Results of Insurance Operations, 2018-2019

Insurance Lines	Numbers of Farmers			Amount of Cover (Php M)			Premium (Php M)			Area (Ha.)/Head/Policy		
	December 2019	*December 2018*	*%Inc./ (Dec)*	*December 2019*	*December 2018*	*%Inc./ (Dec)*	*December 2019*	*December 2018*	*%Inc./ (Dec)*	*December 2019*	*December 2018*	*%Inc./ (Dec)*
Rice	1,009,685	780,383	29.38	28,869.113	22,765.757	26.81	2,894.683	2,300.784	25.81	1,342,876	1,050,343	27.85
Corn	392,866	248,126	58.33	10,598.977	7,122.280	48.81	1,086.379	739.663	46.87	548,547	371,129	47.81
Rice & Corn Combined	1,402,551	1,028,509	36.37	39,468.090	29,888.037	32.05	3,981.062	3,040.447	30.94	1,891,423	1,421,472	33.06
HVC	344,853	308,395	11.82	19,179.692	16,265.774	17.91	1,005.257	1,124.412	(10.60)	487,502	424,395	14.87
Livestock	475,000	335,921	41.40	11,819.258	7,858.654	50.40	524.751	557.881	(5.94)	1,578,285	994,903	58.64
Fisheries	55,130	40,496	46.14	2,072.093	1,530.963	35.35	103.902	83.881	23.87	8,782	5,256	67.09
NCI	6,442	4,211	52.98	1,634.058	1,025.972	59.27	20.720	14.747	40.50	2,617	1,421	84.17
CLTIP	862,890	549,961	56.90	37,936.894	23,259.032	63.11	89.796	59.954	49.77	435,948	167,569	160.16
TOTAL	**3,146,866**	**2,267,49**	**38.78**	**112,110.084**	**79,828.433**	**40.44**	**5,725.488**	**4,881.323**	**17.29**			

**Source: PCIC Annual Report 2019*

Among the crop insurance lines, corn posted the greatest growth at 58.33% with 392,866 farmers livestock and poultry raisers insured. The number of insured among rice farmers grew 29.38% to 1,009,685; in high value crop, growth was at 11.82% involving 344,853 farmers

Total claims paid in 2019 totaled P4.17 billion, 19.53% greater than the amount paid in preceding year. The payment was made to 569,344 farmers and fisherfolk, 31% more than the number of claimants during the previous year. The year's number of claimants comprised 18.09% of those insured.

The indemnity payments resulted in a damage rate of 4.37 during the year, less than a percent lower (0.65%) than the previous year, and a loss ratio of 0.71, which is less than a percent greater (0.01) than the previous year.

Damage rate is computed as a ratio of total indemnity payment over total amount of cover multiplied by 100 while loss ratio is the ratio of total indemnity/total premium. Both are simple indicators of the health of insurance operation.

The distribution of the total number of claimants and indemnity payment by line are *Table 3.8.*

Table 3.8. Number of Claimants and Indemnity Paid, by Insurance Line

Insurance Lines	Number of Farmers			Indemnity (Php M)			Damage Rate		Loss Ratio	
	December 2019	December 2018	% Inc./ (Dec)	December 2019	December 2018	% Inc./ (Dec)	2018	2019	2018	2019
Rice	371,057	321,827	15.30	2,806.546	2,645.596	6.08	11.62	9.72	1.15	0.97
Corn	145,121	96,963	49.67	945.531	686.151	37.80	9.63	8.92	0.93	0.87
Rice & Corn Combined	516,178	418,790	23.25	3,752.077	3,331.747	12.62	11.15	9.51	1.10	0.94
HVC	38,813	7,327	429.73	245.095	75.601	224.19	0.46	1.28	0.07	0.24
Livestock	9,484	4,686	102.39	81.415	39.705	105.05	0.51	0.69	0.07	0.16
Fisheries	2,727	884	208.48	26.514	7.768	214.32	0.51	1.28	0.09	0.26
NCi	64	26	146.15	12.736	1.353	841.32	0.13	0.78	0.09	0.61
CLTP	2,078	1,475	40.88	52.537	32.674	60.79	0.14	0.14	0.54	0.59
Total	**569,344**	**433,188**	**31.43**	**4,170.375**	**3,488.849**	**19.53**	**4.37**	**3.72**	**0.71**	**0.73**
Increase (Decrease) – (2019 vs 2018)								***(0.65)***		***0.01***

3.6.2. Issues and Challenges in the Current implementation of Agriculture Insurance

Several studies reported that PCIC's low insurance penetration rate is largely attributed to operational challenges confronting the institution, among which are: cumbersome enrollment and underwriting system, long and tedious claims settlement procedures, lack of sufficient investment fund to cover PCIC's operations, and mismatch of insurance products with the risk protection needs of small farmers (e.g. amount of insurance cover is only a small proportion of the total production cost of the crop insured).

Aside from these, low insurance penetration rate is also largely attributed to the lack of appreciation and/or awareness of agriculture insurance among farmers. Farmers perceive payment for insurance premium as an additional expense because they are not convinced of the importance and value of risk protection. They think that premium payments are wasted expenses if they are not able to claim. This perspective is further aggravated by the long claims processing period experienced by those who have crop insurance. With delayed claims payment, the value of insurance is lost resulting in farmers' non- appreciation of the importance of insurance. In view of this, most farmers are usually not inclined to renew their agriculture insurance policies.

The development and use of technology-based platforms for the distribution of agriculture insurance isyet to be explored. For instance, distribution channels allowed under the current framework of increased financial inclusion (cash agents and non-bank financial institutions) have yet to be engaged in the distribution of agriculture insurance.

3.6.3. Interest of the Private Sector

The private insurance sectors believes it may contribute to the growth of agriculture insurance through product development, improved distribution and financial literacy

campaigns, and strategic collaborations with other agriculture stakeholders. The current practice whereby PCIC offers subsidized of free agriculture insurance to farmers create unviable competitive environment for private insurers and discourages the development of agriculture insurance. The government's practice of increasing level of premium subsidies to entice farmer enrollment in agriculture insurance is unsustainable as the government just ends up subsidizing up to 100% of the premiums rather that encouraging farmers to share in the cost of insurance. Reducing the % of premium subsidies would enable government to spread its limited resources to reach more farmers. The coursing government subsidies through the private sectors insurers would be a more strategically effective and sustainable approach as the private insurers have proven capabilities for product innovation, promotion, and distribution, as well as the flexibility to enter into strategic collaborations with other agriculture stakeholders. The private sector insurers may also invest in tools and technologies along risk mitigation and reduction in order to help farmers mitigate and better manage risks and ultimately reduce the cost of insurance.

With the mandated increase in the capitalization of insurance companies, private insurers are prompted to develop new markets for insurance. The higher capital requirement will enable private insurance companies (with appropriate reinsurance) to cover for the catastrophic risks that are usually present in agriculture production and related activities. Agriculture insurance could be attractive for private insurance companies because the requirement for higher capital is short dated, hence there is no need to reserve for a long period. Also, private insurance companies could tap into the reinsurance market.

Several private insurance companies have recognized and considered the agriculture sector as a potential new market for insurance. Private insurers recognize that viable insurance business opportunities exist in the agriculture sector particularly with the development of new technology platforms that would enable insurers to more accurately determine the risks associated with agriculture. These platforms can also improve cost efficiency in the delivery of agriculture insurance to farmers located in remote areas. While these technology platforms can also be used by PCIC to improve its efficiencies, private insurance companies have greater flexibility.

The development of index insurance and the interest of the weather bureau to cooperate and provide relevant data for insurance has also generated interest from the private sector. Since other data relevant to the development of index insurance (e.g., crop yield data, soil data, market data etc.) are equally important, the cooperation of other data-generating institutions (e.g., Bureau of Soil and Water Management (BSWM), Philippine Statistical Authority (PSA) is yet to be solicited. In this regard, data sharing protocols need to be established.

There are only four agricultural insurance (or crop insurance) products approved so far in the Philippines by the Insurance Commission. These products were applied for by: a) PGA Sompo Japan Insurance; b) CARD Pioneer Microinsurance; c) Bankers Assurance; and d) Western Guaranty. Of these four products, only two, belonging to Bankers Assurance and to Western Guaranty, are considered parametric-based and MicroAgri. They were, however, sold as part of a package-deal with fertilizer providers. Western Guaranty's product was only available in the Isabela region as well.

The offer of the two parametric-based MicroAgri products did not last for long. Bankers Assurance's product lasted for only two to three months, while Western Guaranty's product was run for only six months in the market. The marketing of these products was hampered by the lack of efficient channels for distribution of their products and the high cost of evaluating and approving claims. In addition, farmers simply lacked the understanding on the necessity and importance of agricultural insurance. Insurance is simply available of because it is required by lending institutions.

*International Finance Corporation (IFC) partnered with CARD Pioneer Microinsurance Incorporated (CPMI) in the Philippines to design and launch a new crop-insurance product to protect farmers from typhoon-related losses. It will initially target CARD's farmer clients. CARD is the Philippines' largest micro-finance institution with four million clients. The crop insurance will be bundled with loans and paid out to rice and corn farmers after a declared typhoon event. It will cover 40,000 farmers and facilitate an additional $8 million in financing in the first year. IFC will continue to work with CPMI on other innovations to expand their market, including designing an index-based portfolio insurance product to protect institutions lending to farmers against typhoon risk. The initiative is supported by the Government of Canada and the Japanese government, a key donor to the Global Index Insurance Facility, a multi-donor trust fund managed by IFC and jointly implemented with the World Bank. Other donors include the European Union and the Netherlands. The facility's objective is to expand the use of index insurance as a risk-management tool in agriculture, food security, and disaster risk reduction

*Source: IFC International Finance Corporation – World Bank Group

3.6.4. Asian Development Bank (ADB) led initiative on Agriculture Insurance Public Private Partnership (PPP): PCIC, PIRA and National Reinsurance Corp. (NatRe) -The Proposed Pilot Program

Considering the low agriculture insurance coverage, the undeniable need of small farmers for risk protection, the issues and challenges faced by PCIC and the interest of the

private sector to participate in the agriculture insurance market, a public-private partnership arrangement for the implementation of agriculture insurance is deemed imperative and timely. Recognizing these challenges, a project to pilot test public-private partnership for agriculture insurance shall be implemented. Under the project, private insurers shall be allowed to participate in the provision of agriculture insurance to small farmers. As a pilot project, the partnership shall be limited to the provision of insurance to farmers engaged in specified crops and regions only. The experience from the pilot implementation shall inform the development of a policy and regulatory framework for a public-private sector partnership in the provision of agriculture insurance services. Arrangements to be instituted during the pilot implementation will be interim.

3.6.5. Objectives of the Pilot Program

The experience that will be drawn out of the pilot implementation of a PPP arrangement will inform and lead to the following:

- Demonstration of how a public-private sector partnership arrangement in agriculture insurance can be viable.
- Determination of the specific roles of the public and the private sector in the implementation of an effective agriculture insurance program
- Design of relevant agriculture insurance products and identification of specific data requirements and data infrastructure required for the design of the identified
- Development of appropriate data sharing protocols with relevant government data collecting agencies.
- Deploying technology to augment value for farmers through VAS.
- Identification and formulation of relevant and supportive regulations for the participation of private insurance companies in the implementation of AI

3.6.6. Program Components and Activities

a. Setting up the AI Pool/Facility

To implement the public-private sector partnership, an agriculture insurance facility/pool shall be established following a successful pilot implementation of AI product offering by the private sector. The pool shall be participated by non-life insurance companies and reinsurance companies. NatRe and PIRA shall initially manage and administer the AI pool/facility. To set up and establish the facility, the following activities shall be conducted:

- Formulation of the detailed design structure of the AI Pool (including the role of PCIC)
- Solicitation of AI pool participants
- Development of AI pool implementation guidelines (to be developed by the AI pool

participants)

- Solicitation and selection of reinsurance companies and/or reinsurance brokers
- Development of strategic partnerships between participating insurance companies, potential delivery channels and technology platform providers

b. Product Development

Based on the experience of PCIC, participating insurance companies shall develop relevant agriculture insurance products for the target farmers. Conduct of FGDs and relevant consultation meetings with target clientele to determine and develop relevant and appropriate agriculture insurance products shallbe supported. The following activities supportive of product development shall be given assistance:

- Identification and design of relevant AI products
- Development of sample data sharing protocols with relevant government agencies

c. Insurance literacy program

As noted in the issues and challenges confronting PCIC, most of the small farmers are not aware of agriculture insurance. They do not have any appreciation of the benefits and importance of agricultureinsurance. Most of them think of insurance as an additional expense that has no benefit to them. In view of this, comprehensive and strategic agriculture insurance education modules shall be developed. In partnership with Agriculture insurance literacy workshops shall be conducted using the developed modules. The following activities shall be conducted under the program:

- Development of relevant AI literacy modules
- Development of relevant collaterals and materials
- Conduct of literacy and advocacy activities

d. Technological Solutions

Wide ranging technology solutions ranging from mobile applications to satellite imagery are now being used in agriculture to enhance productivity, reduce risks, and control costs. It is envisaged that an additional component in the form of a basic technology solution will create better value for farmers along with agriculture insurance. Appropriate solutions will be identified and used in the pilot program with a view to make the program more efficient and effective.

e. Development of relevant and supportive regulations for agriculture insurance

As a test and learn case for the participation of private insurance companies in agriculture insurance, the pilot project shall lead to the crafting of relevant rules and regulations for the safe and sound provision of agriculture insurance.

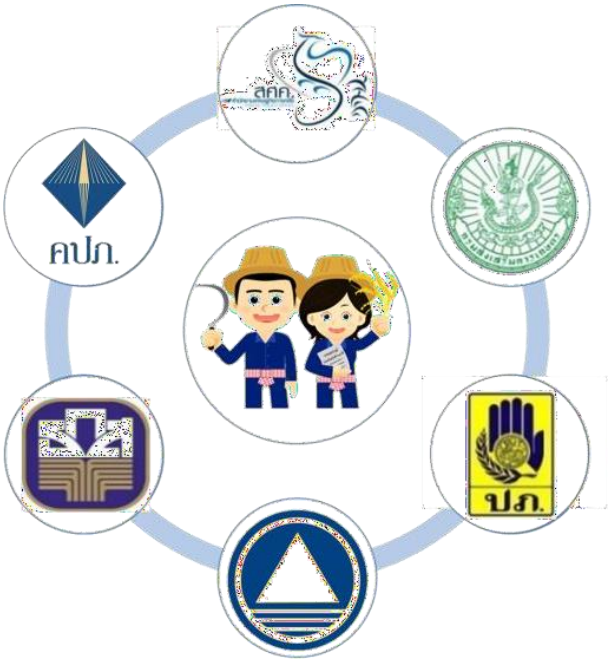
** Source: ADB led initiative on Agriculture Insurance - Project Design for the Pilot Implementation of a Public-Private Partnership Arrangement on Agriculture Insurance – Concept Paper – Ms. Ma. Piedad Geron ADB*

3.7. THAILAND

3.7.1. Rice Crop Insurance - Introduction

Crop insurance is considered the private sector's insurance mechanism that serves as the government's risk management tool. It will enable farmers to manage the risks of natural disasters themselves. In Thailand, crop insurance was concretely established in 2011. Because farmers were exposed to risks during cultivation, the government introduced risk management tools by introducing insurance systems. The government allocated a portion of the budget to subsidize the insurance premiums for participating farmers. During the initial stage, the government started with rice crop insurance to comprehensively cover farmers' risks. This scheme would strengthen rice farmers' financial stability and mitigate damage when they encountered natural disasters. In cooperation with participating insurance companies, the scheme assigned the Thai General Insurance Association to manage the project. Its responsibilities included coordinating with the government sector, collecting insurance premiums, paying for claims, and sourcing international reinsurers. Risk management is particularly critical for insurance underwriting. The Association has provided reliable, well-established, and globally accepted reinsurance companies to take potentially greater risks than what domestic insurance companies could bear. The roles of various agencies joining the scheme are shown in Figure 3.5.

Figure 3.5.: Agencies participating in the rice crop insurance scheme



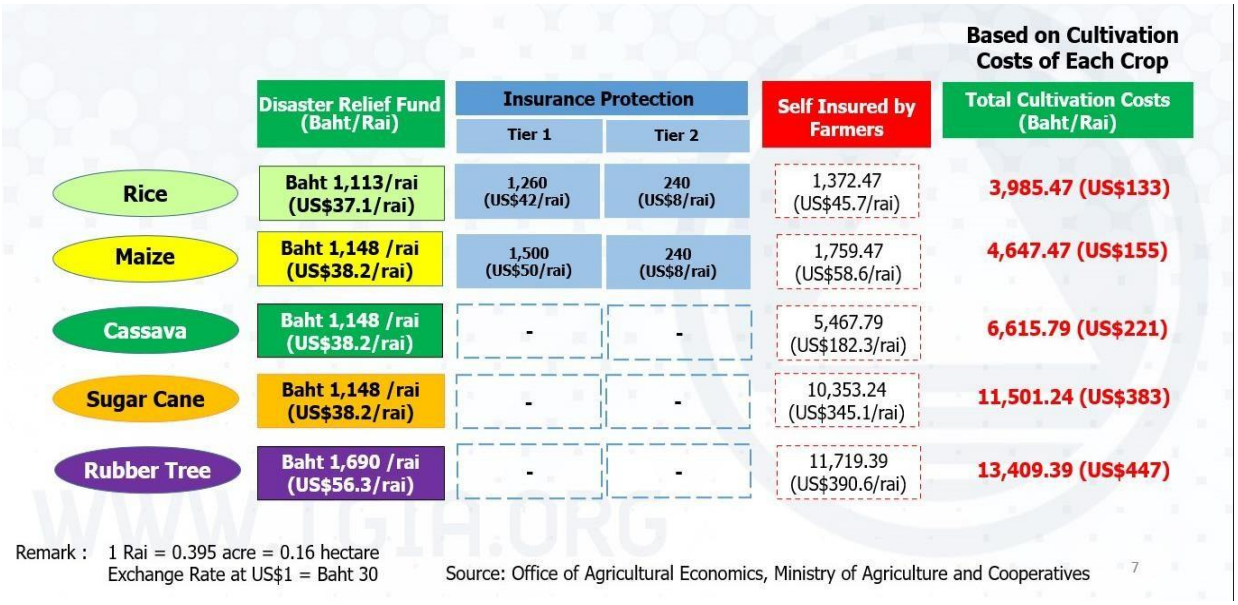
Thai Crop Insurance Top Up Scheme was established in year 2011 to help rice farmers managing their risks exposure by using insurance protection as a tool to protect their farmland. The initiative of this insurance scheme was a collaboration and co-operation with related Thai government agencies and private sectors under Public and Private Partnership (PPP) concept with the following organizations:

1. Fiscal Policy Office (FPO), Ministry of Finance: is a government “Think Tank” agency who initiated and spearheaded the project and collaborated with the Government
2. Department of Agricultural Extension (DOAE), Ministry of Agriculture and Cooperatives: supporting on farmers registration and acting as a national loss adjustor
3. Department of Disaster Prevention and Mitigation (DDPM), Ministry of Interior: responsible for disasters declaration and risk mitigation.
4. Office of Insurance Commission (OIC): approving rice and maize Insurance Top Up policy wordings and premium pricings
5. Bank for Agriculture and Agricultural Cooperatives (BAAC): acted as a distributor in selling rice insurance to their rice loanees as well as the non-loanees
6. Thai General Insurance Association (TGIA): rice insurance scheme administrator and managing the program on behalf of its participating TGIA Members

Each agency plays the following roles:

The government-initiated rice crop insurance because it wanted to support rice farmers affected by natural disasters and to provide them with remedies. When farmers incurred damage, they previously received only a government remedy of 1,113 Baht per rai. However, with the current cost of production, the remedies were inadequate to cover the loss or damage farmers suffered. With rice crop insurance established, farmers would receive two portions of support; 1,113 Baht per rai from the government and 1,260 Baht per rai from the insurance. They could also purchase additional insurance to gain additional coverage of 240 Baht per rai. Insurance would help absorb farmers' risks so that they could plant crops in the next cycle despite a severe disaster, as shown in Figure 3.6.

Figure 3.6. Financial aids from government and insurance



Source: Office of Agricultural Economics, Ministry of Agriculture and Cooperatives

3.7.2. Implementation of Rice Crop Insurance 2015-2019

3.7.2.1. The Insurance Program and Underwriting Performance

The rice crop insurance scheme has been implemented since 2011. As a public-private collaboration, it required claim assessment criteria that could be promptly implemented, which also responded to farmers' risks in a practical manner. As a result, Thailand initiated the name peril protection that provided coverage against the farming areas' loss or damage caused by natural disasters, pests, or outbreaks. The coverage and sum insured were developed based on the information obtained from past insurance records. Because farmers have recognized the importance of insurance, the insured areas have been growing continuously. In 2020, the insured areas exceeded 70 percent of the country's farming areas, as shown in Figure 3.7.

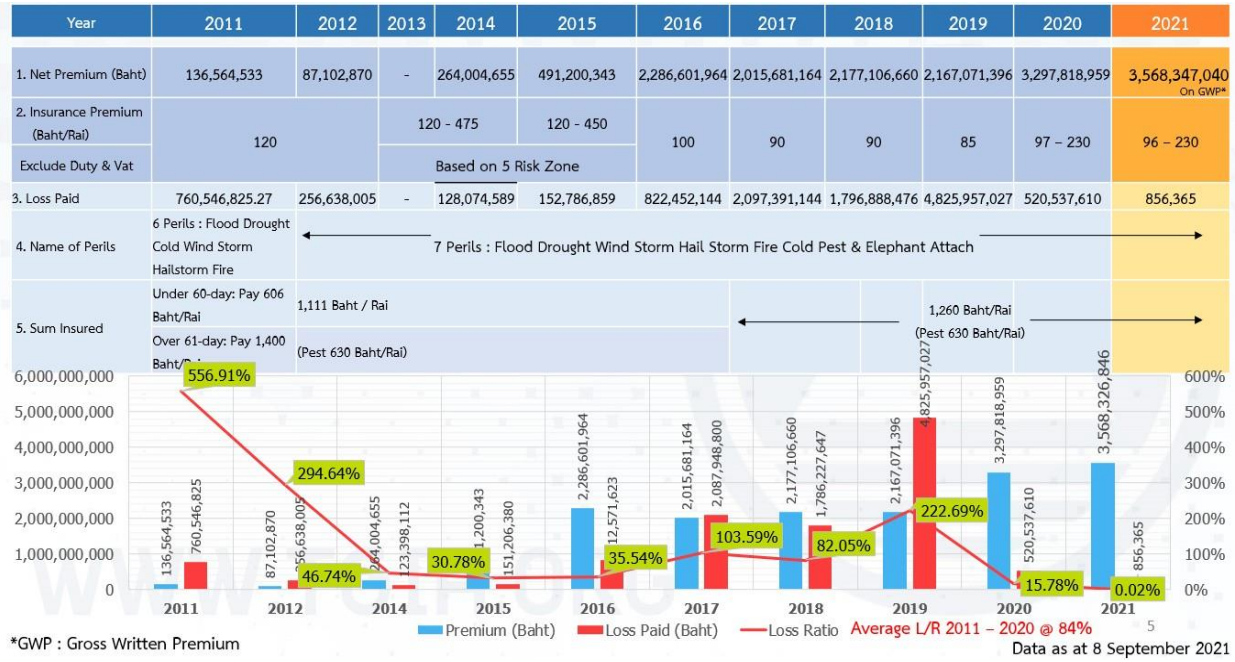
Figure 3.7.: Implementation of Rice Crop Insurance 2015-2019



Years	2011	2012	2014	2015	2016	2017	2018	2019	2020	2021*
1. Plantation Areas (Rais)	62,696,040	64,990,047	63,211,788	49,481,505	56,505,471	56,659,833	53,863,069	61,119,256	58,088,725	58,088,725
2. Insured Areas (Rais)	1,059,131	872,440	830,696	1,512,072	27,176,735	26,117,855	27,600,571	30,859,069	44,362,517	43,503,781
3. Penetration Ratio (%)	1.69%	1.34%	1.31%	3.06%	48.10%	46.10%	51.24%	50.49%	76.37%	74.89%

Premiums and coverage have shown a continuous improvement. Premiums have been declining due to the spread of insured areas. As for coverage, the insurance has added more types of perils to be covered and offered more compensation. For instance, from 2012 onwards, more perils like damage caused by pests or outbreaks were added into the scope of coverage in addition to floods or heavy rains, droughts or delayed rainfall, windstorm or typhoon, cold weather or frost, hail, and fire. In 2019, the wild elephant peril was added into the coverage, and the amount of compensation for natural disasters increased from 1,111 Baht/rai to 1,260 Baht/rai. In case of damage caused by pests or outbreaks, the compensation increased from 555 Baht to 650 Baht/rai, as shown in Figure 3.9.

Figure 3.9.: Evolution of Rice Insurance Scheme



Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1. Net Premium (Baht)	136,564,533	87,102,870	-	264,004,655	491,200,343	2,286,601,964	2,015,681,164	2,177,106,660	2,167,071,396	3,297,818,959	3,568,347,040 On GWP*
2. Insurance Premium (Baht/Rai)	120		120 - 475		120 - 450	100	90	90	85	97 – 230	96 – 230
Exclude Duty & Vat			Based on 5 Risk Zone								
3. Loss Paid	760,546,825.27	256,638,005	-	128,074,589	152,786,859	822,452,144	2,097,391,144	1,796,888,476	4,825,957,027	520,537,610	856,365
4. Name of Perils	6 Perils : Flood Drought Cold Wind Storm Hailstorm Fire	7 Perils : Flood Drought Wind Storm Hail Storm Fire Cold Pest & Elephant Attach									
5. Sum Insured	Under 60-day: Pay 606 Baht/Rai Over 61-day: Pay 1,400 Baht/Rai	1,111 Baht / Rai (Pest 630 Baht/Rai)						1,260 Baht/Rai (Pest 630 Baht/Rai)			

Since the implementation of the rice crop insurance scheme in 2011, farmers and the government have been aware of effective risk management. Therefore, they have taken up more insurance. The government has also formulated various measures to promote and support the scheme continuously. As a result, the scheme has expanded the coverage scope for farmers and reduced their risks of damaged crops caused by natural disasters. In 2019, the scheme expanded to maize insurance in addition to rice crop insurance. Additionally, there was an idea about expanding the scope to cover other types of agriculture.

3.7.2.2. Lesson Learned

Lessons learned from Thailand's rice crop insurance in the past 10 years

(1.) The scheme must create awareness of lessons learned from past failures. The great flood in 2011 resulting in a considerable underwriting loss. The nature of perils and the way most farmers applied for insurance in high-risk areas only served as a warning sign and a shield that prevented the scheme from getting caught up with the premium trap. Instead, the scheme should consider a large volume of insurance in the long term. Furthermore, caution and discipline were required in managing the scheme; the utmost good faith should be adhered to as the insurance’s core philosophy.

(2.) Technology is essential to insurance. The scheme expenses tend to increase to ensure long-term sustainability, especially the expenses in value-added services for the insured and expenses in information technology, which helps create a new age of agriculture and prompt claim management.

(3.) The establishment of an agricultural database is crucial. Data has been proven essential throughout the long-running scheme operation. From the information aforementioned, more than half of the Thai population is engaged in agriculture. Each year, agricultural products exports generate hundreds of billions Baht in revenue for Thailand. Therefore, it is necessary to have a good production management planning system and acquire data from several sources for analytical purposes. Each type of crop has different characteristics; some require plenty of water while others do not. Some are heat-resistant, while others are cold-tolerant. Therefore, choosing the right crops for the area conditions will produce higher yields and bring farmers higher returns. However, in the past, it turned out that farmers' crop selection or the government's crop promotion remained price-oriented, lacking basic "data" to make right decisions.

3.7.3. SWOT Analysis

3.7.3.1. Strengths

a. The operation cost was not too high thanks to the fact that survey criteria from the state disaster declaration were used to control the risk by area.
b. The continuity and long-running insurance helps provide risk data for many years, leading to better risk management and a more extensive database of insured farmers.
c. A crop insurance fund was established for comprehensive risk management and research purposes.
d. The scheme was established by integrated cooperation among many government agencies and the private sector, allowing all sectors to contribute, gain awareness, and exchange information.
e. Farmers receive more supports to fund their next cycle of cultivation
f. Farmers received claims faster than government
g. Government and Bank for Agriculture and Agricultural Cooperatives (BAAC) subsidized insurance premiums. As a result, farmers only have to pay premiums for their additional coverage

3.7.3.2. Weakness

a. Personal data protection law has hindered the management of farmers' data, which requires more caution in implementation.
b. The government jointly managed the scheme; therefore, it was easy to make an ex-gratia payment.
c. The scheme used the government's damage assessment model, causing the delay in damage assessment.
d. Some farmers were not interested in purchasing additional insurance coverage because they only relied on the government support and relief measures.
e. Most of the insured were older people because Thailand is an aging society

3.7.3.3. Opportunities

a. Government policies stipulated clear guidelines for promoting insurance scheme
b. Having been insured for several years, farmers recognized the insurance's benefits and tended to pay more premiums each year.
c. The ASEAN unification caused the rice market to grow, resulting in the growth of insurance in parallel.
d. The insured farmers remained the customers of the Bank for Agriculture and Agricultural Cooperatives (BAAC) because the BAAC subsidized the premiums, which made the

insurance application easier.

e. Farmers' behavior is constantly changing; they are adopting more and more technologies.

3.7.3.4. Threats

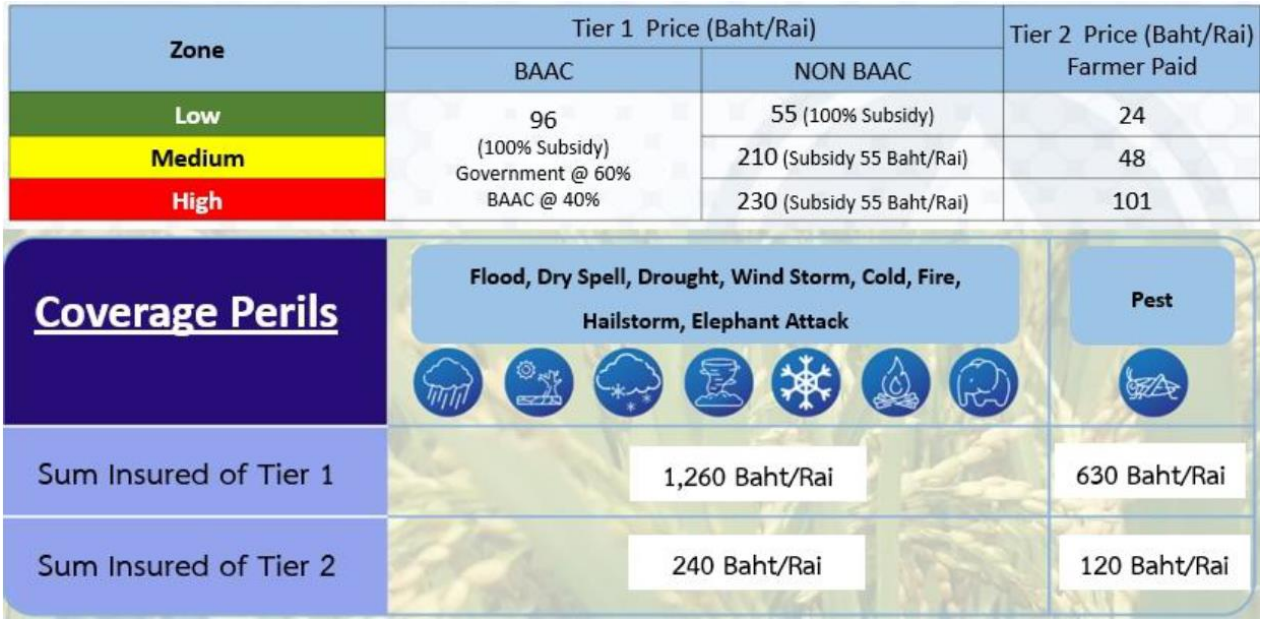
a. Unstable climate (natural disaster)
b. Controls from external entities, such as personal data protection laws
c. The government's policy is on a yearly basis, which requires the Cabinet's approval each year for budget support.
d. The cultivation areas of food crops tended to decline because food crops were replaced by energy crops or crops used as raw materials in other industries, including the expanding urban communities.
e. Farmers who did not bank with the BAAC had no agency to subsidize insurance premiums; therefore, they did not apply for insurance. (Farmers refused to pay for premiums themselves.)
f. Some farming areas were damaged, but they were not declared as disaster areas.
g. In some years, the government provided various forms of support, such as subsidies for the materials, equipment, and harvest costs, whose value was higher than the subsidy for damaged rice. As a result, farmers chose to seek help from the Crop Insurance Fund instead of reporting crop damages. Currently, the Crop Insurance Fund does not support farmers who have received other forms of assistance from the government.

3.7.4. Implementation of Rice Crop Insurance in Thailand

3.7.4.1. Insurance Scheme

Managing the rice crop insurance scheme for over the past ten years, Thailand has developed a coverage model and a claim system. In the current year (the crop year 2021/2022) of the Rice Crop Insurance scheme, the government still subsidizes 60 percent of premiums (including all duties and VAT). Realizing that farmers must recognize the importance of insurance, the government encourages farmers who cultivate in-season rice to apply for insurance in addition to government subsidy. Therefore, insurance models were developed so that farmers could purchase additional insurance. For additional rice crop insurance, farmers have to pay premiums themselves. Insurance premiums are classified based on the risk zones, and has been launched to market already. The current coverage is divided into two systems, compulsory or basic insurance and voluntary or additional insurance. The peril name insurance is offered based on the risks in each area and the claim criteria will be jointly used with the government as shown in Figure 3.5 as follows:

Figure 3.10. Price, Coverage and Sum Insured of Rice Insurance 2021

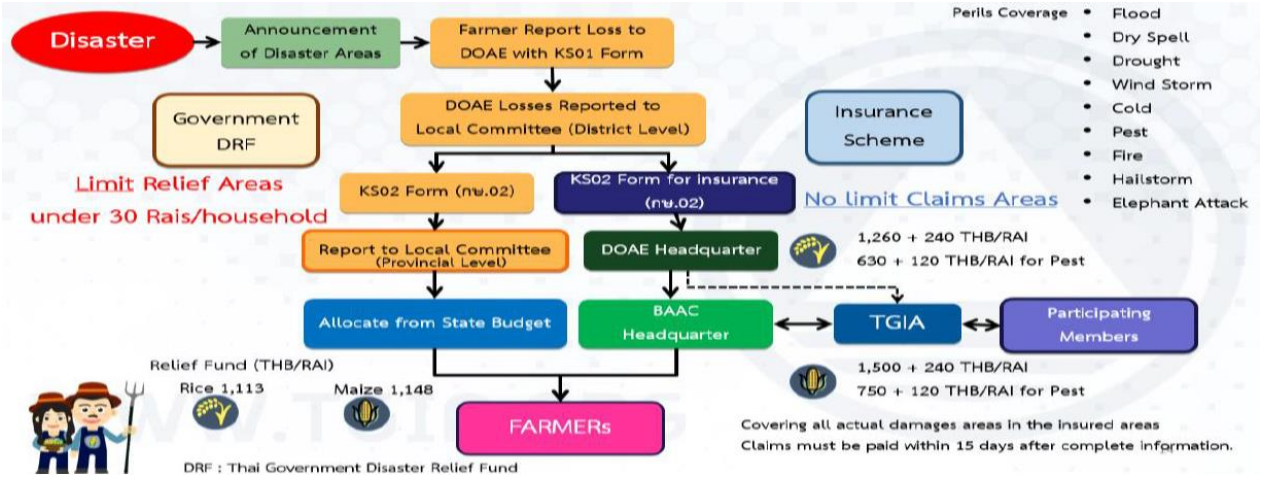


(1.) Basic insurance (Tier 1) offers a maximum coverage of 1,260 Baht per rai for seven perils: flood or heavy rain, drought or delayed rainfall, windstorm or typhoon, cold weather or frost hail, fire, and wild elephant peril. It also offers the maximum coverage of 630 Baht per rai for pests or outbreaks. The premium is divided based on risk levels - low, medium, and high. The insured areas in each province are appropriately distributed.

(2.) Insurance offering additional coverage (Tier 2) for farmers who wish to take additional insurance on top of Tier 1 insurance. It offers a maximum coverage of 240 Baht per rai for seven perils: flooding or heavy rain, drought or delayed rainfall, windstorm or typhoon, cold weather or frost, hail, fire, and wild elephant peril. Moreover, it also offers a maximum coverage of 120 Baht per rai for pests or outbreaks. The insured areas in each province are appropriately distributed.

As for claim payment, the insurer will pay the claims based on actual damaged area by referring to the state disaster declaration. The payment will be limited to the insured area and made within 15 days from the date the insurer receives the evidence from the report on actual damages. The insurer will then compare the report with the farmer registration in that particular year. With inter-agency data linkage, private insurers can promptly manage the claim processes. The claims will then be transferred to the insured farmers who face direct impacts, as shown in Figure 3.6.

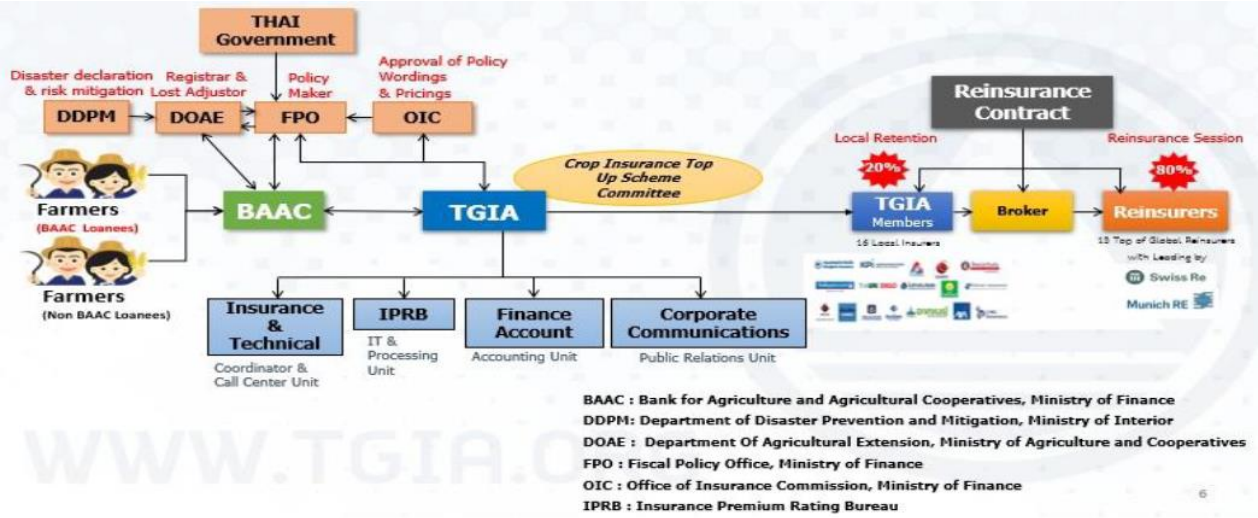
Figure 3.11. Diagram displaying the claim process of crop insurance



3.7.4.2. Government Support

The crop insurance scheme, initiated in 2009, is a project under integrated collaboration between the public and private sectors. The Fiscal Policy Office, Ministry of Finance, held several meetings with the World Bank, government agencies, and private agencies to formulate a national strategy to develop a crop insurance scheme, focusing on developing insurance models and appropriate damage assessment. Recently, the private sector was involved in the foundation development, and the scheme was established in 2011. The government thus plays a vital role in helping farmers learn about the insurance model and understand risk management benefits. Currently, it continues to support farmers whose crops were damaged by subsidizing 60 percent of insurance premiums. The BAAC subsidizes the other 40 percent if the insured farmers are BAAC's customers. For other farmers, they can pay for the premium themselves. The scheme also contributes to essential cross-agency data delivery by linking them together, as shown in Figure 3.12.

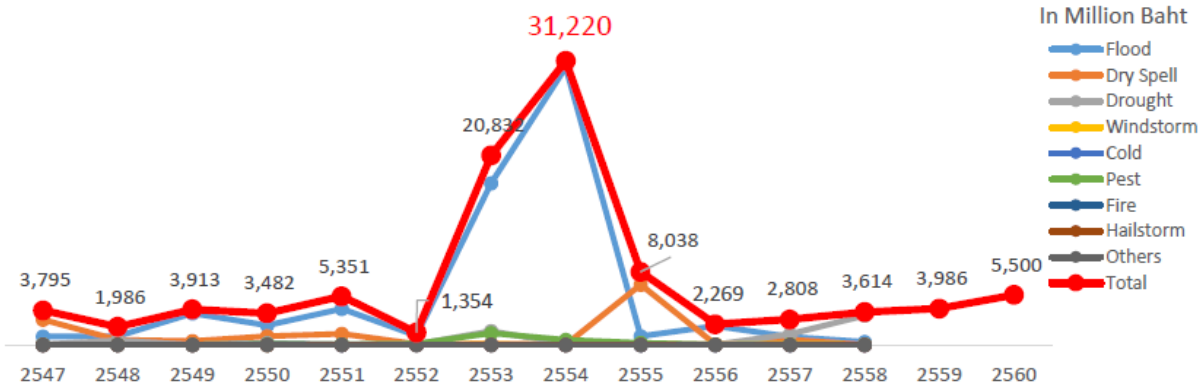
Figure 3.12: Thai Crop Insurance Top Up Scheme Work Flow



3.7.4.3. Insurance Premium Subsidy

For the past 14 years (from 2004 to 2017), the government has provided crop farmers with annual financial support of 7.01 Billion baht on average in compliance with the Ministry of Finance Regulations on Government Advances to Assist Disaster Victims in Emergencies B.E. 2546 and the amendment. In 2009, the government spent the lowest budget at 1.354 Billion baht to support farmers while it spent the highest budget at 31.22 Billion baht in 2011, as shown in Figure 11.

Figure 3.13.: Statistics of the government's financial support provided to farmers affected by natural disasters between 2004 and 2017



Source: Department of Agricultural Extension whose data was collected by the Insurance Premium Rating Bureau

However, if the government wishes to transfer the entire financial burden, the required infrastructure would be the damage assessment methodology, which serves as scientific criteria. They are developed as parametric products that are pre-determined in the insurance policy, specifying which incidence will be eligible for claim payment. Alternatively, expert staff in the private sector can conduct the plot-based assessment. The type of insurance, whether it is a crop insurance scheme, crop yield insurance, or income insurance, and damage assessment methodology must be accepted by farmers first.

3.7.4.4. Investment and Cost Structure[2]

For example, the rice crop insurance scheme, carried out concretely since 2011, is the production cost insurance. The private sector already provides additional protection to the damage assessed by the government and pays subsidies to farmers, namely:

(1.) The existing damage assessment mechanism uses the government system, a survey conducted by the District Disaster Victim Assistance Committee. It is understood and accepted by farmers.

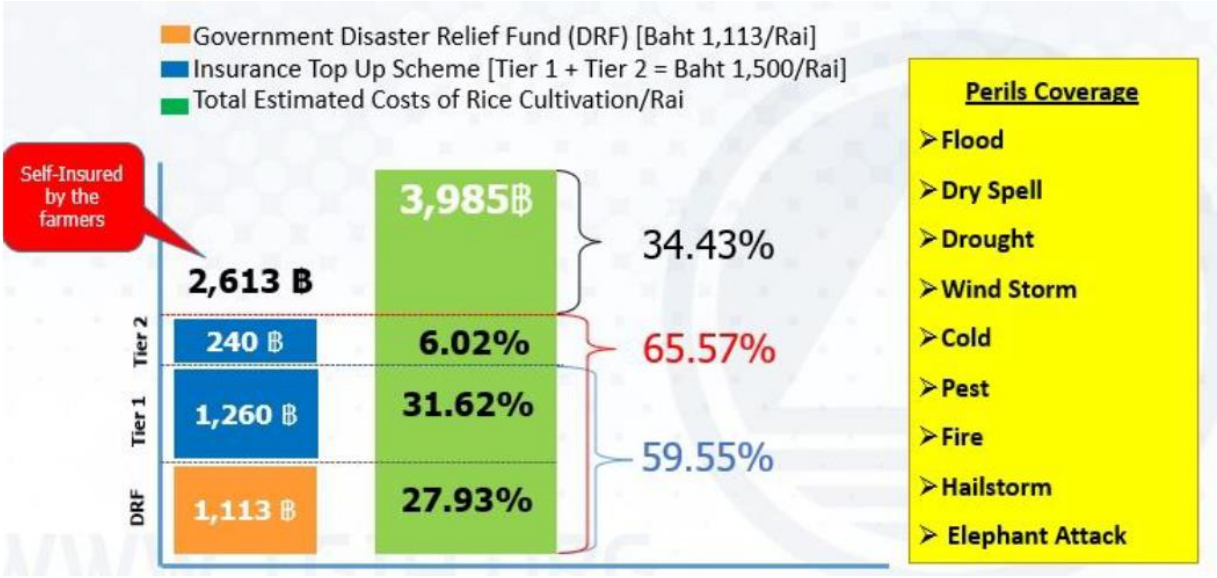
(2.) The scheme uses documents issued and certified by the government to show the number of damaged areas.

(3.) The government provides farmers with financial aid at the rate prescribed by the Ministry of Finance (approximately no more than 30 percent of the total production cost). This helps boost the private insurers' confidence in the government system. They can then provide farmers with additional protection to cover the cost of production.

In 2020 - 2021, farmers received the government's financial aid of 1,113 Baht per rai and a claim of 1,260 Baht per rai from the insurer, totaling 2,373 Baht per year rai or 59.55 percent of the total rice cultivation cost. The average cultivation cost nationwide is 3,985 Baht per rai, as shown in Figure 3.9.

[2] For further information, please see Association Journal no. 140, July – September 2018

Figure 3.14: Indemnity of Thai Rice Structure: 2021/2022



3.7.5. Risk Management

3.7.5.1. Challenges requiring solutions

Future opportunities of crop insurance consist of:

(1) Political stability factor at both international and domestic levels: It is one of the factors that cause change. The key issues are the national reform policies and economic policies that provide a clear direction, resulting in the people's confidence, government support policies, and boosting the domestic and international investors' confidence.

(2) People's basic understanding of insurance: In order for the people to gain an insight to learn the true intention of insurance contracts or policies, despite having better knowledge on crop insurance, the insured must still be provided with information on coverage, conditions, and exception they should be aware of to prevent them from being misled, which may affect the image of the non-life insurance business. The regulatory bodies and the business must have a sense of urgency in educating people on non-life insurance. Currently, all agencies jointly organize "training for the trainer" every year to promote farmers' understanding of rice and maize insurance.

(3) Development of information technology system: The IT system is currently developed to provide the information by farmers' plot. It has applied scientific data, such as satellite images and meteorological data, and crowdsourcing method that collects plot-based data of cultivation and crop damage to assess the damaged farmland caused by natural

disasters. It also takes part in underwriting and benefit payment. The technologies will ensure fast and accurate damage assessment, resulting in the insurers' prompt claim payment and allowing farmers to fund their next cultivation cycle.

(4) New risks from environmental factors: They are caused by climate change, which may cause or intensify the severity of floods, droughts, storms, or earthquakes. This will lead to worse damage or higher claims. Climate change may also cause new unpredictable disasters.

3.7.5.2. Premium Adequacy

For ten years, data on in-season rice paddies and damaged in-season rice paddies has been collected to calculate rice crop insurance premiums. Today, compulsory insurance offers 1,260-Baht coverage, while voluntary insurance offers 240- Baht coverage. Loss comparison between farmers purchasing voluntary and compulsory insurance revealed that farmers with voluntary insurance had higher damage rates. It means higher risk areas were insured. The retrospective evaluation of rice crop insurance also revealed underwriting loss. Therefore, the loss ratio at 80 percent has been determined for rice crop insurance. This is the ratio that the rice crop insurance scheme is expected to earn approximately 10 percent profit in the long term, with premium details that derive a loss ratio of 80 percent.

The profit earned from the entire rice crop insurance scheme is expected to be approximately Z million Baht (10 - year retained earnings = 9 - year accumulated loss + expected profit in 2021 = -X million Baht + Y million Baht = Z million Baht).

Profit margin is about 0.10% per annum only, which is very low. In other words, with this rate, the rice crop insurance can only reach a breakeven point.

Such a factor also depends on the government's and BAAC's premium subsidy policies, leading to several insured areas in the scheme and adequate premiums. However, if the government's policy changes in the future, premium adequacy will decrease due to fewer insured areas; farmers will choose to insure only high-risk or medium-risk areas.

3.7.5.3. Risk Identification and Mitigation

(1). Risk identification

In this report was based on insurance experience and brainstorming groups of employees or agencies involved in rice crop insurance. They jointly considered external and internal incidents that already occurred and affected the organizations' targets and performance.

1. External factors are uncontrollable external environments, such as government policies, politics, economy, riots, catastrophes, interest rates, exchange rates, and counterparties.

2. Internal factors are internal environments that can be controlled or changed, such as policies, strategies, management systems, personnel, and technology used. Name peril insurance identifies seven major risks as follows:

   a) Climate change: Currently, natural disasters tend to intensify in severity and frequency because of global climate change. This leads to higher temperatures, rising sea levels, and volatile weather in each season. Thailand has to encounter various types of natural disasters, resulting in instability of farmers' income. This is therefore a major risk caused by inevitable external factors.

   b) Epidemics: The hot weather and continuous rain cause accumulated moisture in rice paddies, resulting in rice blast disease. The outbreak of various diseases directly affects rice quality and productivity. Furthermore, new types of outbreaks may potentially occur in the future.

   c) Risks of legal and trade regulations: The rice crop insurance scheme has been operating under domestic and international laws and policies. A number of laws related to the company's business operations include the Civil and Commercial Code on Insurance, the Non-Life Insurance Act B.E. 2535, the Personal Data Protection Act, consumer protection laws, and computer-related laws. Therefore, it is imperative for companies to closely monitor changes in relevant laws to improve their work processes and ensure that they remain aligned with those laws. Because of the abovementioned issues, implementation may take longer to achieve the goals. Consequently, it is crucial to find ways to mitigate risks of damages in rice crop insurance.

(2.) Risk mitigation

a) Reinsurance: With a limited capacity, insurers need reinsurance to mitigate their loss from unpredictable disasters and epidemics, which are considered "major" damage. Therefore, insurers try to mitigate their risks by reinsuring some of their liabilities with international reinsurers. Annually, the scheme selects credible reinsurance partners with good ratings.

b) A proposal made for the government to establish a crop insurance fund: The fund

specifically established for crop insurance will undertake reinsurance in parallel with foreign reinsurers. It will also promote monetary preservation within the nation and appropriate insurance premium rates. This will enhance the insurers' capacity and also will shift from the existing reinsurance model that relied mainly on foreign reinsurers to domestic reinsurance, thereby promoting monetary preservation within Thailand. Lastly, it will promote the use of the agricultural insurance system as a faster, more efficient, and more sustainable risk management tool for the government and farmers.

c) Laws and regulations: The scheme's operation is regulated by the quasi-governmental agency, the Office of Insurance Commission (OIC), which is responsible for overseeing and supervising legal matters. Moreover, the personnel in the scheme have been following trends in issuance, announcement, changes, and repeal of laws, trade regulations, and measures of trade barriers to have clear, accurate, and updated information in determining appropriate strategies. Furthermore, the scheme also conducted impact analysis, educated executives and related personnel, as well as ensured its enforcement and strict compliance with laws.

3.) Social Safety Net

Farmers' social safety net was another way to manage risks because the government's initiative of rice insurance and compensation aimed to improve farmers' quality of life. The idea focused on making sure that farmers could stand on their own feet firmly and sustainably, with insurance as a supporting tool. Furthermore, the insurance scheme encouraged farmers to change their perceptions from depending mainly on the climate in cultivation and having no specific risk management to having financial security when facing disasters. By doing so, they can continue their lives and grow rice in the next cycle without incurring more household debts. The scheme also had the policy to educate rice-growing communities on risk management and to provide rice insurance annually. Furthermore, it created a new generation of farmers or smart farmers with technological knowledge and skills. The scheme designed an application and a website where farmers can report loss and damages by themselves. Moreover, the government also supported communities by purchasing rice from communities with produce oversupply and selling them in urban markets. The government also built groundwater banks to increase green spaces for Thai farmers. Despite taking a long time to witness results, the scheme will greatly benefit the society and country in the future. At the same time, the government had a policy on crop insurance, which was one of the important measures used as a tool to help farmers manage their finances. The insurance would cover production costs in the event of a natural disaster, reduced productivity, and volatile price of produce. This would help create a stable income and career for farmers.

The insurance system could also be used to manage risks for farmers in the long run.

3.7.6. Summary

Insurance is used by organizations or agencies as a form of risk management, which transfers risks to insurance companies instead. Therefore, the government had implemented the rice crop insurance scheme since 2011, allowing the private sector to provide rice insurance in addition to the government's remedial measures. This aimed to support the government's policy, which subsidized a portion of insurance premiums for insured farmers. In addition, the government had the policy to carry out this scheme continuously and sustainably. In 2011, it provided a single coverage rate for six perils and had the total insured area of 1,059,131 rai or 1.73 percent of the country's total farming area. From 2017 onwards, the scheme has increased the coverage for the rice paddies' loss or damage caused by seven perils from natural disasters, pests, or outbreaks. The scheme has increased coverage and the sum insured based on insurance records. Farmers have recognized the importance of insurance as seen in growing insured areas. Currently, the insured areas account for more than 70 percent of farming areas in the nation. However, the scheme still needs government policies to promote and support sustainable agriculture insurance. If there is any change in the government subsidy policy, which requires farmers to pay more premiums, the change will affect the voluntarily insured areas and pose risks to the insurance portfolio. In this case, farmers in low-risk areas will no longer feel motivated to join the scheme, while those in high-risk areas will remain in the scheme. This will result in a high rate of damage to the insurance system and cause long-term unsustainability.

3.8. VIETNAM

3.8.1. Introduction

Agriculture, the main economic engine and income source for 70% of Vietnamese, is highly exposed to risks. Different measures are being adopted to mitigate these risks, by both farmers and government, of which, international experience indicates that agricultural insurance (AI) can be an effective tool. AI has been implemented in Vietnam for nearly 30 years but was not well developed. In 2011, to further develop the AI market for promoting agricultural production and ensuring social security, the Vietnamese government issued the National Agricultural Insurance Pilot Program (NAIPP). After three years of implementation from 2011-2013, this program achieved a number of significant results and the Vietnamese government has directed the Ministry of Finance (MoF) and the Ministry of Agricultural and Rural Development (MARD) to continue to develop AI in Vietnam.

In Vietnam, the AI market was rather small, AI companies were lacking agricultural experts and the linkage between different stakeholders related to AI were limited. Moreover, farmers' awareness about AI have been inadequate and their small and fragmented production scale causes a lot of constrains for insurance companies to penetrated agriculture markets. During the NAIPP period, more than 300 thousand farmer households and agriculture enterprises participated in the Program, of which 77% were poor households and 15% were near-poor. This indicates a low voluntary participation rate because poor and near-poor households enjoyed a 90-100% premium exemption. Total value insured by the pilot program was VND 7,747.9 billion (USD 342.2 million), total revenue from AI premiums was VND 394 billion (USD 17.2 million) and total compensation paid was VND 701.8 billion (USD 31.0 million). While the compensation rate in the rice and livestock sectors were reasonable and and insurers were able to make profit, the overall compensation rate in the aquaculture sector reached 306.83% and caused the overall loss of the Program.

Empirical analysis results show that impacts of NAIPP on farmer production differed between sectors. In Dong Thap (rice sector), NAIPP did not have significant impacts on farmer's income, cost and profits. In Vinh Phuc (livestock sector), the impacts were much more significant. After controlling all other factors, the research shows that NAIPP helped to increase farmers' income, reduce production costs, and thus, increased their profit. Participants in Vinh Phuc were also more specialized as contribution of livestock production in their total income is higher than other households.

3.8.2. Rice Insurance

Rice insurance experienced successes in the pilot program with a large number of participants and a low claims ratio. 236,397 households/production organizations participated in rice insurance, of which 76.45% were poor households – who got supported 100% of insurance premium under the regulations; near poor households accounted for 17% and others households only accounted for 6.7% of total participants. It is possible that participation in rice insurance did not come from the producers' actual demand, with a small proportion of the voluntary participants, but rather households participated because of the big premium support from the government. Among provinces where rice insurance was implemented, Ha Tinh had the highest number of participants (47,597participants); Nam Dinh ranked 2nd (31,960 participants) and An Giang was the 3rd (1,789 participants). An Giang and Dong Thap, two provinces in the key rice production for export area in Vietnam, recorded a much lower rate of participants compared to other provinces. However, the rate of voluntary participants in these two provinces was relatively high, (74% in An Giang and 20% in Dong Thap). Dong Thap and An Giang appealed to rice purchasing companies and input suppliers to support farmers participating in the insurance, creating a new model that linked the responsibilities of stakeholders in rice supply chain. This may be explored when the government AI program is reintroduced.

Most of the insured area is from North Central of Vietnam, where risks, climate risks are more likely to happen. Total insured area of Nghe An and Ha Tinh account for more than 50% of total insured area. While in An Giang and Dong Thap, two main rice producers of Vietnam, total insured area is even lower than Nam Dinh and Thai Binh.

This counter-intuitive result may be due to the higher poverty rate in Nghe An and Ha Tinh led to a higher rate of participation when the poor households were supported. The results of pilot implementation relied a lot on the attention, guidance and involvement of the local authorities in the implementation process, these provinces performed well under the guidance of Decision 315 and guidelines from the government.

As rice insurance premium is similar in most provinces, the distribution of total premium revenue is according to above insured area. Of which, total revenue from the Agriculture Insurance premium was 170 billion VND (USD 7.3 million)

The claim ratio and value of compensation in rice insurance is quite high, compensation was 294 billion VND (USD 12.7 million).

3.8.3. Livestock Insurance

Similar to rice insurance, most of livestock participants are poor households. Among 60,133 households/production organizations participating in livestock insurance during the three years of pilot, 84% of them are poor households. Near poor households account for 10% and other households account for 6% of the participants.

Despite participant provinces of livestock insurance scattered all around Vietnam, the vast majority of participants were located in Binh Dinh province. Number of participants in Binh Dinh was 7,399, accounted for 47.9% of the total number. Thanh Hoa followed with 5,192 households (33%); Hai Phong with 2,785 households (18%).

Total revenue from premium was correlated to the number of participants, where Binh Dinh province contributed more half of the total premium. Total revenue from livestock premium was 15.5 billion VND (USD 650,000), of which, Binh Dinh had the largest amount of revenue with 8,8 billion VND (USD 382,000), followed by Thanh Hoa with 4,4 billion VND (USD 210,000), Hai Phong with 2.1billion VND (USD 95,000).

3.8.4. Aquaculture Insurance

Aquaculture insurance have the highest voluntary participation rate among 3 insured sectors. Aquaculture insurance was implemented in 5 provinces, including Ben Tre, Soc Trang, Tra Vinh, Bac Lieu and Ca Mau. During 3 years of implementation, 4,938 households participated the NAIPP, of which, poor and near poor households only account for less than one third, opposite to other sectors. The reason of this is the nature of aquaculture production in Vietnam, which requires a lot of initial investment and most poor households cannot afford. Among provinces where aquaculture insurance was implemented, Ben Tre had the highest number of participants with 2,756 households; followed by Ca Mau (1,941 households); Tra Vinh (241 households).

The insured value and premium revenue was according to the insured area. Total insured aquaculture value during the pilot period was 2,883.7 billion VND (USD127.3 million). Total revenue from aquaculture premium was 218.2 billion VND (USD12.4 million), of which Soc Trang and Bac Lieu recorded the highest revenue. However, it can be seen that the value to area ratio in Ben Tre and Ca Mau was much higher than other provinces.

Compensation rate of aquaculture insurance was the highest among 3 insured sectors, with led to the overall loss of NAIPP. Total actual compensation of aquaculture was 76 billion VND (USD3.3 million), the average claims ratio was 306%. Especially, Tra Vinh province only

implemented aquaculture insurance after the supplement of Circular 43/TT- BNNPTNT, one year later compared to other provinces but the claims ratio was up to 466.7%.

The results show a significantly high rate of compensation in aquaculture insurance. The result in Ben Tre show significant difference in the frequency of disease outbreak in NAIPP years comparing to earlier years. Insurance fraud did happen, but was not considered big problem. The problem with aquaculture insurance lies in the previous risks evaluation activity - the insurance companies underestimated the risk of diseases to aquaculture. One of the respondents from our survey - who is both a farmer and an aquaculture veterinary with nearly 10 years of experience in aquaculture production - said that, diseases co-exist with aquaculture production in Mekong River Delta and every year, he loses at least 30% of his production to diseases, but still remains the most productive aquaculture farm in his village. Controlling diseases in aquaculture is not only problem with farmers but also with Vietnamese government, and until these diseases are controlled at a certain level, its insurance is not recommended.

3.8.5. Application of Advanced Technology

The Vietnamese government should support insurance companies in the pilot application of advanced technologies in AI monitoring assessment such as remote sensing, online data transmission, use of mobile phone systems, etc. The role of government is to create an enabling environment to establish a good inter-connected database and provide suitable infrastructure/facilities. With a better database and adequate infrastructure, insurance companies will be able to design suitable insurance products.

3.8.5. Policy and regulation

The Ministry of Finance said that it is very necessary to develop and submit to the Prime Minister for promulgation a Decision on the implementation of agricultural insurance support, based on legal and practical bases, contributing to the implementation of the road map, the guidelines of the Party and the State's policies on agricultural, farmer and rural development, specifically:

Firstly, the Prime Minister's Decision on the implementation of agricultural insurance support is to implement the agricultural insurance policy according to Decree No. 58/2018/ND-CP.

Secondly, Decision No. 22/2019/QD-TTG dated June 26th, 2019 and Decision No. 03/2021/QD-TTg dated January 25th, 2021 on the implementation of a policy to support agricultural insurance from June 26th, 2019 to December 31st, 2021. Therefore, it is necessary to promptly issue the Decision on policy implementation for the next period (from January 1st,

2022) to ensure the continuous, stable and uninterrupted implementation of the policy and there is no legal gap that makes it difficult for farmers to participate in insurance.

Thirdly, the promulgation of the Prime Minister's Decision on the implementation of agricultural insurance support facilitates the development of agricultural insurance in order to support agricultural production in areas damaged by natural disasters.

On the basis of the state budget balance, the Ministry of Finance proposes the insured which will be supported in the draft Decision as follows: The crop is rice; livestock including buffaloes, cows, pigs; aquaculture includes black tiger shrimp and white leg shrimp.

Regarding the level of supporting, to encourage organizations and individuals of agricultural production to participate in agricultural insurance, inheriting the provisions of Decision No. 22/2019/QD-TTg and Decision No. 03/2021/QD-TTg, the Ministry of Finance proposes regulations on organizations and individuals in agricultural production to be supported and the maximum support level for agricultural insurance premiums as prescribed in Article 19 of Decree No. 58/2018/ND-CP, specifically as follows: Agricultural production individuals belong to poor households, near-poor households: 90%; other agricultural production individuals: 20% of agricultural insurance premium; agricultural production organizations meet specific conditions: 20%.

CHAPTER 4

SUMMARY AND CONCLUSION

Agriculture has long been a key sector in ASEAN as it is blessed with fertile soil, favorable weather and adequate water, with rice being the most important crop that is widely cultivated. Agriculture contributes significantly to the economy as it serves as the countries' important production and employment resources, although recently the contribution in overall GDP has been declining over the years.

Some ASEAN countries become major exporters of rice and other agricultural products in the world. Beside rice, there are also field crops such as grain, sugar, fiber crops etc and horticultural crops such as vegetables, fruits, flower etc for export and for domestic needs.

Agriculture is significantly affected by climate change. Delayed rainfall, tropical storm, flood, drought and insufficient water will reduce productivity. Pest is also an important factor affecting productivity. Natural disaster is a risk that farmers have to face in their daily production life.

Governments initiate agricultural policies including insurance program for farmers as part of risk management efforts to help farmers face the risks. It is crucial to prevent farmers from running out of fund to start the next cultivation cycle after they encounter natural disaster. Insurance program is expected to help support farmers affected by natural disasters and provide them with remedies. Governments invites private sectors to provide insurance program and government help the insurance penetration by providing premium subsidy.

The rice crop insurance can be indemnity basis or parametric basis. For indemnity basis, the insurance is generally a named peril policy covering loss or damage due to natural disaster and pests. The sum insured is normally the cost of production.

Thailand is a good example for agricultural insurance due to its success in developing rice crop insurance. Started in 2011, the program has now reached 6.9 million hectares of insured rice farmland from a total of 9.3 million hectare of rice farmland in the country, or almost 75% of the country's total rice farmland area.

One of the keys of success is the strong collaboration between farmers, relevant government agencies from Ministry of Finance, Ministry of Agriculture, Ministry of Interior, premium rating office, bank and the insurance association. Thailand has also developed good coverage model and an effective claim system.

There are always challenges in our efforts to help farmers. The challenges for implementation of agricultural insurance include farmers' limited insurance literacy, risk selection by farmers, premium adequacy and business sustainability since the insurance program relies in many extents to the government subsidy on premium.

Almost all aspects of agricultural insurance have been highlighted in this write-up. We hope this write-up regarding agricultural insurance will become an important source and reference for those who want to implement agricultural insurance or to evaluate the existing agricultural insurance in their country.