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ASEAN GUIDELINE ON AGRICULTURAL INSURANCE IMPLEMENTATION

Lessons and experience from the ASEAN

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Table of Contents

Acronyms

ADB	Asian Development Bank
ACA	PT Asuransi Central Asia
AHPND	Acute hepatopancreatic necrosis disease
AIC	Agricultural Insurance Corporation of India
AMS	ASEAN Member States
APPIK	Asuransi Perikanan bagi Pembudidaya Ikan Kecil (Fisheries insurance for smallholder fish farmers)
ASEAN	Association of Southeast Asian Nations
AUBU	Asuransi Usaha Budidaya Udang (Shrimp Cultivation Business Insurance)
AUTP	Asuransi Usaha Tani Padi (Paddy Farming Business Insurance)
AUTS	Asuransi Usaha Tani Sapi (Cattle Business Insurance)
AYII	Area yield index insurance
BAAC	Bank for Agriculture and Agricultural Cooperatives (Thailand)
BHT	Thai Baht
BMZ	German Federal Ministry for Economic Cooperation and Development
CAP	Center for Agricultural Policy
CCE	Crop cutting experiment
CRI	Climatic Risk Index
CRN	Climate Resilience Network
CTL	Constructive Total Loss
DA	Department of Agriculture (the Philippines)
DOAC&FW	Department of Agriculture Cooperation and Farmers Welfare (India)
DOAE	Department of Agricultural Extension (Thailand)
DRF	Disaster risk financing
DFRFI	Disaster risk financing and insurance
DRM	Disaster risk management
FAO	Food and Agriculture Organization (FAO) of the United Nations
FCIP	Federal Crop Insurance Program (USA)
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
GWI	Global World Insurance Company
Ha	Hectare
HVC	High value crop
HIC	High income country
IDR	Indonesian Rupiah
IFAD	International Fund for Agricultural Development
IPCC	Intergovernmental Panel on Climate Change
IPSARD	Institute of Policy and Strategy for Agricultural and Rural Development (Vietnam)
IRRI	International Rice Research Institute (the Philippines)

JASINDO	PT Asuransi Jasa Indonesia
LR	Loss ratio
LTALR	Long-term average loss ratio
MAFI	Ministry of Agriculture and Food Industries (Malaysia)
MARD	Ministry of Agriculture and Rural Development (Vietnam)
MFI	Microfinance institution
MOF	Ministry of Finance
M&E	Monitoring and evaluation
MPCI	Multiple peril crop insurance
NAIPP	National Agricultural Insurance Pilot Program (Vietnam)
NCIS	National crop insurance scheme
NPCI	Named peril crop insurance
PMFBY	Pradhan Mantri Fasal Bima Yogana (India)
PPC	Provincial People's Committee (Vietnam)
PPP	Public-private partnership
PCIC	Philippines Crop Insurance Corporation
PHP	Philippine Peso
RIICE	Remote Sensing-based Information and Insurance for Crops in Emerging Economies
RFID	Radio frequency identification
RS	Remote sensing
RSBSA	Registry System for Basic Sectors in Agriculture (the Philippines)
SDC	Swiss Agency for Development and Cooperation
SIPAC	System of Protection against Climatic Risks (Portugal)
TGIA	Thai General Insurance Association
TNCIS	Thai National Crop Insurance Scheme
UAI	Unit area of insurance
USD	United States Dollar
VND	Vietnamese Dong
WICI	Weather indexed crop insurance
WII	Weather index insurance

Executive Summary

In 2020, the total population of the 10 ASEAN Member States amounted to 661.5 million, a very high proportion of whom were living in rural areas, mainly reliant on agriculture (crops, livestock, aquaculture, and forestry) for their main livelihoods (consumption and income). Agriculture is also an important source of employment, national income (GDP), exports, and foreign exchange earnings. Most farmers in ASEAN are very small landowners, cultivating less than 1 Ha of land: a structure of small micro-buyers that poses major challenges for the operation of agricultural insurance.

The ASEAN region is one of the most exposed in the world to natural and climatic disasters, including earthquakes, volcanic eruptions, typhoons, floods, and droughts, as well as being subject to pests and diseases of crops and livestock. Such disasters can cause many millions of dollars in loss and damage for the agricultural sector in an average year, running into billions of dollars in more catastrophic years. Climate change is already having major adverse impacts on crop production and yield as well as affecting livestock and aquaculture. Furthermore, these negative impacts are predicted to increase significantly by the turn of the century.

The public and private sectors in ASEAN employ a wide range of disaster risk management (DRM) practices and disaster risk financing (DRF) to provide agricultural tools and instruments to compensate farmers in the event of a natural disaster. Agricultural insurance is one of the instruments ASEAN Member States can use to transfer some of the unmanageable risks faced by farmers to national and international capital and insurance markets.

Agricultural insurance in the ASEAN region is relatively new, with the exception of the Philippines, where a public sector specialist agricultural insurer, the Philippines Crop Insurance Corporation (PCIC), has been offering subsidised crop insurance to smallholder rice and maize farmers for more than 40 years. Within the last decade, Thailand and Indonesia have also developed national subsidised agricultural insurance programmes, which are showing promising results in terms of scale-up and coverage for small-scale farmers. At the other end of the scale, there is no agricultural insurance programme in Brunei or Singapore (where the agricultural sector is very small); currently, there is no such insurance in important agricultural economies such as Lao PDR and Malaysia and only small-scale pilots in Cambodia, Myanmar, and Vietnam.

For several years, GIZ has worked actively with the ASEAN Secretariat to promote knowledge sharing, understanding, experience, and best practices for agricultural insurance among Member States. In 2017, the ASEAN Climate Resilience Network commissioned a 10-Phase Guideline on the steps to be followed in the planning, design, and implementation of a national crop insurance programme. Based on the positive feedback received, GIZ commissioned the current study to build on the earlier guideline by extending it to include crops, livestock, and fisheries with the specific aim of sharing the actual experiences of ASEAN Member States in the design and implementation of agricultural insurance, as well as highlight the issues and challenges faced by stakeholders in implementing their programmes and learn from the success stories leading to a scale-up.

This report contains an updated analysis of the availability of crop, livestock, and aquaculture insurance provision in ASEAN, including large-scale subsidised national programmes in Indonesia, the Philippines, and Thailand through to the innovative small-scale unsubsidised private sector start-up initiatives in countries such as Cambodia and Myanmar. A detailed assessment of the uptake, penetration, and financial underwriting performance of these programmes is also presented, based on the information provided by public and private sector participants for this study, highlighting some of the key issues and challenges identified by each country in scaling up insurance.

The guideline begins by highlighting the need for each ASEAN Member State to conduct a detailed risk assessment to identify the key risks facing the agricultural sector, their frequency, severity, and impacts (financial losses) to inform decisions on risk layering and the most appropriate tool to adopt for agricultural risk management or DRF.

This is followed by an assessment of the key policy options facing governments in deciding how to develop national agricultural insurance programmes, and the legal and institutional framework options that best suit each country. The assessment draws on the public sector insurance experiences of the Philippines and Indonesia, the public-private partnership (PPP) model adopted in Thailand, and international experience, which suggests PPP models are the most sustainable in the long term. The report highlights the successful programmes which have clearly defined the roles and responsibilities of each public and private sector stakeholder under such a PPP model.

The guideline contains a detailed assessment of the current range of crop, livestock, and aquaculture insurance products offered by insurers in each ASEAN Member State and highlights their suitability for the targeted farmers. To date, indemnity-based agricultural insurance products have mainly been marketed to all types of farmers in the ASEAN, irrespective of their suitability for very small-scale semi-commercial and subsistence farmers in the region. The report recommends more research and development into index-based crop insurance products, including weather index insurance (WII) and area yield index insurance (AYII). There is a need to harness technological innovations such as remote sensing in the next generation of products developed in the region.

The guideline also directly tackles the sensitive issue of premium subsidy provision. Most growth in agricultural insurance penetration in ASEAN over the past decade has been fuelled by huge injections of government financial support in the form of very high premium subsidies, of up to 100% (i.e., free insurance) in Indonesia, the Philippines, Thailand, and Vietnam. These levels of premium subsidy are unsustainable in the long term, and it is recommended that ASEAN Member States currently embarking on developing their own national agricultural insurance programmes start with lower subsidies.

The guideline also deals with distributional issues and highlights Thailand's experience where crop insurance penetration has increased exponentially since 2016, when crop insurance was made compulsory for borrowers of seasonal credit. International experience shows that bundling crop insurance with credit and other services is more likely to lead to sustainable agricultural insurance programmes since it adds value for the farmer. ASEAN Member States, which are only now planning their own national agricultural insurance programmes, should study the advantages and drawbacks of the Thai model as well as the crop-credit-insurance linkage in the Philippines and Indonesia.

It may take many years for farmers to become aware and understand trust in agricultural insurance and for programmes to scale up and reach high levels of penetration and sustainability: this means that under any PPP initiative, governments must adopt a long-term planning strategy and be committed to budgeting for premium subsidies and other support.

The guideline also addresses the need for capacity building and training for insurers in ASEAN and the sharing of knowledge and information at the country level.

1. Introduction

1.1. Background and Guideline Objectives

The central objectives of the guideline are as follows: 1) to identify the key lessons, experience, and best practices employed by ASEAN Member States (AMS) when implementing agricultural insurance programmes to achieve scale and sustainability, since such success factors may be of interest to countries currently developing and piloting their own national agricultural insurance programmes; and 2) to highlight a series of key policy-related options and decisions that ASEAN governments need to address in the planning, design, implementation, and scaling up of their own national agricultural insurance programmes. Within the overall scope of this study, the following key questions will need to be addressed:

- How to prepare and implement an agriculture insurance scheme at scale?
- What are the key processes in developing or improving agricultural insurance for implementation?
- Who should be involved in the development and implementation process? What should be their roles (public and private stakeholders and beneficiaries such as farmers)?
- What elements should be considered for effective agricultural insurance implementation (human resources, technology support, coordination mechanism, etc.)?

However, this guideline is not a standard blueprint or road map for AMS to follow, which will automatically lead to the scaling up and financial stability of their programmes. The agricultural diversity in each country, agro-climatic conditions, risk exposure, government policy and support for agriculture and agricultural insurance, degree of insurance market development, as well as agricultural insurance demand and supply prohibit such a standardised and prescriptive approach.

The current study follows on from an earlier 2016 initiative commissioned by the ASEAN Climate Resilience Network (CRN) titled 'The 10 Phases in Developing a National Crop Insurance Programme: Guide Overview'[1]. This initiative led to the development of a series of guidelines for ASEAN governments (and other public and private stakeholders) to consider in their plan, design, and implementation of a national crop insurance programme. The current study on developing a guideline for Agriculture Insurance Implementation in ASEAN aims to build on the earlier 10-Phase Guide by extending its scope to include crops, livestock, and forestry.

This study has been conducted under the project 'Innovative Climate Risk Financing in Cooperation with ASEAN', a supplementary measure under the ASEAN-German regional cooperation project on the 'Promoting Sustainable Agriculture Value Chains in ASEAN (ASEAN AgriTrade)' project, under the purview of the ASEAN Sectoral Working Group on Crops (ASWGC), commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) and implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in collaboration with the AMS and ASEAN Secretariat.

1.2. Methodology

This study includes:

a) An extensive review of the available literature on the design and implementation of agricultural insurance in AMS.
b) In-depth semi-structured virtual interviews with more than 25 public and private agricultural insurance stakeholders in AMS (Annex 1).
c) A short questionnaire, distributed to public and private sector interviewees (Annex 5); the results of which are presented at relevant points in this report and guideline.
d) An earlier draft of this guideline was circulated to AMS stakeholders in late September 2021 for their comments and feedback, with the main findings and recommendations discussed at a virtual Regional Consultation Workshop on 28 October 2021. This final report incorporates the useful comments and feedback provided.

[1] https://asean.org/wp-content/uploads/2021/08/10-Phases-Guide-Crops-Insurance.pdf

1.3. Structure of the Report

The remainder of this report is structured as follows: Chapter 2 presents a review of agricultural insurance provision, the issues, challenges, and lessons learnt from the 10 AMS. Chapter 3 deals with the guidelines for implementing agricultural insurance and highlights the common features of scaled-up programmes in the ASEAN and more broadly. Finally, Chapter 4 presents conclusions and recommendations for AMS agricultural insurance policymakers and practitioners to consider.

2. Agricultural Insurance in ASEAN

This chapter presents an up-to-date overview of agricultural crop, livestock, and aquaculture provision in AMS including national subsidised programmes and unsubsidised pilots. The types of agricultural insurance products on offer (indemnity-based versus index-based) are analysed along with the farmers' experiences of the various programmes in terms of uptake. This is followed by a brief review of the key issues and challenges of implementing agricultural insurance in the AMS. This is the first time such a detailed analysis has been conducted on all AMS, and it is expected to help both public and private stakeholders in each country to compare experiences, ultimately leading to effective future planning, budgetary support, and implementation decisions.

2.1. Agriculture in ASEAN Member States

Agriculture remains the most important socio-economic sector in countries in the ASEAN region including Cambodia, Lao PDR, Indonesia, Myanmar, and Vietnam, where a high proportion of the population live in rural areas and are employed in agriculture. With its significant contribution to GDP, agriculture continues to play a central role in the economies of Malaysia, the Philippines, and Thailand, while it is less significant in countries with minimal agricultural activity such as Singapore and Brunei Darussalam (Table 2.1).

Table 2.1. Agricultural and Rural Development Indicators in ASEAN

Country	Population (Million)	Land Srea (sq.Km)	Agricultural Land (% of Total)	Agricultural Land (Ha 000)	Arable Land (Ha 000)	Aquaculture Value Added (% of GDP)	Aquaculture Employment (% of Total)
Brunei Darussalam	0.4	5,270	2.7	14,400	5,000	1.2	1.95
Cambodia	16.7	176,520	31.5	5,566,000	3,911,000	22.8	34.5
Indonesia	273.5	1,811,570	38.2	26,300,000	26,300,000	13.7	28.5
Lao PDR	7.3	230,800	10.4	2,394,000	1,550,000	16.2	61.4
Malaysia	32.4	328,550	26.1	8,571,000	1,826,000	8.2	10.3
Myanmar	54.4	653,520	19.7	12,889,000	11,810,000	22.8	48.8
Philippines	109.6	298,170	41.7	12,440,000	3,429,700	10.2	22.9
Singapore	5.7	700	0.9	700	560	0.0	0.0
Thailand	69.8	510,890	43.3	22,110,000	16,810,000	8.6	31.4
Vietnam	97.3	310,070	39.2	12,168,800	6,988,300	14.9	37.2

Sources: World Bank Agriculture and Rural Development Indicators Database. https://data.worldbank.org/indicator. Figures are 2018 or latest for 2018-19 period

A key feature of the agricultural sector in ASEAN is that farm holdings are very small on average. For example, according to the most recent agricultural census in 2012, the Philippines has 5.56 million farms/holdings, covering 7.19 million Ha, with an average holding of 1.29 Ha per farm. However, 3.1 million (57%) of all farmers own or cultivate less than 1 Ha of land with an average of 0.28ha per holding, 88.9%

own less than two Ha, and only 1.8% own more than 7 Ha[2]. In Indonesia, according to the 2003 Agricultural Census, 75% of the country's 25 million farm holdings are less than 1 Ha, with only 11% being larger than 2 Ha. In Vietnam, about 70% of farms operate on less than 0.5 Ha, and only 8% have more than 2 Ha. A similar pattern emerges in Cambodia, Lao PDR, Myanmar, Malaysia, and Thailand.

Paddy rice is the most important crop in ASEAN and a major staple for small-scale and subsistence farmers. About 23% of total global rice production (115 million metric tons) is produced by AMS, with Indonesia, Vietnam, Thailand, Myanmar, the Philippines, and Cambodia being ranked in the top ten in the world by tonnage. Likewise, livestock, especially poultry and pigs, are crucial to the small-scale mixed farming systems of many AMS, as are cattle and buffalo. Forestry and plantation crops are also popular in Indonesia, Malaysia, Thailand, Myanmar, Lao PDR, and Cambodia. Finally, fresh water and brackish-water aquaculture (fish farming) such as shrimp, tilapia, and carp are prominent in the region, with Thailand being a major exporter of shrimp.

2.2. Climate Risk Exposure to Agriculture in ASEAN

The 10 AMS are located in one of the world's most exposed regions to extreme weather events such as typhoons, excess rain and floods, and droughts, as well as natural disasters including volcanic eruptions, earthquakes, tsunamis, landslides, and mud slips. The region is also subject to biological events such as pests and epidemic disease outbreaks in crops, livestock, and fisheries. According to Germanwatch's long-term Climatic Risk Index (CRI), from 1999–2018, Myanmar has recorded an average of 55 major weather-related loss events per year, making it the second-most affected country in the world. Over this same 20-year period, three other AMS were ranked in the top ten most weather-affected countries: the Philippines (CRI Rank 4), Vietnam (CRI rank 6), and Thailand (CRI rank 8), incurring major human and economic losses (Eckstein et al., 2021).

Climate change is severely impacting agriculture in ASEAN through more extreme weather events, with the strongest and most consistent increases in temperature expected in northern Indonesia, Singapore, and Malaysia. In fact, ASEAN may experience an increase in temperatures of 3–4 °C and a rise of 40% in rainfall by the end of the century. Increasing temperatures and extreme weather events are also leading to a decline in crop yields in many Southeast Asian countries (Thailand, Vietnam, and Indonesia); massive flooding in Hanoi and Hue (Vietnam), Jakarta (Indonesia), and Vientiane (Lao PDR); landslides in the Philippines; and droughts in many other parts of the region (IPCC, 2007; 2014). Water shortages, agricultural constraints, risk to food security, infectious diseases, forest fires, and the degradation of coastal and marine resources are also increasing (Raghavan et al., 2019). Under high levels of global warming scenarios, the IPCC report states that models based on current agricultural systems suggest large negative impacts, mainly relating to water availability and a reduction in crop yields. In particular, a significant reduction in rice yield is also likely to affect exports and the entire regional supply chain due to higher demand. This could influence the insurance market and inflate prices, thereby disrupting economic stability (Raghavan et al., 2019).

According to the IPCC, relatively few studies examine the climate change impacts on livestock production, although it is expected to directly affect yield quantity and quality (Notenbaert et al., 2017), as well as indirectly impacting the livestock sector through feed quality changes and the spread of pests and diseases (Kipling et al., 2016). Furthermore, a steady increase in the risks associated with bivalve fisheries and aquaculture at mid-latitudes is coincident with rises in temperature, ocean acidification, introduced species, disease, and other drivers. Sea level rise and storm intensification pose a risk to hatcheries and other infrastructure (Callaway et al., 2012; Weatherdon et al., 2016), while other risks are associated with the invasion of parasites and pathogens (IPCC, 2018).

2.3. Agricultural Insurance Provision, Uptake, and Performance in ASEAN

[2] 2012 census. https://psa.gov.ph/content/special-report-highlights-2012-census-agriculture-2012-ca.

2.3.1. Status of agricultural insurance provision in 2021

Agricultural insurance in most AMS is relatively new, except for the Philippines, Thailand, and Vietnam, where small-scale crop or livestock insurance initiatives date back to the latter part of the twentieth century.

In the past decade, Indonesia, the Philippines, and Thailand have achieved considerable success in scaling up their crop insurance programmes for small-scale rice farmers, maize farmers (the Philippines and Thailand), and high value crops (HVCs) (the Philippines), backed by government premium subsidies. Livestock and aquaculture insurance are commercially available in Indonesia and the Philippines but have yet to be scaled up (Table 2.2).

As of 2021, there is no agricultural insurance provision in Lao PDR or Malaysia, but the governments of both countries are keen to introduce crop insurance soon (Table 2.2). Finally, no agricultural insurance programme exists in Brunei and Singaporegiven that the agricultural sector is very small (Table 2.2).

Table 2.2 Agricultural Insurance Provision in ASEAN as of 2021

Country	Agricultural Insurance (Yes/No)	Year Introduced [1]	Market Status	Crop Insurance [2] [3]	Livestock Insurance	Fisheries / Aquaculture Insurance	Main Market: Public, Private, PPP	Government Support for Premium Subsidies
Brunei	No							
Cambodia	Yes	2015	Pilot	Pilot (WII)	X	X	Private	No
Indonesia	Yes	2016	Scaling-up	Commercial (NPCI); Pilot (WII)	Commercial (Indemnity)	Commercial (Indemnity)	Public	Yes
Lao PDR	No							
Malaysia	No							
Myanmar	Yes	2018	Pilot	Pilot (MPCI)	X	X	Private	No
Philippines	Yes	1981	Scaling-up	Commercial (MPCI; NPCI); Pilot (AYII; WII)	Commercial (Indemnity)	Commercial (Indemnity)	Public	Yes
Singapore	No							
Thailand	Yes	1978 (2011)	Scaling-up	Commercial (NPCI). Pilot (WII)	Pilot (Indemnity)	Pilot (Indemnity)	PPP	Yes
Vietnam	Yes	1982 (2011)	Pilot	Pilot (AYII)	Pilot (Indemnity)	Pilot (Indemnity)	PPP	Yes

Sources: Mahul and Stutley (2010); FAO (2011); AgroInsurance International (2021); AMS Survey Interviews (2021)
Notes:
[1] Years in parenthesis are when governments introduced national subsidised agricultural insurance
[2] Index-based crop insurance including: weather index insurance (WII) and area yield index insurance (AYII)
[3] Traditional indemnity-based crop insurance: multiple peril crop insurance (MPCI), named peril crop insurance (NPCI)

2.3.2. Types of crop, livestock, and aquaculture insurance products and programmes

Most major crop insurance products in ASEAN are based on traditional crop indemnity. For example, in the Philippines, PCIC offers a multiple peril crop insurance (MPCI) to rice and maize farmers, while in Thailand and Indonesia, large-scale rice programmes involve damage-based, named peril crop insurance (NPCI) policies. Crop AYII was piloted in Vietnam during 2020, using remote sensing technology to trigger payouts for rice producers through an innovative AYII programme. In Cambodia, Thailand, the Philippines, and Indonesia private sector insurers are piloting WII, using both ground weather stations and remote sensing imagery for crops such as rice and maize (Table 2.2).

Two AMS, namely the Philippines and Indonesia, currently offer commercial livestock insurance products that have achieved a measure of scale-up, while Vietnam has piloted livestock insurance since 2011 and Thailand started a pilot dairy programme in 2018 (Table 2.2). All these programmes are indemnity-based named peril accidental death policies but also insure named class A epidemic diseases in livestock. As of 2021, no insurer in the AMS is offering index-based livestock insurance (Table 2.2).

In 2021, aquaculture insurance became commercially available in both Indonesia and the Philippines for finfish and shrimps and has also been piloted in Vietnam since 2011, while pilot aquaculture programmes are currently under preparation in Cambodia and in Thailand. Aquaculture insurance programmes in all AMS are based on traditional indemnity-based mortality and disease cover (Table 2.2).

Annex 3 presents further details of the indemnity-based and index-based agricultural products and programmes underwritten by public and private insurers in 2021.

2.3.3. Government support for agricultural insurance in ASEAN

Government support for agricultural insurance in ASEAN is mainly through premium subsidies. These are available in 50% of AMS, namely, Indonesia, the Philippines, Thailand, and Vietnam. In these countries, premium subsidies of up to 100% are available against the cost of commercial premiums (i.e., free insurance). The governments of Indonesia, the Philippines, and Vietnam are willing to offer micro-level retail insurance to subsistence and poor farmers. In Thailand, the government offers a 60% subsidy on Tier 1 cover, and since it was made compulsory in 2016, the Bank for Agriculture and Agricultural Cooperatives (BAAC) also offers a 40% premium subsidy on Tier 1 cover resulting in this layer being 100% subsidised (see Annex 3 for full details of agricultural insurance premium subsidy provision).

In several AMS, the government supports agricultural reinsurance through national (state) reinsurers in Vietnam, Indonesia, and the Philippines.

2.3.4. Agricultural insurance uptake and penetration

Since the launch of the TNCIS for rice in 2011, Thailand has achieved very high levels of crop insurance penetration such that in 2020, three-quarters (76%) of the national rice area was insured under the TNCIS. One of the main reasons for this is that in 2016, the government elected to make Tier 1 crop insurance cover compulsory for rice farmers taking out seasonal loans from the BAAC. In the Philippines and Indonesia, public sector insurers are also achieving high levels of uptake on their subsidised rice insurance programmes. However, the small-scale unsubsidised pilots in Cambodia and Myanmar have yet to achieve significant voluntary uptake, and this also applies to Vietnam under the second phase of the NAIPP2 (Table 2.3).

Table 2.3. ASEAN Member States: Agriculture (Crop) Insurance Uptake and Penetration Levels

Country	Latest Year	No Insured Farmers	Insured Crop Area (ha)	Penetration Rate (% of Farmers or % Crop Area Insured)
Brunei				
Cambodia	2021	675	887	< 0.1%
Indonesia	2020	1,367,678	1,000,001	6.9% of rice farmers; +/- 8% rice area
Lao PDR				
Malaysia				
Myanmar	2021	37	81	<0.1%
Philippines	2019	1,747,404	2,378,925	31% of farmers (2012 census)
Singapore				
Thailand	2020	3,301,000	6,192,000	76% of national rice area
Vietnam	1st Pilot (2011-13)	236,397	65,297	1% of national rice area
	2nd Pilot (2020/21)	7,291	1,465	<0.1%

Sources: Various, including survey respondents (2021), annual reports, and internet reports

In the Philippines and Indonesia, subsidised livestock insurance programmes are scaling up commercially, but current levels of penetration are much lower than for the crop sector. Vietnam exhibited strong demand for aquaculture insurance under the 1st Pilot NAIPP, and this also applies to Indonesia (see Annex 3 for full details of livestock and aquaculture insurance uptake and penetration).

2.3.5. Underwriting performance

For agricultural insurance programmes to be financially sustainable in ASEAN, they must: (i) demonstrate growth over time and achieve scale-up to enable insurers to cover their operational and administrative (O&A) costs; (ii) achieve a wide geographical spread of risk; and (iii) over an insurance cycle (usually 7–10 years), cover the claims paid to farmers as well as the company's O&A expenses out of earned premium, and in the case of private commercial insurance companies, generate reasonable profits (return on equity) for their shareholders. Insurers and reinsurers typically price their programmes to achieve a long-term average loss ratio of no more than 70–75% to cover the claims paid plus O&A expenses and profit margin.

Table 2.4 presents a performance summary of the agricultural insurance programmes in ASEAN based on their long-term annual average loss ratios. Due to the catastrophic flood and drought losses incurred in 2019, Thailand achieved a long-term loss ratio of 89% between 2011 and 2020, with pool insurers and their reinsurers experiencing underwriting losses once O&A expenses and profit expectations are considered. In Indonesia, the Jasindo NPCI programme for rice has achieved very sound underwriting results (59% loss ratio), but losses have been incurred on livestock (119% loss ratio) and aquaculture (102% loss ratio) insurance programmes. In Vietnam, the NAIPP1 (2011–2013) achieved very sound underwriting results on crop and livestock insurance programmes, but aquaculture insurance experienced anti-selection and very severe epidemic disease losses (307% loss ratio), resulting in an overall underwriting loss for Bao Viet and Bao Minh insurance companies and their national and international reinsurers (178% loss ratio). Consequently, underwriters have been unwilling to insure diseases on the aquaculture policy under NAIPP2. In Cambodia, the private sector rice WII scheme has yet to achieve scale and risk spread, experiencing a long-term loss ratio of 175% (Table 2.4) (see Annex 3 for full results).

Table 2.4. ASEAN Member States Agricultural Insurance Results

Country	Years	Programme	Crop Loss Ratio (%)	Livestock Loss Ratio (%)	Aquaculture Loss Ratio (%)	All Programmes Loss Ratio (%)
Brunei						
Cambodia	2015-20	Forte	175%			175%
Indonesia	2015-20	JASINDO	59%	119%	102%	66%
Lao PDR						
Malaysia						
Myanmar	2018-20	GWI	0%			0%
Philippines	2009-2019	PCIC	64%	10%	19%	59%
Singapore						
Thailand	2011-20	TNCIS	89%			89%
Vietnam	1st Pilot (2011-13)	Boa Minh/ Bao Viet	21%	15%	307%	178%
	2nd Pilot (2020/21)	Bao Viet	7%	0%		3%

Sources: Cambodia, Indonesia, Thailand, and Vietnam: 2021 AMS interviewees; the Philippines, PCIC annual reports

2.4. Agricultural Insurance Achievements, Issues, and Challenges in AMS

2.4.1. Key achievements

Agricultural insurance programmes in Indonesia, the Philippines, and Thailand have scaled up considerably during the past two decades and are now protecting large numbers of farmers. Scale-up has been enabled by massive government premium subsidies in these countries and compulsory linkage between insurance and crop-credit provision. In Thailand, Tier 1 top-up cover was made compulsory for BAAC borrowers in 2016. One major benefit of moving from voluntary to compulsory insurance is that anti-section (the tendency for rice farmers in high flood risk areas to purchase insurance while those in low flood risk areas are reluctant to do so) has been greatly reduced. In the Philippines, PCIC cover for MPCI rice and maize farmers is also directly linked to crop-credit provision.

While main agricultural insurance programmes in Indonesia and the Philippines are underwritten by public sector monopoly insurance companies, Thailand has developed an interesting PPP Pool model to crowd in private sector insurers. Coinsurance pools have many potential benefits, including the economies of scale from sharing product design and scheme implementation costs through to the higher retention levels achievable and cheaper reinsurance. Coinsurance pools are also a feature of several very large national agricultural insurance programmes in other countries, including China and in Spain (Agroseguro Pool) and Turkey (Tarsim Pool).

Vietnam, Cambodia, and Myanmar are learning from their pilot experiences, but to date have not achieved sustainable scale-up. However, Lao PDR and Malaysia are still trying to identify the most appropriate legal and regulatory framework and institutional and operating model(s) to promote and implement agricultural insurance. There is also a debate on the supporting role of governments and the most appropriate types of crop insurance products to start with.

During the October 2021 Regional Consultation Workshop, nearly all AMS participants identified the PPP institutional and operational framework as being the most appropriate model for implementing agricultural insurance in their respective countries.

2.4.2. Key issues and challenges

Under this study, AMS public and private sector interviewees completed a short questionnaire to highlight the key issues and challenges faced in implementing and scaling up agricultural insurance in their respective countries. The results of the survey are presented in Annex 3, with key issues and challenges highlighted below, also drawing on the author's experience.

Low levels of voluntary demand

High levels of premium subsidies are not in themselves a precondition for achieving high levels of voluntary insurance uptake by farmers. For example, Vietnam has faced major challenges in achieving voluntary demand and uptake in the second pilot phase (2018–2021) despite major premium subsidy support (up to 90% subsidies for poor and nearly poor farmers).

The farmers' lack of awareness and knowledge of agricultural insurance was highlighted by AMS representatives both in their responses to the study questionnaire and during the Regional Consultation Workshop. They also identified the need for investment in insurance literacy training and education if agricultural insurance is to achieve scale and sustainability.

Public expenditures for premium subsidies

The cost of premium subsidies is placing a major fiscal burden on governments in the Philippines and Thailand, and to a lesser extent in Indonesia and Vietnam. Annual premium subsidies currently cost the government about USD106 million in the Philippines and USD62 million in Thailand. The governments in Indonesia, the Philippines, and Vietnam offer premium subsidies of up to 100% (i.e., free insurance) on micro-level retail insurance programmes for disadvantaged subsistence and poor farmers; while in Thailand, the government offers a 60% subsidy on Tier 1 cover, and since this was made compulsory in 2016, BAAC also offers a 40% premium subsidy on Tier 1 cover, making this layer 100% subsidised. There are major drawbacks to offering farmers 100% premium subsidies on commercial agricultural insurance schemes (see Chapter 3.5 for further discussion).

Indemnity-based crop insurance products are not best suited to small-scale farmers

Premium subsidies are being channelled into mainly indemnity-based crop MPCI (the Philippines) and NPCI (Indonesia, the Philippines, and Thailand) products and programmes which are not best suited to small-scale farmers, especially subsistence farmers. Indemnity-based MPCI products were originally developed for large commercial farmers in high income countries such as the USA, Canada, and Europe. These products place high demands on pre-season and mid-season field-level inspections and measuring the

actual yield at harvest time to determine whether or not a payment claim is due. For smallholder rice and maize farmers in the Philippines and throughout the ASEAN region who typically cultivate less than 1 or 2 Ha of such crops, generating premiums of no more than USD50–100 per policy, MCPI is prohibitively expensive to administer (see Chapter 3.6 for further discussion).

Private agricultural insurers in ASEAN do not have access to government support

In the Philippines and Indonesia, government policy on channelling premium subsidies through state monopoly insurers only is crowding out private sector competition. Private insurers cannot compete on price with the heavily subsidised products offered by PCIC and Jasindo, and in the absence of premium subsidies, private commercial insurers struggle to sell their innovative crop index products[3].

Private insurers in Cambodia, Myanmar, Indonesia, Thailand, and the Philippines are piloting index-based crop insurance solutions, but in the absence of premium subsidies and other support from government, they are struggling to achieve uptake and scale. Governments in ASEAN need to review their premium subsidy provision for private commercial insurers if they wish to create sustainable private sector insurance markets and reduce the fiscal burden on the public sector budget (see Chapter 3.5 for further discussion).

Lack of technical knowledge and expertise

In countries such as Lao PDR, Myanmar, and Malaysia, there is little or no tradition of agricultural insurance. Consequently, insurance companies lack the technical knowledge and expertise to design, rate, and implement indemnity and index-based agricultural insurance products and programmes and require support for capacity building and training in this specialism.

Further details on specific issues and challenges to scaling up insurance are contained in Annex 3 attached to this report.

3. ASEAN: Guiding Principles for the Implementation and Scale-up of National Agricultural Insurance Programmes

3.1. Introduction

The Guideline – 10 Phases in Developing a National Crop Insurance Programme – provides a useful step-by-step checklist of key tasks, activities, and decisions for governments (and their stakeholders) to consider before planning, designing, and launching a national crop insurance programme or improving and strengthening current programmes under implementation.

These 10 phases have been reorganised into a simplified framework with the key activities highlighted (see Figure 3.1):

Phase 1. Diagnostics and Setting of Policy Objectives for the National Agricultural Insurance Programme (time frame 6 to 12 months):

- **Formation of a high-level steering committee (SC) and technical working group (TWG)** to oversee the diagnostic phase.
- **Risk assessment**: It is recommended that government policy and objectives for agricultural insurance involve detailed national and sectoral (agriculture, livestock, forestry, and fisheries) risk modelling and assessment to quantify the key hazards, their frequency, and the severity of loss to each sector/sub-sector.

[3] However, it should be noted that in 2021, the Philippine government embarked on a series of PCIC reforms to promote private sector entry into agricultural insurance. In May 2021, the Insurance Commission published Advisory No. 2021–09 titled 'Guidelines on the Adoption of a Regulatory Sandbox Framework for Piloting Agriculture Insurance'. The new regulations permit private insurers to enter into PPP agreements with the PCIC jointly to underwrite agricultural insurance products and programmes, granting private insurers access to PCIC premium subsidies.

- **Situation analysis** of the existing agricultural risk management and DRF for agriculture instruments and programmes to identify the sectors and segments in the rural farming population which are already protected and the gaps where agricultural insurance may play a role at micro, meso, or macro level.
- **Identification of options for government policy and objectives** for the national agricultural insurance programme and a commitment to provide legal, financial, and other support.
- **Steer away from a pilot project approach towards agricultural sector-programme planning** for the medium to long term**.**
- **Feasibility study (Solutions Appraisal)** with a focus on identifying options and solutions (technical, institutional, operational, and financial, outlining a 10+ year business plan and budget).
- **Workshop(s) for all public and private stakeholders to decide whether or not to approve the plan and to move on to Phase 2.**

Phase 2. Preparation (Planning and Design) (12 to 18 months)

- **Setting the National Policy and Objectives for Agricultural Insurance** (target sectors, farmers, etc.) in conjunction with public and private stakeholders and farmers' representatives.
- **Identification and agreement on the institutional framework for a national agricultural insurance programme**, **agreement on the type of government financial and other support, and drafting the enabling legislation in the form of an Agricultural Insurance Act (Law).**
- **Development of a costed business plan and strategy to secure funding for Phase 2 in preparation for implementation.**
- **Planning and design of the organisational and operational systems and procedures for the national agricultural insurance programme and clear identification regarding the roles of public and private sector stakeholders.** Focus on digital/FINTEC technology applications to raise policy awareness, premium collection, and claims settlements. Identify low-cost distribution systems, including bundling insurance with input and output services/value chain actors.
- **Product design and development:** Products must be designed to meet the risk transfer needs of farmers, livestock, and aquaculture producers. A plan for the development of new crop, livestock, aquaculture insurance products and programmes must be identified over at least 5–10 years, starting with the priority sectors identified by government, while also considering commercial and export commodities, etc.
- **Insurance and reinsurance planning.**
- **Design capacity building and training materials for public and private sector partners and target farming audience.**
- **Design of monitoring and evaluation (M&E) systems.**

Phase 3. Implementation and Scale-up

1. **Adopt a medium- to long-term phased programme using a build-up approach for implementation,** with rollout of new products and programmes each year rather than a pilot project.
2. **Use M&E to evaluate each product or programme on an annual basis** and upgrade and strengthen them accordingly.

Figure 3.1. Framework for the Planning, Design, and Implementation of a National Agricultural Insurance Programme

Phase 1. Initial Multi-Stakeholder Assessment on the Need for Agricultural Insurance	**Phase 4**. National Policy Creation and Subsidy	**Phase 7**. Field Implementation Training and Farmer Socialisation
Phase 2. Feasibility Study and Farmer Risk Assessment	**Phase 3**. Insurance Partnerships and Regulatory Framework	**Phase 8**. Pilot/Proof of Concept Launch and Improvements
Phase 4. National Policy Creation and Subsidies	**Phase 5**. Product Development, Distribution, and Pricing	**Phase 9**. Revised Approach, Products, and Pilot Coordination
	Phase 6. Stakeholder Responsibility and Process Creation	**Phase 10**. Full Programme Launch and Scale-Up

Source: Author's reworking of the 10 Phase Guide Overview (GIZ, 2017)

The remainder of this chapter is devoted to the discussion of options and decisions governments in ASEAN may wish (or need) to consider when planning and designing the launch of a new national agricultural programme or the implementation and scaling up of existing programmes. Wherever possible, governments should draw on the actual lessons learnt and experience gained by insurers in the region and/or international experience and best practice. The key areas are as follows:

1) Defining policy objectives for agricultural insurance, risk assessment, and alignment with existing DRF for agriculture programmes;
2) Institutional framework options for agricultural insurance in AMS;
3) Defining the roles and functions of stakeholders under PPP frameworks;
4) Government support for agricultural insurance and the role of premium subsidies;
5) The need to develop innovative agricultural (crops, livestock, and fisheries) insurance products in ASEAN;
6) Distributional considerations (voluntary vs compulsory and bundling);
7) Insurance and reinsurance considerations.

3.2. Defining Policy Objectives for National Agricultural Insurance Programmes in ASEAN

3.2.1. Use of agricultural insurance to support government objectives

In the planning and design of national agricultural insurance programmes, governments will need to clearly define their objectives and priorities and target sectors or commodities they wish to insure.

There are several ways in which agricultural insurance can assist governments to achieve their policy objectives (Table 3.1). While some of these objectives are complementary and overlapping, others are very different and require alternative technical solutions. For example, crop and livestock insurance products suitable for the risk management needs of medium- and large-scale commercial farmers are totally unsuited to small-scale subsistence farmers who make up the bulk of the farming population in ASEAN.

Table 3.1 Agricultural Insurance Support for Government Objectives

Policy Objective	How Agricultural Insurance Helps Achieve Government Objectives
Raise Productivity and Incomes	Agricultural insurance can reduce small and semi-commercial farmers' risk aversity to investing in new technology; it can help improve access to formal agricultural credit thereby enabling farmers to purchase improved seed and fertiliser technology or new higher yielding breeds of livestock, thereby raising productivity and incomes (and national income).
Stimulate Capital Investment in Agriculture	Protecting commercial and state banks against loan default in the event of crop failure/death of animals, thereby stimulating capital investment in agriculture.
Protect Poor Farmers	It can be designed as a social protection instrument for poor and vulnerable farmers against catastrophic losses and sustain their consumption and incomes.

Policy Objective	How Agricultural Insurance Helps Achieve Government Objectives
Protect the Government's Budget	It can be used to support or reduce the government's contingency budget for ad hoc disaster relief to affected farmers/rural communities.
Stabilise Rural Farming Populations	In some countries (e.g., USA; Spain) subsidised agricultural insurance has been used to stabilise the rural and farming populations and reduce outwards migration.

Source: Author

Banks and other financial institutions are traditionally risk-averse to lending to emerging and semi-commercial farmers in developing countries, who are often unable to provide collateral in the form of land title and other fixed assets. Credit and insurance bundling often acts as a catalyst for banks to increase agricultural lending. In turn, farmers can use the credit to invest in improved seed and fertiliser technology and invest in better breeds of livestock, thereby increasing productivity and income. To a certain extent, this policy objective of promoting crop-credit insurance has been pursued by governments in the Philippines, Thailand, and Indonesia.

3.2.2. Government policy measures to promote agricultural insurance uptake and penetration

A wide range of policy measures exist for governments to adopt for promoting agricultural insurance uptake (Table 3.2). According to section 3, the most common form of government support in AMS is premium subsidy provision, and a significant factor in the scaling up of agricultural insurance, particularly in the Philippines and Thailand. The BAAC in Thailand is also promoting compulsory insurance for farmers who access formal crop production credit, contributing to the massive scaling up of the TNCIS for rice and maize.

The benefits and drawbacks of these key policy measures are reviewed in this chapter. Governments in Lao PDR, Cambodia, Malaysia, and Myanmar planning to introduce their own agricultural insurance or piloting programmes will need to make early decisions on which policy measures to adopt.

Table 3.2. Government Policy Measures for Promoting Agricultural Insurance

Key Policy Measures	Key Countries Adopting
1. Establish agricultural insurance legislation	ASEAN Member States (tbc)
2. Invest in data strengthening	ASEAN Member States (tbc)
3. Invest in financial and rural literacy programmes	ASEAN Member States (tbc)
4. Finance premium subsidies for agricultural producers	Philippines, Thailand, Indonesia, Vietnam
5. Waive agricultural insurance taxes (VAT, stamp duty)	ASEAN Member States (tbc)
6. Make agricultural insurance compulsory for farmers accessing formal credit	Philippines, Thailand (India, Mexico, Brazil)
7. Provide disaster aid only to farmers who have purchased crop insurance	Spain, USA
8. Align crop insurance with government disaster compensation (and social safety net programmes)	Thailand, USA
9. Set national standards for agricultural insurance product design and pricing to be adopted by all insurers	Portugal, USA
10. Establish statutory agricultural insurance pools	Thailand only in the ASEAN region (also South Korea, Spain, Turkey)
11. Promote state catastrophe reinsurance protection	Philippines, Vietnam

Source: Author

3.2.3. Risk assessment to help formulate national agricultural insurance policy

Risk assessment is a crucial first step to designing a national disaster risk financing and insurance (DRFI) strategy for agriculture because appropriate strategies and policies cannot be formulated without a clear understanding of the risks.

Agricultural risk assessment centres on analysing and quantifying the frequency and severity of different risks (hazards) in terms of damage and economic loss to the agricultural commodity or sector under study (crops, livestock, fisheries, forestry). Such an assessment in the form of a modelled probability distribution function of damage (as illustrated in Figure 3.2.) enables the risk to: (a) be quantified and the expected probable maximum loss calculated for return periods from 1 to 150 years or more; and (b) be layered and appropriate risk mitigation, risk coping, and risk transfer strategies and mechanisms designed at micro level

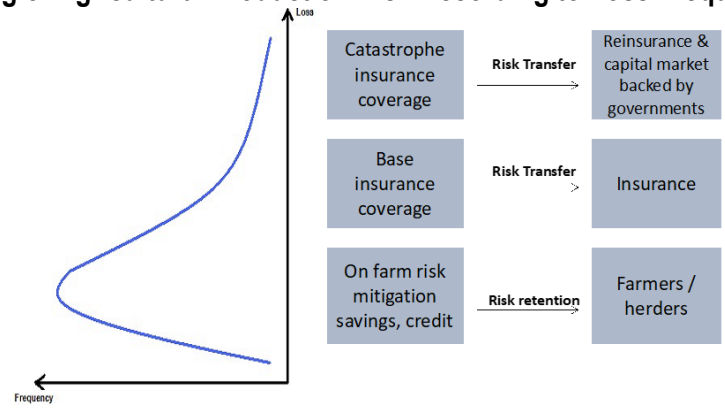
(individual farm level), meso level (farmer organisations, value chain actors, and markets), and macro level (regional and national government) (GlobalAgRisk, 2009; Mahul and Stutley, 2010; Choudhary et al., 2016; PARM, 2018, Lung, 2020).

1. **Layer 1: High Frequency, Low Losses (retained by farmers and value chain actors):** These typically occur at least once every five years, but farmers can be affected by a variety of independent risks (e.g., crop hail, localised pests, and diseases). Farmers typically retain and manage and mitigate these risks through mixed cropping, diversification of farming systems and sources of income, informal savings and credit, and the purchase of agro-chemicals and veterinary products to control crop and livestock pests and diseases. Governments may also invest in risk coping strategies such as animal and plant breeding to build resistance against pests and diseases, as well as large-scale irrigation networks.

2. **Layer 2: Medium Frequency, Medium Losses (market-based risk coping and risk transfer mechanisms):** These are risks that cannot be effectively managed by farmers and value chain actors (e.g., hail, frost, localised excess rain, and windstorms) and typically occur at least once every 6–10 years. Here, market-based risk coping (formal savings) and risk transfer solutions (formal credit and insurance) are most appropriate. Governments may also invest in meso/macro risk coping strategies such as ex-post-disaster compensation programmes, social safety net mechanisms, reserve funds, and contingent lines of credit.

3. **Layer 3: Low Frequency, High Losses (governments, insurance and reinsurance):** These typically occur approximately every 10–20 years but are high-severity risks such as catastrophic drought, flooding, and epidemics. Governments can cover these infrequent losses through sovereign risk transfer, catastrophe insurance/reinsurance, innovative financial products (e.g., catastrophe bonds, CAT DDOs[4]), and humanitarian assistance from donors, development partners, and NGOs.

Figure 3.2. Layering of Agricultural Production Risk According to Loss Frequency and Severity



Source: Mahul and Stutley (2010)

According to GlobalAgRisk (2009), risk assessment should focus on the following:

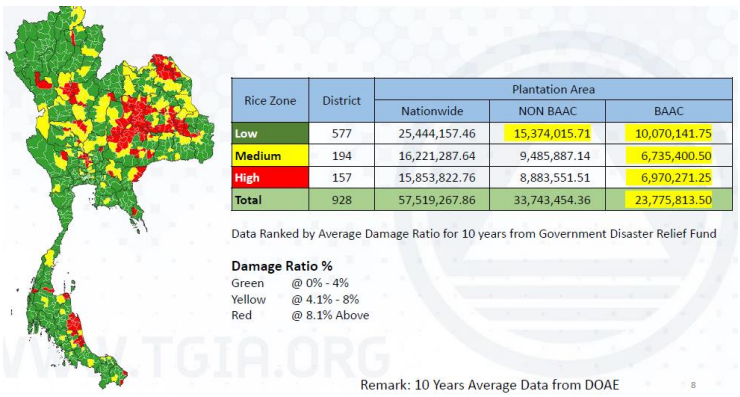
1) The frequency and severity of risks.
2) The regional variations in the sources of risk, types of crops, livestock, and other commodities produced, level of infrastructure, and integration into the value chain since this will affect the choice of agricultural risk management and financing mechanisms.
3) The type of farmer and landholding size (ranging from small resource-poor farmers typically producing subsistence food crops through to large-scale agri-businesses producing HVCs for export) since this will affect their choice of suitable risk management and risk transfer/insurance mechanisms.

[4] Development Policy Loan with Catastrophe Deferred Drawdown Option (Cat DDO).

4) The current range of risk management strategies, public and market-based agricultural risk financing instruments and programmes, ensuring they are properly aligned with the national agricultural insurance programme to avoid overlap.

The outputs of the formal risk assessments can be invaluable to the insurance industry for risk mapping and zoning as well as rating purposes. For example, in Thailand, where very close alignment exists between the government-funded natural disaster relief scheme for farmers and the TNCIS, insurers can map the national rice crop into high, medium, and low flood risk zones based on time series area damage data provided by the Department of Agricultural Extension (DOAE) (Figure 3.3). Similar risk mapping/zoning has been conducted for rice and maize in the Philippines.

Figure 3.3. Thailand: Risk Assessment of Rice Damaged Area



Source: TGIA, August 2021.
Notes: Rice planted area to damaged area ratios based on 10-year average data provided by DOAE

AMS in the early stages of formulating national strategies for agricultural insurance and just starting to pilot agricultural insurance (including Cambodia, Lao PDR, Malaysia, and Myanmar) are strongly recommended to conduct a formal risk assessment for key agricultural commodities and sectors, to aid the design of their national programmes. It is recommended that risk profiles be conducted for major crop, livestock, and key production areas to guide the development of suitable insurance products in Cambodia, Lao PDR, and Malaysia (AgroInsurance International, 2021).

3.3.4. National agricultural insurance should be part of a comprehensive disaster risk financing and insurance strategy

For AMS currently planning (e.g., Lao PDR, Malaysia) or piloting agricultural insurance products (Cambodia, Myanmar, and Vietnam) with a view to scaling these up over time under a national agricultural insurance programme, it is important that they are not developed in isolation, but planned as the result of a systematic risk prioritisation process, and built on and integrated with existing DRM and DRF for agriculture. All AMS have national legislation on DRM that provides a legal framework for governments to respond quickly to disaster events (see Box 3.1 for details), and governments in AMS currently retain most of their disaster risk by relying heavily on annual (contingency) budget allocations (AgroInsurance International, 2021).

Box 3.1 National Disaster Risk Management Legislation in ASEAN Member States

Brunei, Malaysia, and Singapore have specific laws that focus on emergency preparedness and response to natural hazards, as well as some technological hazards. Each of these countries have elements of early warning and recovery response in place.

Cambodia, Indonesia, Lao PDR, Myanmar, Thailand, and Vietnam have broad legislation covering the full spectrum of DRM, including prevention, preparedness, early warning, mitigation, emergency management/response, and early recovery. The legislation establishes special national institutions responsible for coordinating DRM, as well as local structures with varying responsibilities and functions in each country.

The Philippines is the only AMS with a permanent DRM system that gives high priority to disaster risk reduction. The aim of the national system is to establish a whole-of-society approach to disaster risk governance.

Source: AgroInsurance International (2021)

Lung (2020) identifies four key elements of an overall DRF strategy and framework for governments to consider when designing and implementing a national DRF/agricultural insurance strategy:

1) Prioritising risks

The choice of which natural and climatic disaster risks to address should be based on a clear prioritisation of risks. Key questions that policymakers should ask themselves in developing a national agricultural insurance strategy (see Figure 3.4) include:

- Who do you want to protect? (i.e., which agricultural sectors and segments of the farming population and why)
- What do you want to protect them against?
- How will you protect them? (i.e., with what agricultural insurance instruments)
- Who will pay and how? (affordability and willingness to pay for agricultural insurance is a key issue for smallholders)

2) Ensuring alignment

DRF instruments should avoid unintended overlap with each other. Every instrument should pursue a specific purpose with its scope tailored according to the targeted risk, beneficiaries, and payout timing. In cases where disaster relief compensation programmes and agricultural insurance are not carefully aligned, some farmers may receive double indemnities.

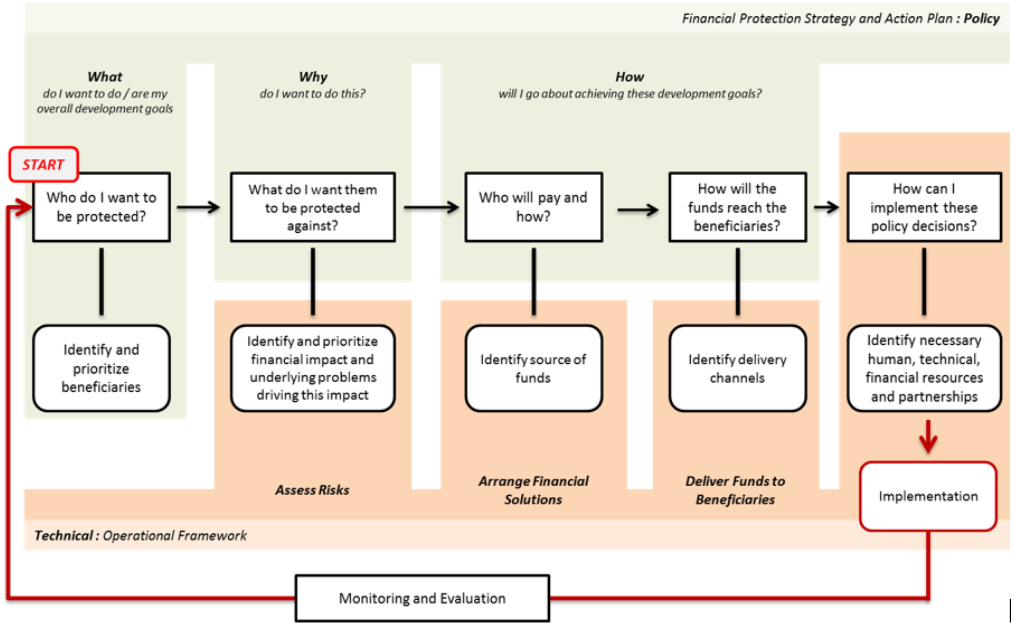
3) Ensuring complementarity

DRF instruments should strengthen one another. This is often not the case since they are designed in isolation. In cases where free government disaster relief compensation programmes and agricultural insurance are not carefully aligned, farmers tend to avoid buying insurance but wait for free disaster compensation (see below for further discussion).

4) Ensuring integration in long-term planning and policy

It often takes time for DRF instruments to develop their full potential. This is particularly applicable to agricultural insurance, which may take between 10 and 20 years to reach scale and sustainability, and where the government elects to a) support premium subsidies or b) purchase insurance cover and fund premiums on catastrophe products designed to payout infrequently on large events. Their commitment to premium subsidies and/or premium financing needs to be a long-term decision.

Figure 3.4. Decision Process to Guide Governments in Developing and Implementing National Disaster Risk Financing, an Insurance Strategy, and Programmes for Agriculture

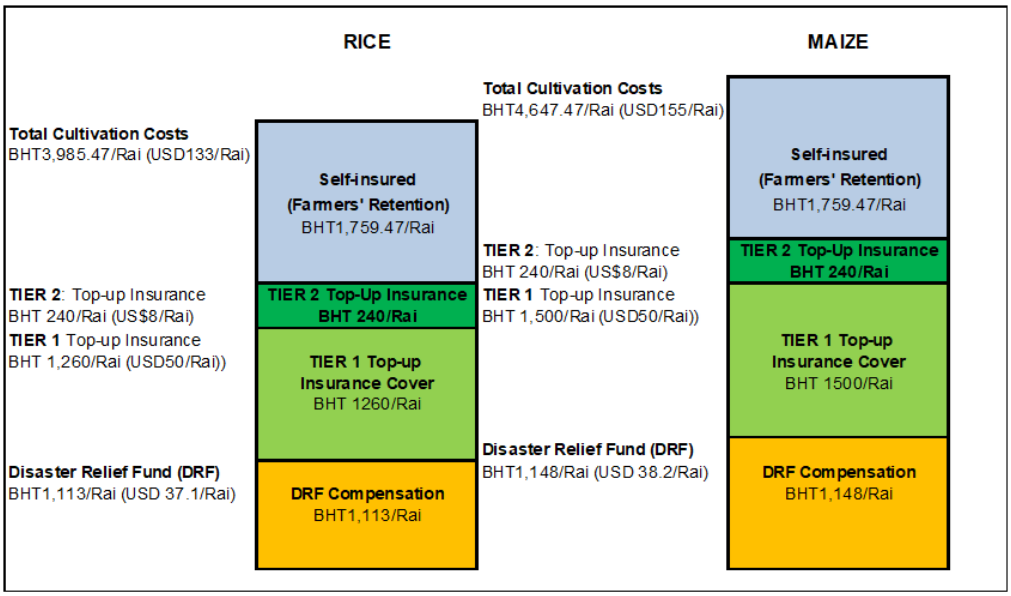


Source: World Bank (2014)

Case Study 1: Thailand

In Thailand, the TNCIS for rice and maize is carefully aligned with the government's Disaster Relief Fund and provides 'top-up' commercial insurance protection over and above the DRF compensation levels (Figure 3.5). The TNCIS operates under a form of double trigger for indemnity payments: first a natural disaster must be declared by the government, leading to DRF compensation payouts; and secondly, the DOAE needs to assess the damage on a farmer-by-farmer basis to confirm whether an insurance top-up indemnity payment is due from the Thai General Insurance Association (TGIA)/insurers.

Figure 3.5. Thailand: Alignment of Disaster Relief Fund and Top-up Crop Insurance



Source: TGIA August (2021)

Case Study 2: Vietnam

Vietnam has an extremely well-developed natural disaster management system and post-disaster emergency relief and reconstruction scheme, partly funded by central government and local government

(provincial and district level). Under the State Budget Law of 2002, central and local governments are required to allocate between 2% and 5% of their total planned budget for capital and recurrent expenditure for a contingency budget to meet spending on preventing, combating, and overcoming natural disasters (e.g., typhoon, flood, landslide, drought). In 2008, the total central and local contingency budgets amounted to VND9050 billion (USD650 million) (World Bank, 2010). Following major typhoon and flood events, farmers tend to receive compensation payments in the form of seeds and fertilisers or small animals to replace lost livestock. In addition, the government, under Decree No.02/2017/ND-CP, has authorised the provision of state-funded compensation to farmers, forestry producers, livestock producers, fish farmers, salt producers, and producer cooperatives or organisations incurring catastrophe losses exceeding 30% of their expected production caused by natural disasters and epidemics.

However, in their review of the NAIPP1 (2011–13), Dao and Tai (2014) note that in Vietnam, there are too many uncoordinated government-funded programmes duplicating disaster relief to farmers (Box 3.6) acting as a disincentive for farmers to purchase agricultural insurance. This problem is not confined to Vietnam but a feature of many countries with market-based agricultural insurance and free government compensation programmes (see Annex 4 for details).

3.3.5. The need to formulate a long-term business plan, strategy, and budget for a national agricultural insurance programme

AMS currently now planning (Lao PDR, Malaysia) or piloting (Cambodia, Myanmar, and Vietnam) agricultural insurance should be aware that designing, implementing, and scaling up agricultural insurance is a long-term process, potentially taking several decades before the planned levels of uptake and penetration are achieved. Consequently, preparing a national insurance plan and budget requires a long-term commitment (Phase 4).

The largest mature national subsidised agricultural insurance programmes have mainly been operational for many years, such as the US Federal Crop Insurance Program (FCIP) established in 1938; the Spanish national agrarian insurance pool programme implemented by Agroseguro in 1980; and Turkey's Tarsim pool launched in 2005. In Asia, the origins of the Indian Pradhan Mantri Fasal Bima Yogana (PMFBY) scheme can be traced back to the late 1970s, while in the Philippines, the PCIC was established by presidential decree in 1978, commencing crop insurance operations in 1981. In all these countries, agricultural insurance legislation was passed to establish these programmes and define the roles of the public or public-private partners only, and determine the government's financial role, in particular, the financing of premium subsidies. Insurers have been able to scale up these programmes over time due to the continuity of financial support and long-term commitment from the government, safe in the knowledge that they can plan and invest for the future.

In Cambodia, Forte Insurance is piloting crop WII with the Asian Development Bank (ADB) under a six-year project with the commitment to subsidise premium subsidies up to 2023, while in Myanmar, Global World Insurance (GWI) has approval from the regulator for a two-year pilot with no premium subsidies. In Vietnam, Bao Viet and Bao Minh previously participated in a three-year PPP pilot under the subsidised NAIPP from 2011–2013, then suspended for six years until being relaunched with subsidies from 2019–2020, subsequently extended to 2021.

In addition, the governments of Indonesia and Thailand have been subsidising agricultural insurance for the past six and ten years, respectively. Governments need to work with public and private sector stakeholders to prepare their national agricultural insurance business plans and strategies.

Governments in ASEAN may find it useful to study the existing legislation covering the operations of mature programmes in the USA, Spain, and Turkey. For example, in Spain, the national agricultural insurance business plan and budget is reviewed and updated on a three-year rolling basis to identify priority products and programmes the government plans to introduce and any changes in premium subsidy support levels. As part of this planning process, insurers participating in the Agroseguro pool are required to commit their capacity for the next three years and formally give three years' notice if they plan to exit the pool. Furthermore, all

stakeholders participate in the preparation of the annual plan and budget, which they then proceed to implement.

3.4. Institutional Framework Options for Agricultural Insurance in AMS

3.4.1. Institutional models for agricultural insurance in ASEAN

The five AMS currently conducting feasibility studies for the introduction of agricultural insurance (Malaysia, Lao PDR) or pilot testing crop insurance (Myanmar, Cambodia, and Vietnam) will need to carefully consider the most appropriate institutional model to adopt according to their local circumstances, namely: 1) public sector, 2) private sector, or 3) a PPP (see Table 3.3 and Figure 3.6):

- **The public sector model** (also termed fully intervened model), favoured by the Philippines since 1978 with the formation of the public agricultural insurance company PCIC, has enjoyed a monopoly over all government subsidised agricultural crop, livestock, and fishery insurance programmes. This public sector model also applies to Indonesia where, in 2015, the government approved PT Asuransi Jasa Indonesia (Jasindo), the state insurer, as the sole company eligible for implementing subsidised crop and livestock insurance.
- **The private sector model** is currently featured in Cambodia where Forte Insurance has pioneered voluntary crop index insurance for the past five years with no government support, but struggles to achieve demand and penetration. Also, in Myanmar, GWI is piloting crop insurance.
- **The public-private partnership model** has been adopted in Thailand since 2011 where the TGIA, on behalf of 16 co-insurers, underwrites the national rice and maize top-up insurance programme. The government supports this private sector-led scheme with premium subsidies and assistance with both the distribution of cover and adjustment of crop losses.

In Vietnam, Bao Minh and Bao Viet Insurance Corporations (joint venture insurers with majority public sector shareholders) exclusively underwrite the subsidised crop, livestock, and aquaculture Phase 2 pilot insurance programmes. In Malaysia, the Ministry of Agriculture and Food Industries (MAFI) is currently in discussion with the state's Agro Bank to develop a captive insurance company to pilot rice WII insurance with support from takaful and retakaful companies[5]. In Myanmar, the state-owned Myanmar Insurance Corporation is also planning to offer agricultural insurance.

Table 3.3. ASEAN Member States: Institutional Models for Agricultural Insurance

Country	Private	Public	Public-Private Partnership
Brunei	None	None	None
Cambodia	Forte Insurance (Cambodia) Plc		
Lao PDR	None		
Indonesia	Asuransi Central Asia (ACA). PT Reasuransi Maipark Indonesia (Maipark)	PT Asuransi Jasa Indonesia (Jasindo) for AUTP crop insurance. Jasindo AUTS Livestock insurance	Jasindo APPIK (AUBU) Aquaculture coinsurance agreement with seven insurers
Malaysia		Public sector proposal through Agro Bank and possible captive insurance vehicle	
Myanmar	GWI Co Ltd	Myanmar Insurance Corporation	
Philippines	Card Pioneer Micro-Insurance Inc.	Philippines Crop Insurance Corporation (PCIC). PCIC is co-insuring with Pioneer	In 2022, PCIC is planning a PPP agricultural insurance programme with a private insurer
Singapore	None	None	None
Thailand	WII Initiative	None	Eleven private insurers (pool) managed by Thai General Insurance Association
Vietnam	Livestock and Plantation cover	Bao Minh Ins. Corp. (JV), majority shareholder = State Capital Investment Bao Viet Ins. Corp. (JV), majority shareholder = MOF	

[5] MAFI/Agro Bank interview August 2021. See also https://www.malaymail.com/news/money/2021/03/11/agricultural-insurance-to-be-introduced-for-farmers-livestock-breeders-fish/1957036.

Source: Author, based on the survey and interview results

Key features of the public sector subsidised agricultural insurance programmes in the Philippines and in Indonesia are that they offer cover for a wide range of classes (crops, livestock fisheries, and aquaculture), mainly targeted at small-scale subsistence farmers. While these public sector programmes demonstrate scale-up, their main disadvantage is that they are exclusively authorised to access very high levels of government premium subsidy (at least 80% of premiums) and tend to crowd out private sector insurers who do not qualify for subsidies and cannot therefore compete on a level playing field.

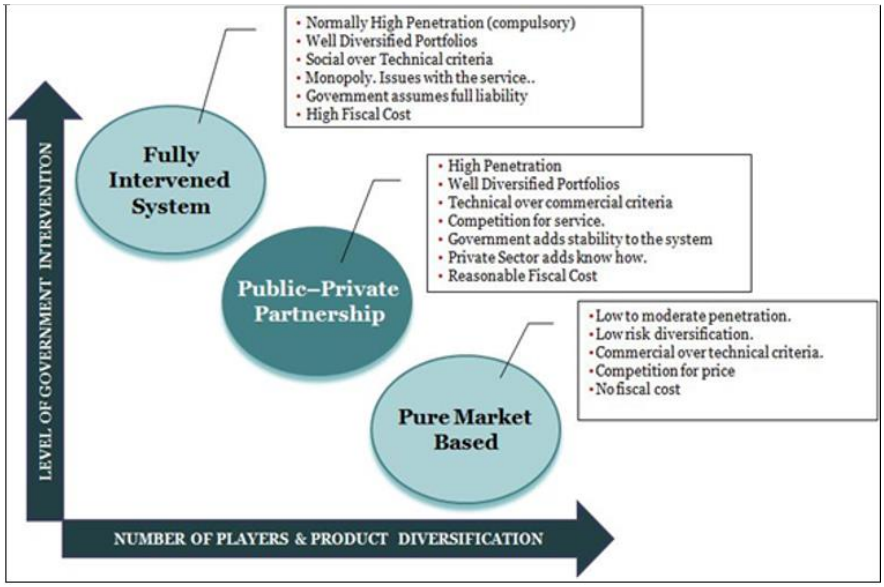
3.4.2. International experience

In the latter part of the twentieth century, governments in developing countries such as China, India, Mexico, Brazil, and the Philippines introduced public sector agricultural insurance companies to provide subsidised crop and livestock insurance to smallholder farmers (Figure 3.6). Most of these programmes subsequently failed due to poor governance and negative underwriting results (Hazell et al., 1986; Hazell, 1992; Hazell et al., 2017) and were replaced by PPP programmes: These include the current PPP programmes in China, India, Mexico, and Brazil (Mahul and Stutley, 2010). The PCIC is one of very few surviving public sector agricultural insurance programmes, achieving scale and financial sustainability in recent years.

International experience shows that models based on PPPs can often generate synergies, allowing each partner in the system to contribute to a more effective and efficient intervention (Figure 3.6). PPPs are appropriate for smallholder farming economies where the government can support private sector insurers to develop cost-effective programmes for very large numbers of small-scale farmers. Under PPP arrangements, the most common form of government support is premium subsidies, followed by reinsurance and insurance legislation, while in some cases, governments also contribute towards the insurers' O&A costs (e.g., USA and South Korea)[6]. The set of possible arrangements for an agricultural insurance PPP is broad, and there is no predefined approach to be prescribed, so each AMS should assess which solution best suits its specific needs.

There are also many pure market-based agricultural insurance models with no form of government support or intervention. However, these are mainly located in high income temperate countries which only offer named peril crop hail indemnity cover, such as the USA, Argentina, Australia, New Zealand, South Africa, Germany, the Netherlands, and Sweden.

Figure 3.6. Institutional Models for Agricultural Insurance Provision



Source: Iturrioz (2009)

[6] For a detailed review of government support for agricultural insurance see Mahul and Stutley (2010).

3.4.3. Public-private partnership agricultural insurance models

For governments in ASEAN interested in introducing a national agricultural insurance programme under a PPP arrangement, several institutional/operational framework options exist. These options could apply equally to countries currently without operating PPPs for agricultural insurance like Cambodia, Lao PDR, Malaysia, and Myanmar, and also Indonesia and the Philippines should the governments of these countries decide to open up their subsidised state-insured agricultural insurance markets to competition by private commercial insurers. The main PPP structural models are as follows:

i) **Open market competition by existing public and private insurers:** Interested public and private sector insurance companies authorised by the insurance regulator can offer agricultural insurance products and services in the form of a PPP, competing on an individual basis with government support by way of premium subsidies. Companies are free to offer products and services at their own premium rates. This model is commonly found in countries such as Mexico, Brazil, Chile, and Italy (Mahul and Stutley, 2010).

ii) **Regulated market competition by approved public and private insurers:** Under this model, insurers are authorised to underwrite standard agricultural insurance policies at approved rates. Government support is usually more comprehensive and may include the setting up of a legal and regulatory framework, technical, logistical, and financial assistance (subsidies on premiums and/or operating costs, loss assessment, and reinsurance). This model is found in the USA, where about 15 private and/or mutual Managing General Agencies (MGAs) participate in the FCIP and underwrite the FCIP's standard crop and livestock insurance products/programmes at standard rates approved by the government. Similarly, in Portugal, under the PPP integrated System of Protection against Climatic Risks (SIPAC), private insurers agree to underwrite standard SIPAC approved policies and commercial reference rates for each crop and region in the country (see Mahul and Stutley, 2010). India is an example of a semi-regulated-market approach in Asia today. Since 1980, India has operated a subsidised national crop insurance scheme (NCIS), underwritten by the state General Insurance (and Reinsurance) Corporation (GIC) of India. In 2002, the government transferred the NCIS into a newly formed specialist public sector agricultural insurer, the Agricultural Insurance Corporation of India (AIC), the only company authorised to receive state and federal government premium subsidies. Under a series of market reforms, the Indian agricultural insurance market was opened up to competition by private insurance companies, and today, the PMFBY is underwritten by about 14 private sector and four public sector insurance companies, including AIC. All insurers must underwrite the standard government approved AYII policy, while Reformed Weather-Based Crop Insurance (RWBCI) companies are able to access government premium subsidies. The unique feature of the programme is that insurance companies must compete by tender (annual or multi-year) for business with the 29 state governments of India: the company offering the lowest overall premium quote for underwriting the business in selected areas of the state wins the bid for that year[7].

iii) **Formation of a national PPP agricultural insurance pool programme**: Thailand's TNCIS for rice and maize is the largest crop insurance pool programme in ASEAN. The Philippines also has experience with agricultural insurance pools through the former Philippine Livestock Management Services Corporation pool in which the PCIC also participated. Finally, in Indonesia, Jasindo participates in a coinsurance pool for aquaculture insurance (*Asuransi Perikanan bagi Pembudidaya Ikan Kecil* [APPIK]). Internationally, Spain (Agroseguro pool) and Turkey (Tarsim) stand out as countries with national agricultural insurance pool programmes. Other countries with formal pool companies for agricultural insurance include Austria, China, Mongolia, India (for livestock), and Senegal.

There are major potential benefits for insurance companies joining together to form a coinsurance pool, including the sharing of technical knowledge, expertise in the design and rating of products,

[7] For more information on the tender process see: https://pmfby.gov.in/tender.

and operational costs, and therefore the possibility of achieving economies of scale. A coinsurance pool also enables risk pooling, which increases risk retention locally, and through risk diversification, the potential to reduce the cost of purchasing reinsurance (see Box 3.2 for further details of the advantages and drawbacks of pool programmes).

Box 3.2. Benefits and Limitations of Coinsurance Pool Arrangements

Benefits

Economies of scale are achieved through operating as a single entity with shared (pooled) administration and operating functions.

- Reduced staffing requirements (fixed costs)
- Shared costs of product research and development, actuarial work, and rating
- Reduced costs of underwriting, claims control, and loss adjustment

There are cost advantages to purchasing common account (pooled) reinsurance protection rather than each company attempting to place its own reinsurance programme.

- Stronger negotiating position with reinsurers
- A larger, more balanced portfolio and better spread of risk
- Reduced costs of reinsurance due to pooled risk exposure
- Reduced transaction costs (reinsurance brokerage, etc.)

Pool members face no competition on rates in a soft market and can maintain technically set rates. Most pools operate as the sole insurance provider or monopoly (e.g., Austria, Senegal, Spain, and Turkey), and therefore no price competition exists.

Pool members can maintain underwriting and loss adjustment standards. Under a pool monopoly arrangement, the pool manager can ensure that common high standards are maintained in the underwriting of crop and livestock insurance and claim adjustment. Where companies are competing against each other for standard crop insurance business, there is often a problem of varying loss adjustment standards between companies.

Limitations

A pool may act as the sole agricultural insurer, resulting in a lack of market competition and the following issues:

- Limited range of products and services offered by the monopoly pool underwriter
- Restrictions on the range of perils insured
- Restrictions on the regions where agricultural insurance is offered or the type of farmer insured
- Lack of competitiveness in the premium rates charged by the pool

Source: Mahul and Stutley (2010)

3.5. Defining the Roles and Functions of Each Stakeholder under a Public-Private Partnership Model

In the preparation (planning) phase of a national PPP agricultural insurance programme, it is extremely important that all stakeholders clearly define their roles, starting with policy objectives, fiscal support, and implementation, through to an annual performance review, monitoring, and evaluation. Table 3.4 builds on the 10 Phases by highlighting some of the key roles typically assumed by public and private sector stakeholders, according to best practice.

International experience shows that insurers (often in collaboration with their lead reinsurers) are best placed to design and rate agricultural insurance products (based on sound actuarial principles) and to prepare insurance contracts (wording) for subsequent approval by the insurance regulator. Insurers should take the lead in product awareness and creation, promotion, and distribution (often in conjunction with government agricultural extension departments, public sector financial institutions, and private sector value chain distributers), and subsequently risk acceptance and underwriting, claims assessment, and claim settlement (Table 3.4).

Government stakeholders, through ministries of finance and agriculture, can promote agricultural insurance through the creation of an enabling legal and regulatory environment. For example, the passing of specific

agricultural insurance laws to commit budget support for field operations and outreach, including premium subsidies; support for insurance product development through the provision of data and statistics, and field-level testing of prototypes; awareness creation and registration of farmers; and assisting insurers with field loss assessment. Under certain circumstances, governments may also act as a reinsurer of last resort. For instance, where a programme is in its start-up phase and premium volumes are low, and the costs of accessing international reinsurance are high, or in cases where it is more cost-effective for governments to retain/reinsure a high layer of catastrophe risk (Table 3.4).

Table 3.4. Key Roles for Private and Public Actors in Developing and Implementing a National PPP Agricultural Insurance Programme

Private (& State) Insurance Companies	Public Sector	Joint Activities
Risk modelling/data analysis	Policy for agricultural insurance	Annual and long-term planning of agricultural insurance business plan and budget
Product design, actuarial, and rating	Specifying target commodities and farmers	Awareness creation and farmer education
Risk acceptance and underwriting	Legal and regulatory framework and consumer protection	Support to product distribution through public sector aggregators
Claims reporting, adjusting, and settlement	Decisions on types of fiscal support to agricultural insurance and allocating annual budget	Support to field loss assessment activities
Decisions over risk retention and reinsurance strategies	Registration of farmers	Monitoring of scheme performance and impact evaluation
Additional data collection	Disbursement of premium subsidies (and auditing of subsidies)	
Marketing and distribution of the insurance products through risk aggregators and value chain actors	Data collection crops/livestock/weather to support risk assessment and rating and financial data (costs of production and prices for valuation purposes)	
Monitoring of product performance (basis risk)	Acting as a reinsurer of last resort	

Source: Author

Case Study 3: PPP in Thailand

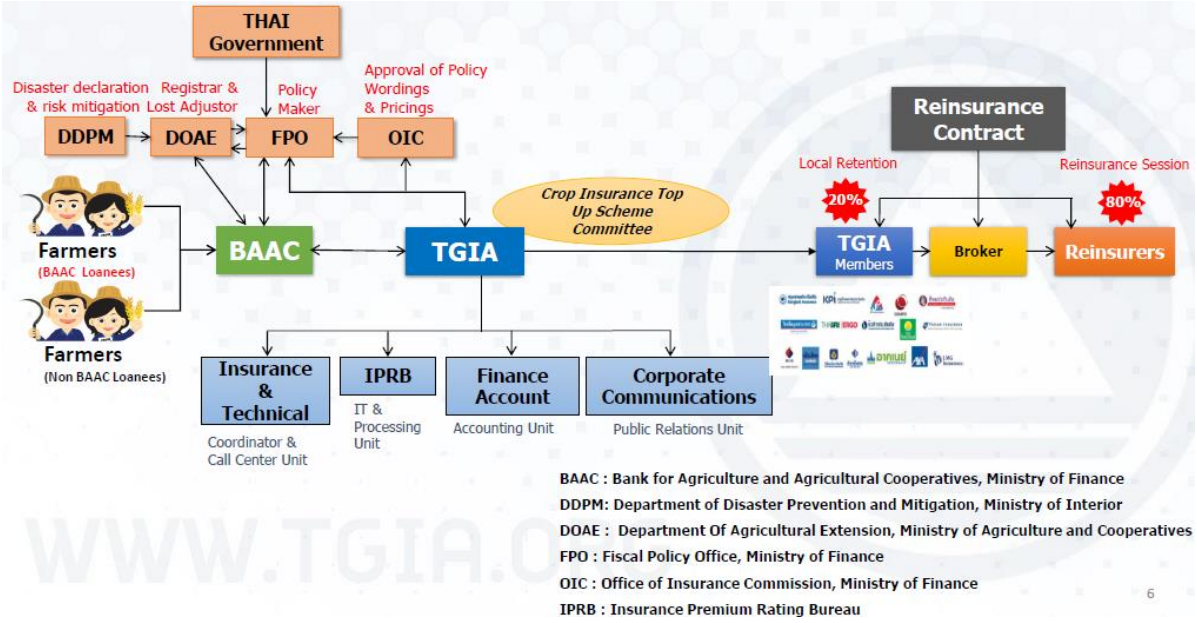
Thailand has the largest PPP programme in ASEAN: Figure 3.7 presents an organogram of the scheme, the main public and private partners, and their specific roles and functions. During the planning and design of the programme, careful attention has been given to clearly defining the roles of each stakeholder:

- The Fiscal Policy Office (FPO) of the Ministry of Finance plays the role of policymaker and advises on issues such as premium subsidies (currently 60% on Tier 1 cover) provided by the government.
- The Office of Insurance Commission (OIC) is the Thai insurance regulator responsible for approving crop insurance products and pricing (premium rates).
- The Thai General Insurance Association (TGIA acts as a managing underwriter for the TNCIS on behalf of the pool of 11 (2021) co-insurers and is responsible for scheme administration, underwriting and claims settlement, organisation of the reinsurance programme for the scheme, stakeholder coordination, call centre operation, IT functions, accounting, etc.
- The Bank of Agriculture and Agricultural Cooperatives (BAAC) plays a key role in TNCIS implementation and acts as a partner agent to the TGAI/Pool insurers. As the main distribution channel, the BAAC

assists in raising awareness in farmers towards insurance, premium collection, and claims disbursements on behalf of the TGIA and also finances (subsidises) 40% of the Tier 1 premiums for BAAC loanee clients.

- The Department of Agricultural Extension (DOAE of the Ministry of Agriculture and Cooperatives (MOAC) is responsible for the enrolment and registration of rice and maize farmers, provision of crop production and yield, and price data for product design and rating purposes. Most importantly, it conducts in-field individual farmer loss assessments for the TGIA pool insurers.
- The Department of Disaster Prevention and Mitigation (DDPM) is responsible for implementation of the national disaster relief programme for rice, maize, cassava, sugar cane, and rubber plantation farmers, as well as the declaration of disasters and compensation payments.
- International Reinsurers. The TNCIS is fully reinsured under a quota share reinsurance treaty (20% retention by TGIA pool members: 80% cession to reinsurers). Reinsurance played a critical role in the ability of the TNCIS to absorb major flood losses in 2011 and 2012 (557% and 295% loss ratios, respectively), and especially during 2019 when the programme was much larger, and rice maize drought and flood claims amounted to BHT5.2 billion (USD167 million, LR 231%) (TGIA, 2021).

Figure 3.7. Organogram of the Thai National Crop Insurance Scheme (TNCIS) for Rice and Maize

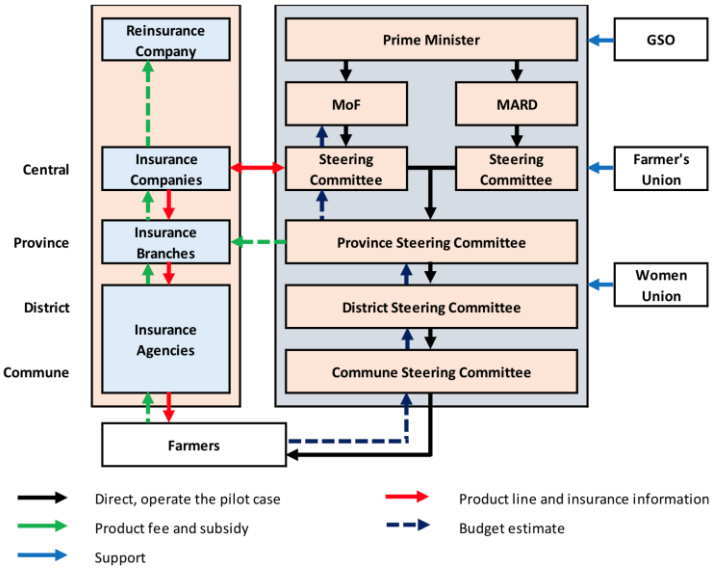


Source: Courtesy of TGIA (2021)

Case Study 4: PPP in Vietnam

A PPP approach has been used to implement the NAIPP1 (2011–2013) in Vietnam. Three public sector institutions played a key role in supporting the pilot, namely the Ministry of Finance (MOF), Ministry of Agriculture and Rural Development (MARD), and the Provincial People's Committee (PPC). The two insurance companies approved to underwrite the NAIPP were Bao Viet and Bao Minh (joint-stock corporations), with local reinsurance backing from VinaRe (as per Circular 121/2011/TT-BTC, Decision 2174 / QD-BTC and 2175 / QD-BTC) and international reinsurance backing from SwissRe. The organisational and operating structure of the NAIPP1 is shown in Figure 3.8.

Figure 3.8 Vietnam: Organisational and Operating Structure of the NAIPP1 (2011–2013)



Source: Tinh (2018)

The key roles of public and private stakeholders in the design and implementation of the NAIPP1:

- **Steering Committees** were established at central, provincial, district, and commune level with representation from the main line ministries and supporting agencies, providing general supervision, instruction documents, inspecting, monitoring, and evaluating the pilot during and after implementation. The steering committees also prepared annual budget estimates for NAIPP activities at all levels while information on the number of farmers potentially buying the insurance was transferred to the MOF to estimate the funding support (premium subsidies and programme operating expenses) for the following year.
- **The MOF** played a key role in the NAIPP by issuing guidance to insurers on policy wording and tariffs for the agricultural insurance programmes, beneficiaries, pilot areas, insurance profiles, procedures, and financial mechanisms for stakeholders, plus the co-financing of premium subsidies with provincial governments.
- **The MARD** prepared instructions for pilot area selection, insurance coverage, regulations on agricultural production and disease monitoring, collaborating with the MOF in formulating insurance terms and guidelines, and training deployment for local authorities and insurance companies.
- **The PPC** established an Agricultural Insurance Provincial Steering Committee, district steering committees, and commune steering committees in its pilot areas.
- **Bao Viet and Bao Minh** (insurers appointed by the MOF) recruited and trained new staff to implement the programme, forming a division specialising in agricultural insurance operations and claims adjustment and developing a network of field staff in the pilot areas. The insurers also coordinated with local authorities to encourage agricultural producers to participate in the insurance programmes, collaborating with local authorities to collect statistical data, tracking diseases, confirming the actual damage, and carrying out the compensation procedure. VinaRe coordinated with the two insurance companies to place their reinsurance programmes on the NAIPP with SwissRe (FAO, 2016; CAP-IPSARD, 2017; Bui, 2018). See Box 3.3 for further details of public sector roles in the NAIPP (2011–2013).

Box 3.3. Main Government Agencies Responsible for NAIPP Implementation and Their Roles

Agency	Main Responsibilities
Ministry of Finance (MOF)	Choosing insurance companies to implement the programme Approving the rules for premium, insurance commissions, and insurance liability Guiding financial mechanisms, supporting policies for insurance companies Stipulating profile, procedures, and processes for agriculture insurance Providing funding under the responsibility of the central budget and guiding PPCs to implement policies to support agriculture insurance Supervising the implementation of agriculture insurance Reviewing, evaluating, and annually reporting the implementation of agriculture insurance to the prime minister
Ministry of Agriculture and Rural Development (MARD)	Giving specific guidance on the types of natural disasters and epidemics that are covered Coordinating with MOF in stipulating profile, procedures, and processes for agriculture insurance Determining criteria on scales of paddy, animal husbandry, and aquaculture for agriculture insurance Specifying standard culture practices for paddy, livestock, and aquaculture in agriculture insurance Quarterly reporting of performance assessment under its scope of responsibility and proposing corrective measures, as needed, to MOF
Provincial People's Committees (PPCs)	Establishing the steering committees for local agricultural insurance chaired by the vice chair of each PPC Organising the implementation of agriculture insurance, allocating funding (from the central budget and local budgets), inspecting and supervising agriculture insurance in the province Coordinating with MOF in stipulating profile, procedures, and processes for agriculture insurance Reporting of quarterly assessment and proposing corrective measures to MOF and MARD

Source: FAO (2016)

The Vietnamese experience shows that in the original design of the NAIPP, the MOF assumed a leading role in the design of crop, livestock, and aquaculture insurance products and premium rating as well as setting the systems, procedures, and eligibility for premium subsidies. Similarly, the MARD assumed a leading role in the selection of pilot areas, field operations, and procedures. As such, the two insurers played a secondary role in programme planning, design, and implementation. As noted above, international experience suggests insurers should assume primary responsibility for product design, rating, and ownership of the programme.

In conclusion, AMS currently planning national PPP agricultural insurance programmes may wish to closely study the organisational and operational frameworks and divisions of roles and responsibilities in the Thai NCIS.

3.5. Government Support for Agricultural Insurance and the Role of Premium Subsidies

3.5.1. Types of government support and international experience

Governments throughout the world in high-, middle-, and low-income countries provide financial and other support for agricultural insurance. Government intervention in insurance business class is often justified. For example, the need to correct market failures or the non-availability of suitable crop and livestock insurance products, especially for small farmers; to assist insurers due to the high start-up costs of designing products, operating systems, and procedures for implementing insurance in remote rural areas; and address issues of affordability and the inability of smallholder farmers to pay the often high premium rates for crop and livestock insurance.

The ways in which governments typically provide support for agricultural insurance are listed in Box 3.4. Premium subsidies, the most common form of support, is provided by about two-thirds of countries for some

form of agricultural insurance. Other popular measures are public sector reinsurance and legal and regulatory support (Mahul and Stutley, 2010). Governments give much less attention to enhancing data and information systems for agricultural insurance, conducting awareness and education campaigns for farmers, capacity building and training for insurers and public and private sector stakeholders, and the development of low-cost insurance distribution systems and FINTEC digital technology applications.

Box 3.4. Ways in Which Governments Can Support Agricultural Insurance

- Create an enabling legal and regulatory framework
- Enhance data and information systems
- Education and capacity building
- Research and development (products)
- Insurance distribution systems and financial transaction platforms
- Public premium subsidies
- Catastrophic risk sharing/risk financing

Source: Author

3.5.2. Premium subsidies in agricultural insurance

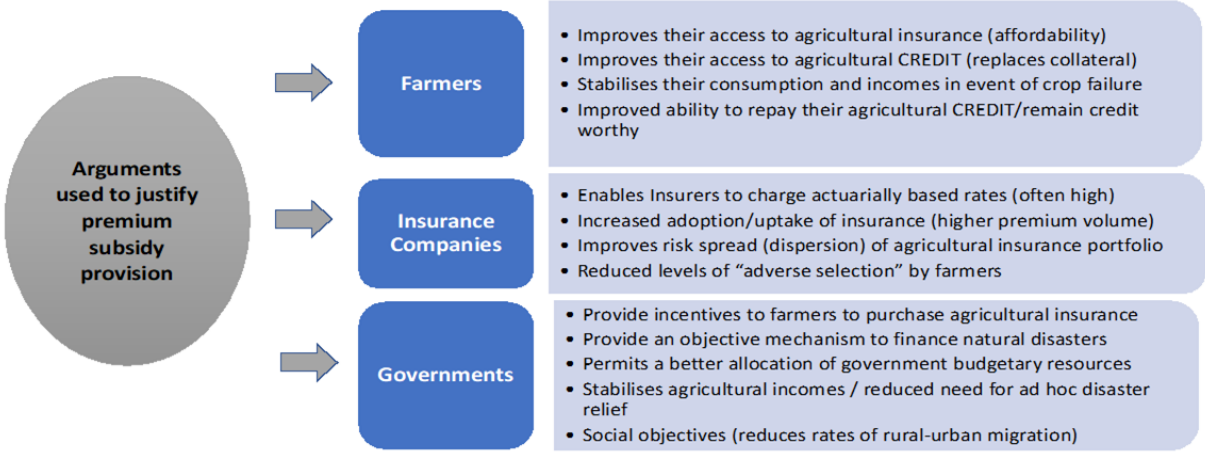
AMS currently promoting national agricultural insurance programmes will need to make a major decision on their policy support or otherwise for agricultural insurance premium subsidies. Accordingly, they may wish to review the experiences of countries such as the Philippines and Thailand that have massively scaled-up agricultural insurance coverage and penetration in recent years on the back of significant annual budgetary support in the form of premium subsidies.

Advantages and disadvantages of premium subsidies

Premium subsidies are the most widely practised form of government support to the (mainly) individual-farmer micro-level agricultural insurance programmes operating in both developed and developing countries. In a study of agricultural insurance provision in over 65 countries, Mahul and Stutley (2010) reported that nearly two-thirds (63%) of the governments provided premium subsidies.

Governments often use the argument that premium subsidies are required to make agricultural insurance policies more affordable and accessible for small-scale farmers, who are usually their primary target. Financial institutions (banks and insurers) also benefit where premium subsidy provision leads to increased uptake and penetration. When farmers have crop insurance, banks can improve their loan recovery rates in the event of severe crop failure, while increased insurance adoption usually means that insurance companies achieve better risk spread while reducing adverse selection. Finally, governments can use premium subsidies to promote private sector agricultural insurance as a means of replacing ad hoc disaster relief (Figure 3.9).

Figure 3.9. Rationale for Premium Subsidies in Agricultural Insurance



Source: Author

It is notable that no large-scale MPCI programmes exist in the world today that do NOT attract government premium subsidies. Private insurers have previously attempted to offer such unsubsidised MPCI programmes in South Africa and Argentina but have experienced major anti-selection by farmers in the face of very high premium rates (typically 7.5 to 10.0% or more) for such cover, incurring high underwriting losses. As such, where MPCI is offered, it is nearly always under a public only or PPP arrangement attracting high premium subsidies. These features are applicable to the PCIC's MPCI loss of yield programme for rice and maize in the Philippines, and to a lesser extent, the comprehensive damage-based catastrophe flood, drought, pest, and disease cover in Thailand and Indonesia.

However, the provision of nondiscriminatory premium subsidies is regressive because it disproportionately benefits the larger farmers to the detriment of small and marginal farmers. Also, subsidies that cover a large part of the overall premium can promote moral hazard, encouraging farmers to grow high-risk crops in regions not technically suited to the crop. Once premium subsidies have been introduced by governments, it is politically very difficult to reduce or withdraw them. In many countries operating nondiscriminatory premium subsidies, the fiscal costs to the government are extremely high, and as insurance penetration increases, subsidies place an additional burden on the national budget (Mahul and Stutley, 2010).

There is growing consensus in development circles that smart subsidies for reducing the cost of premiums are required to make micro-level index insurance more widely accessible and affordable for the rural poor. 'Smart' subsidies are designed and implemented to provide maximum social benefits while minimising market distortion and client mistargeting. Poorly designed subsidies can undermine efficiency and incentives within the insurance industry. For example, they can encourage overuse of health care by beneficiaries as well as overinvestment in risky, sometimes environmentally damaging, agricultural activities. A subsidy should be designed with a clearly stated and well-documented purpose, addressing market failure or equity concerns while successfully targeting those in need with minimum inefficiency. Smart subsidies are designed with a clear exit strategy or a long-term financing strategy in mind, as well as a good M&E system that tracks subsidy performance; paramount for the success of any subsidised insurance scheme (Hill et al., 2014).

There are rationales for providing direct and indirect insurance subsidies: (i) direct premium subsidies can be used to improve coverage equity by extending insurance access to previously excluded groups, such as low-income individuals; and (ii) indirect subsidies can be used to correct market failures that may have hindered insurance sector development. However, Hill et al. (2014) recommend that before governments consider premium subsidy support, they should first implement alternative subsidy measures to correct market imperfections, such as investing in information systems and supporting start-up costs and reinsurance to encourage microinsurance market development.

3.5.3. Premium subsidy provision in ASEAN

The Philippines, Thailand, and more recently, Indonesia have significantly scaled up their national (or PPP) agricultural insurance programmes over the past decade on the back of major commitments by governments to premium subsidy provision. Affordability is the key challenge in providing agricultural insurance products for smallholder farmers in AMS with minimal resources (ASEAN, 2017). Premium subsidies make insurance cheaper and more accessible to small farmers and can lead to increased adoption and penetration (AgroInsurance International, 2020).

The Philippine government has traditionally granted the PCIC access to premium subsidies on its regular rice and maize MPCI programmes. Until 2012, the PCIC's premium subsidy budget was about USD2 million or less, and rice with maize farmers only being eligible for premium subsidies of about 40 to 50% of the full commercial premium, while HVCs, livestock, and fisheries (aquaculture) were ineligible. Starting in 2013, the Philippine government adopted a policy of promoting special agricultural insurance programmes targeted at small-scale subsistence farmers eligible for free (100% premium subsidies) agricultural insurance protection, significantly increasing its budget for premium subsidies to PHP3,500 million in 2019. With the inclusion of the PCIC and Department of Agriculture (DA) premium subsidies, the total actual premium

subsidy expenditure in 2019 amounted to PHP5,487 million (USD106 million), representing a very high proportion (96%) of the PCIC's total premium of PHP5,725 million (USD110.5 million) (Table 3.5).

In Thailand, the central government provides a 60% premium subsidy for the rice and maize Tier 1 top-up insurance programme. However, with the introduction of compulsory Tier 1 crop insurance for BAAC loanees in 2019, these farmers have been offered incentives in the form of a 40% premium subsidy by the BAAC, meaning that Tier 1 cover is free (100% subsidised) for BAAC loanee farmers. Non-loanee farmers continue to be eligible for the central government 60% premium subsidy. Tier 2 cover is being promoted by the TGIA and BAAC without any form of premium subsidy. With the major scaling up of the Thai top-up programme, total premium subsidies in 2020 amounted to BHT2 billion (USD62 million). Premium subsidy levels are also very high in Indonesia, amounting to 80% for crop and livestock under the Jasindo AUTP and 100% for the aquaculture insurance programme. In Vietnam, poor households were eligible for 100% premium subsidies under Phase 1 of the National Agricultural Insurance Pilot Programme (2011–2013) and 90% under Phase 2 of the NAIPP (2019–2021) (Table 3.5).

Table 3.5. ASEAN Member States: Agricultural Insurance Premium Subsidy Provision

Country	Premium Subsidy Availability	Source	Eligibility	Premium Subsidy Levels	Premium Subsidy Cost
Brunei	-	-		-	
Cambodia	Yes (pilot)	ADB funded	Forte Insurance led consortium under MEF-WICI-ADB (2021)	50% (2021)	ADB Budget USD4.95 million (2018–2025)
Lao PDR	No				
Indonesia	Yes	Central Government	Jasindo (state insurer) only	80% for crops and livestock 100% for aquaculture	n.a.
Malaysia	No				
Myanmar	No				
Philippines	Yes	Central/Provincial Government and PCIC	PCIC only (state insurer)	• 100% for farmers insured under special programmes • 51% for the PCIC regular programme for rice and corn farmers • 2019 overall premium subsidy 96% of total premium	PHP5,487 million (USD106 million) 2019
Singapore	-	-		-	
Thailand	Yes	Central Government	Thai Rice & Maize Pool Insurers (11)	• 60% central government • 40% BAAC (for loanees) • 0% for Tier 2 top-up cover • (Maximum 100% for BAAC credit clients)	THB2 billion (USD62 million) 2020
Vietnam	Yes (pilot)	Central Government	Bao Minh/Bao Viet only (JV companies)	Phase I (2011-13)[8]: • 100% for poor households/farmers • 90% near poor households/farmers • 60% non-poor households/farmers • 20% farming organisations and cooperatives Phase 2 (2019-21)[9]: • 90% poor/near poor households/farmers • 20% non-poor households/farmers • 20% farming organisations and cooperatives	Budget VND358 Bio (US70 million) n.a.

Source: Author, based on a literature review, data, and information provided by interviewees from ASEAN

Case Study 5: Premium subsidies and increased penetration of agricultural insurance in the Philippines

Between 1981 and 2010, the PCIC's underwriting operations were severely constrained by a lack of capital and reserves and a very restricted budget for premium subsidies. Coverage for farmers, livestock producers,

[8] Decision No. 22/2019/QD-TTg decision on the implementation of the agricultural insurance support policy.
[9] Decision No. 22/2019/QD-TTg.

and fisherfolk was extremely low at about 100,000 individual policies per year, representing a penetration rate of <2%. During this period, government premium subsidies (GPSs) amounted to about 50% of total premiums, while farmers paid the remaining 50% (Figure 3.10).

However, during the past decade, the Philippine government has extensively expanded its premium subsidy support to the PCIC. Starting in 2013, it introduced a series of new special agricultural insurance programmes[10] for small-scale and poor subsistence crop/livestock/fishery producers, offering 100% premium subsidies, increasing PCIC's uptake and penetration significantly to nearly 41% of all farmers and fisherfolk in 2019. The huge increase in mainly free agricultural insurance (100% premium subsidies) has been accompanied by a similar rise in the number of insured farmers. In 2010, the PCIC insured a total of 104,241 farmers, while in 2019, its uptake rate among farmers, livestock producers, and fisherfolk reached 2.28 million policies, equivalent to a penetration rate of 40.5% of the nation's 5.56 million registered farm holdings. Over this period, the actual government premium subsidy increased from PHP189 million (USD4.2 million), equivalent to 49% of total agricultural insurance premiums in 2010, to PHP5,487.4 million (USD105.9 million) or 96% of total premiums in 2019 (Figure 3.10).

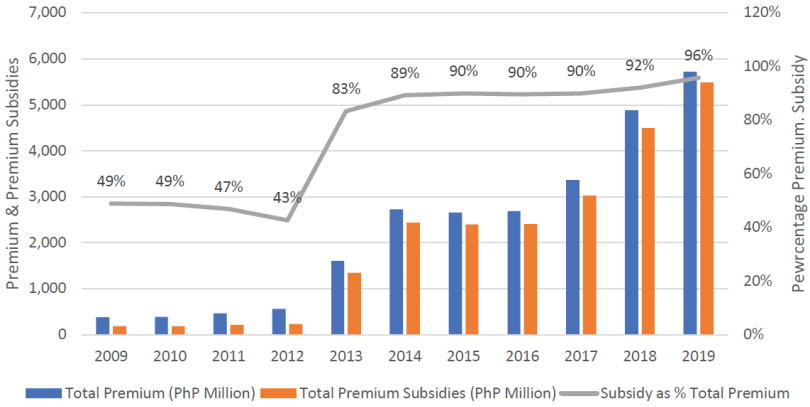
Figure 3.10. The Philippines: Role of Premium Subsidies in Scaling up Agricultural Insurance Penetration

Source: Author's analysis of the PCIC Annual Reports 2009–2019
Note the very high correlation between the value of premium subsidy provision and number of farmers insured by PCIC (Pearson R^2 value = 0.987)

A further feature of the Philippines is that practically all the growth in agricultural insurance sales since 2013 has been under the free (100% subsidised) special programmes for small-scale and subsistence farmers rather than the PCIC's regular programme for semi-commercial farmers, livestock producers, and fisherfolk. Accordingly, the central government (as well as PCIC and DA) premium subsidy levels (as a proportion of total premiums) have risen sharply from less than 50% of the PCIC's total annual premium between 2009 and 2012 to 96% in 2019 (Figure 3.11).

Figure 3.11. The Philippines: Increase in Premium Subsidy Levels 2009–2019

[10] Including in 2019: 1) RSBSA; 2) non-RSBSA Rice and Corn Insurance Programmes; 3) DA-Production Loan Easy Access (DA-PLEA); 4) DA-Survival and Recovery Program (DA-SURE); 5) DA-Yolanda Rehabilitation and Recovery Programme (DA-YRRP); and 6) DA-Department of Agrarian Reform-Land Bank of the Philippines (DA-DAR-LBP) Agrarian Production Credit Program (APCP).



Source: Author's analysis of the PCIC Annual Reports 2009–2019

Conversely, in the Philippines, the PCIC's regular agricultural insurance programmes have failed to achieve any significant growth over the past decade. In 2019, total agricultural insurance policy sales amounted to only 85,837 made up of 65,374 (76% of the total) for subsidised rice and maize (51% average premium subsidy). Sales were also very low for unsubsidised programmes, including HVCs (1,873 policies or 2% of the total); livestock (16,059 policies or 19% of the total); and fisheries (2,531 or 3% of the total). These figures tend to suggest a very low demand by farmers, livestock producers, and fisherfolk for the PCIC's non-subsidised agricultural insurance products and programmes.

3.5.5 Summary of premium subsidy provision in ASEAN

In summary, the ASEAN and wider international experience tends to suggest that government premium subsidies can be a major catalyst for increased adoption of agricultural insurance, particularly by smallholder farmers. However, there are no guarantees that high premium subsidies will lead to high penetration (SwissRe, 2019). If a scheme has been properly designed and distributed, penetration will increase over time. Similar findings apply to Vietnam in its Phase 2 implementation of the NAIPP in that despite poor farmers qualifying for 90% premium subsidies, voluntary demand and uptake of crop and livestock insurance has been very low.

3.6. Developing Innovative Agricultural Insurance Products in ASEAN

3.6.1. One size does not fit all: current status

The current range of micro-level crop insurance products offered to farmers under large-scale subsidised programmes in ASEAN is very restricted except for the Philippines. As presented in section 2, these countries mainly offer indemnity-based crop insurance products for extremely small-scale and often subsistence farmers.

- The Philippines: The PCIC offers MPCI loss of yield cover for rice and maize; NPCI damage-based cover for HVCs.
- Thailand: The TNCIS offers NPCI damage-based cover for rice and maize.
- Indonesia: Jacindo offers NPCI damage-based cover for rice, in this case, a Constructive Total Loss (CTL) policy (see below for further comment).

Several small-scale pilot crop index insurance programmes also exist in these countries and other AMS, including WII and AYII pilots, as previously presented in section 2.

For crop insurance, one size does not fit all, and products must be tailored to the risk transfer needs of different farmers. Figure 3.12 shows the three main categories of farmers in ASEAN according to farm/cultivated landholding size, along with the suitability of traditional commercial indemnity-based and/or index insurance products for each category. For the purposes of this report, farmers are classified as follows: 1) commercial (>25 Ha); 2) semi-commercial (1–5 Ha); and 3) subsistence (<1 Ha).

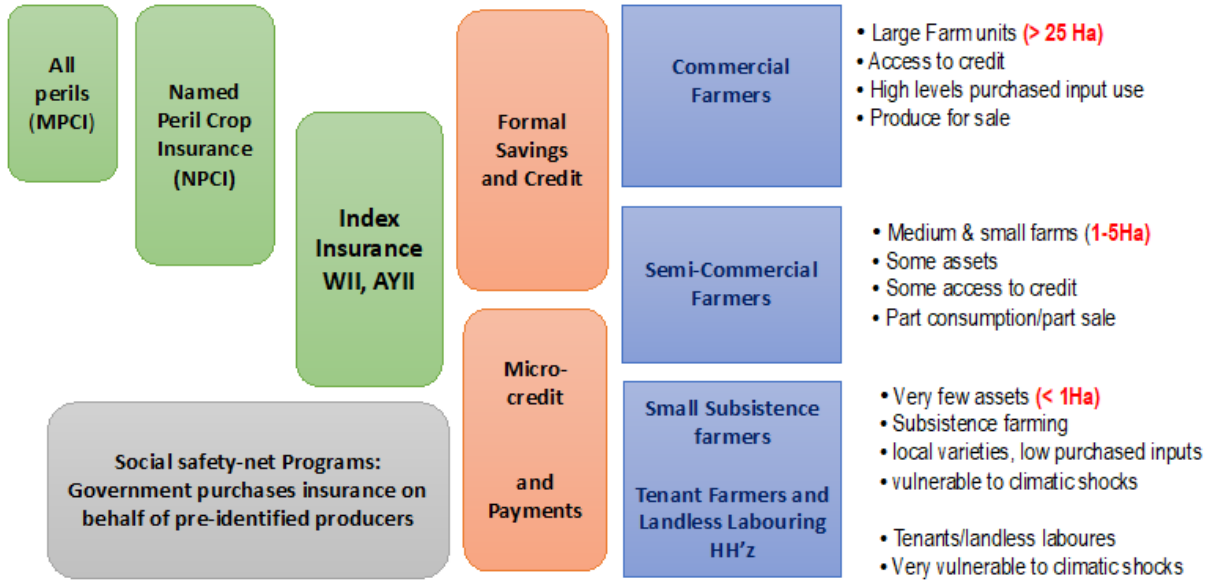
For commercial farmers in AMS, who cultivate more than 25–50 Ha of rice or maize, accounting for less than 2–3% of all farmers, an individual-grower MPCI may be a suitable product. Insurers can offer MPCI cover to large farmers because the premium is adequate to cover the costs of pre-acceptance risk inspections, mid-season monitoring inspections, and end-of-season crop yield assessment.

However, an individual-farmer MPCI is not a suitable product for small semi-commercial/emerging farmers, who own between 1 and 5 Ha, accounting for no more than about 15 to 20% of all farmers in AMS. The MPCI (and NPCI) is extremely difficult and costly to implement and assess losses on small-scale farming units of 1 to 5 Ha (due to moral hazard and anti-selection issues), as evidenced in the Philippines, Thailand, and Indonesia.

Small semi-commercial farmers produce crops for both family consumption and sale, increasingly accessing seasonal crop loans to invest in improved high-yielding seed and fertiliser technology, thereby facing financial exposure in the event of crop loss. For these farmers, a product such as WII or AYII may offer a more appropriate risk transfer solution than MPCI or NPCI (Figure 3.12) since neither of these require costly pre-inspections or individual field-by-field loss assessment.

Since the early 2000s, WII for individual farmers has been heavily promoted as a low-cost (to operate) solution for resource-poor subsistence farmers. However, caution should be exercised in selling WII to subsistence farmers in AMS, whose priority is to smooth consumption and avoid financial exposure in terms of crop loans. Rather than selling often costly individual crop insurance to subsistence farmers, governments should develop micro-savings, contingent credit, and a social safety net in the form of conventional ex-post natural and climatic disaster compensation programmes, or which could be insured/protected through the purchase of ex-ante index insurance at the meso or macro level, i.e., by provincial/national governments (Figure 3.12).

Figure 3.12. Agrifinance and Insurance Products Designed to Meet the Needs of Each Segment of the Farming Population



Source: Author, based on GlobalAgRisk (2009)

Crop insurance: Low levels of coverage (protection)

Wherever possible, insurance should be designed to compensate the insured in full for the cost of replacing the insured goods. In livestock insurance, it is common practice to base the sum insured on the market replacement cost for the lost animal, often subject to coinsurance of 10 to 20% on the value of the claim to reduce moral hazard. In crop insurance, there is great flexibility when establishing the sum insured. For example, in crop-credit insurance programmes, the sum insured is usually established according to the value of the crop loan amount. In other cases, insurance is designed to cover the full costs of production (possibly

about two-thirds of the expected output value). Some crop insurance products in HICs, such as the USA, provide a very high level of protection in the form of revenue coverage (expected yield times an agreed sales price).

In the large-scale subsidised crop insurance programmes in Indonesia, the Philippines, and Thailand, the relatively low sums insured/levels of compensation for crop losses do not even cover the costs of production for the main crops. In Indonesia, the current level of coverage is based on partial compensation for the costs of rice production, set at IDR6 million per Ha. This standard sum is offered to all rice growers applying for insurance cover. AgroInsurance International (2019) recommended offering variable insurance cover to more closely reflect the actual costs of production. In the Philippines, the average sum insured for rice and maize is about PHP20,000/Ha against the average costs of production, amounting to about PHP30,000 to 40,000/Ha; while in Thailand, the Tier 1 sum insured for rice and maize of BHT1,260/Rai and BHT1,500/Rai, respectively, only equates to about one-third (32%) of the average costs of production for these two crops. Even with the addition of the underlying disaster relief payments and Tier 2 voluntary cover, the level of protection (compensation) only amounts to 66% of the average costs of production for rice and 62% for maize (see Figure 3.5).

There is an obvious trade-off for governments between the desire to increase the sum insured coverage levels and the corresponding cost of premium subsidies arising on the sum insured and thus the premium generated.

Jasindo AUTP rice policy – drawbacks

The AUTP rice policy is a catastrophe crop insurance cover that only indemnifies crop losses when damage exceeds 75% of the rice crop grown on the insured farm. This subsidised rice policy is available to small semi-commercial and subsistence farmers with up to 2 Ha of rice. In effect, the AUTP is a CTL policy, with 75% of the first loss deductible, meaning that an Indonesian rice farmer must lose more than three-quarters of their expected crop production and yield before a claim is triggered, leading to a fixed indemnity payment of IDR6 million per Ha. Farmers incurring major financial losses of up 74% of their crop do not receive any indemnity at all since such cover is unlikely to meet the risk management needs (smoothing consumption, protecting seasonal crop loans, etc.) of many smallholder farmers or lending institutions. While the catastrophic nature of this policy means that premium rates can be maintained at a very low level of 3%, farmers are not receiving the protection they would normally expect under a crop insurance policy since with a 3% premium rate, this CTL policy can only afford to make full claim payments once every 40–50 years. It is recommended that a review of the AUTP policy is conducted to strengthen the protection afforded to farmers by this cover.

3.6.2. Development of new innovative retail crop, livestock, and aquaculture insurance products for small farmers

Area yield index insurance

AYII is a loss-of-crop-yield policy that aims to overcome many of the drawbacks of traditional individual-farmer MPCI crop insurance, and all AMS are strongly recommended to consider developing AYII as an alternative to their mainly indemnity-based MPCI and AYII products and programmes.

AYII is particularly suited to the needs of small-scale farmers since it provides more comprehensive loss of yield protection for natural, climatic, and biological perils than single peril WII, insuring against too much or too little rainfall and much cheaper to operate than MPCI. AYII lends itself to linkage (bundling) with crop-credit programmes for small farmers. It has been implemented for more than 40 years in India under the NCIS and more recently PMFBY, where up to 2020, it was compulsory for farmers accessing loans from banks to purchase parallel crop AYII cover. The programme currently insures about 50 million small-scale and subsistence farmers each year.

The key feature of the AYII product is that it does not indemnify crop yield losses at the individual farmer or field level. Rather, AYII makes indemnity payments to farmers according to yield loss or shortfall against an average area yield (the index) in a defined geographical area (e.g., district, subdistrict, parish, or village), commonly referred to as the unit area of insurance (UAI).

The area yield approach has the key advantages of minimising moral hazard and anti-selection, while administration costs are significantly reduced, making the product much more suitable for small-scale farmers. Under an AYII policy, yield losses are settled against the area average yield index, with no settling of losses on individual farmer's fields. This means that individual farmers cannot influence the yield outcome, such as by purchasing cover only for fields in low-lying areas subject to flooding and waterlogging (anti-selection) or applying suboptimal levels of husbandry and pest, disease, and weed control (moral hazard) in the expectation of claiming for the yield loss on their crop insurance policy. The costs of operating AYII are much lower than for an MPCI policy, especially since individual farm pre-inspections and in-field crop loss assessments are not required, offering the potential to market this product at a lower premium to small- and medium-size farmers (see Table 3.6 for the further advantages of AYII).

The main disadvantage of an AYII is basis risk, namely the difference in the actual yield outcome achieved by individual farmers on their own fields and the average area yield. For example, an individual farmer may incur severe crop production and yield losses due to localised perils (e.g., hail or flooding by a nearby river), but because these localised losses do not impact the county or departmental average yield, the grower does not receive any indemnity. Other problems include the need for an accurate procedure to measure the average area yields in the defined UAI (Table 3.6).

The operation of AYII cover requires: (i) accurate historical yield data (minimum of 10–15 years) at the local area level (UAI) to construct a yield index; and (ii) an objective and accurate method of establishing the actual average yield in the insured growing season to determine whether or not a payout is due. In most countries where AYII is implemented commercially (including India and now Pakistan, as well as Ghana, Kenya, and Uganda in Africa), the government agricultural extension services are involved in seasonal crop yield surveys through crop cutting experiments (CCEs). In CCEs, crops are harvested from randomly located subplots (e.g., 5 m x 5 m) in randomly selected farmers' fields and then threshed and weighed once fully dried to estimate the average yield for that plot. Typically, between 15 and 20 CCEs will be taken in the defined UAI and the yields averaged to determine the actual average yield for that UAI. Where the average actual yield is below the insured yield coverage level, all insured farmers receive a payout based on the amount of yield shortfall in the UAI.

Table 3.6. AYII: Preconditions for Operation, Advantages, and Disadvantages

Preconditions	Advantages	Disadvantages
• Homogeneous cropping systems in the defined geographical area (e.g., region, district, county) that form the UAI. • Accurate historical regional yield data. • Timely, accurate, and impartial procedures for estimating 'actual' average yield in the UAI. • In some cases, special insurance regulations.	• Individual-grower time series yields are not needed. • Data are available: regional yield statistics are recorded in most countries. • Delivery cost to growers is lower. • Product is suited to systemic risk (e.g., drought). • Adverse selection and moral hazard are minimised. • No in-field loss assessment is required. • Cost of loss assessment is reduced. • It is yield-based, so picks up all weather risks and other causes of shortfalls.	• Basis risk is an issue (though risk is lower than for WII). • The product is not suitable for localised perils (e.g., hail). • Accurate measurement of 'actual' average yields in insured units may be difficult. • Farmers' acceptance may be difficult.

Source: World Bank

Vietnam is currently the only AMS to have successfully rolled out AYII for well over 300,000 smallholder farmers under the NAIPP1 (2011–13). However, the following problems were experienced: 1) official rice yield data was only available at district level and not commune level; 2) area yield estimation at harvest time

was based on farmer surveys and the estimates of local commune-level agricultural staff rather than through objective crop yield sampling methodology, leading to complaints by some farmers concerning the accuracy of the procedures; and 3) some farmers experienced basis risk due to localised losses but did not receive an indemnity (FAO, 2016; CAP-IPSARD, 2017).

In the Philippines, GIZ assisted the PCIC with a feasibility study (GIZ, 2010) followed by a pilot AYII programme for rice farmers on Leyte Island in 2013–2014, but this has not taken off due to a lack of yield data at local level, and issues over the introduction of systematic crop cutting experiments. It is strongly recommended that the PCIC and its stakeholders in the Philippines reconsider AYII as an alternative to the MPCI cover for subsistence rice and maize farmers insured under the Registry System for Basic Sectors in Agriculture (RSBSA) and other special programmes (World Bank, 2019a; 2019b). This will only be feasible if the government strengthens its crop yield data measurement systems at local level.

In Indonesia, AgroInsurance International (2019) has recommended that the government explore the potential to develop AYII for small-scale rice and maize farmers as an alternative to the AUTP named peril damage-based CTL policy. Only 17% of Indonesian farmers currently have access to credit and the introduction of AYII could be linked to the provision of seasonal loans from banks, helping smaller farmers to access credit as well as protecting them from loss.

Case Study 6: Satellite Technology Applications for Area Yield Measurement

Under the launch of NAIPP2 (2019–2021), Vietnam became only the second country in the world, after India, to apply technological innovation to its rice AYII product by switching to satellite-based remote sensing (RS) AYII cover.

Since 2013, the Swiss and German governments have sponsored a project on Remote Sensing-based Information and Insurance for Crops in Emerging Economies (RIICE)[11], in several major rice producing countries, including Cambodia, India, Indonesia, Thailand, and Vietnam. RIICE uses satellite imagery (free of charge) to support government agencies in measuring planted rice areas, monitoring crop progress during the growing season, and estimating crop production and yield up to the time of harvest to a high degree of precision. The accuracy levels of RIICE are as high as 80–85% of the true crop yield. In Vietnam, RIICE has been implemented since 2013 in conjunction with the MARD under a consortium of the International Rice Research Institute (IRRI) from the Philippines, the German International Development Agency (GIZ), SARMAP (a Swiss remote sensing specialist company), the Swiss Agency for Development and Cooperation (SDC), and SwissRe. RIICE enables the government of Vietnam to monitor and respond to natural rice disasters caused by drought, flood, salinity, etc.

The RIICE satellite technology can be used to support AYII by providing timely and accurate estimates of the average rice yields in defined areas (e.g., communes) at the time of harvest and where yield shortfall has occurred, triggering payouts. The RIICE technology was first used for crop insurance purposes by the State Government in Tamil Nadu India, to support the PMFBY crop AYII programme, which previously relied on sample CCEs on representative farmers' yields in each UAI. The state experienced major logistical problems in implementing the CCE programme with delays of up to six months in approving the area crop yield results and determining whether or not claims payouts were due. Starting in the 2017 Rabi Season, RIICE technology was used to estimate crop yields at harvest time and trigger timely and objective yield shortfall payouts to farmers insured under the PMFBY AYII programme[12].

[11] RIICE is a public private partnership programme sponsored by the Swiss Agency for Development and Cooperation (SDC) and the German Federal Ministry for Economic Cooperation and Development (BMZ).

[12] RIICE Press Release: Satellite technology expediates insurance payouts in India's crop insurance programme https://www.asean-agrifood.org/press-release-satellite-technology-expedites-insurance-payouts-in-indias-crop-insurance-programme/.

In July 2019, the SDC signed a two-year agreement with the MARD to fund a RIICE crop AYII project for rice farmers in selected provinces of Vietnam[13]. The SDC is contributing to institutionalise RIICE technology into the official rice monitoring system of the MARD. In Vietnam, RIICE scientists have been working closely with their national counterparts at the National Institute of Agricultural Planning and Projection (NIAPP) and Can Tho University (CTU) to calibrate and test the RIICE product in the country's major rice growing areas in the Red River and Mekong Deltas. RIICE reports an accuracy level of up to 95% in their satellite estimates of area yields for rice and actual rice yields measured on the ground.

The RIICE satellite AYII product was launched by Bao Viet Insurance Company in the 2020 summer rice growing season in Nghe An Province under the NAIPP second pilot, and so far, Bao Viet has insured a small rice portfolio (7,291 farmers; 1,465 Ha of rice). The satellite technology triggered small payouts in the first season (7.2% loss ratio). However, some reports indicate that farmers complained about their average yields being lower than those calculated using the RIICE RS technology and therefore did not receive a payout[14]. This evidence highlights the need for farmers to receive careful education and training on the operation of satellite index cover to estimate area yields to ensure they understand that due to basis risk, their yields may be different than the average area yield.

Remote sensed/satellite imagery is increasingly becoming more accurate with a very high resolution of 1 m^2, and new products are constantly being researched and developed, including evapotranspiration and soil moisture indices. The cost of this technology is coming down while the estimation accuracy of crop damage, crop production, and yields is improving[15]. Over the next 5–10 years, many AMS are expected to adopt satellite AYII as an alternative to current in-field crop area yield sampling methodology and/or a hybrid RS/AYII product.

Livestock insurance

Throughout the world, insurers have found it very difficult to offer individual animal livestock products to smallholders with one or two animals due to the very high administration costs involved. Employing qualified veterinary officers to identify, tag, register, and conduct a pre-inspection health check and then vaccinate each animal can be extremely costly. Similarly, the costs of deploying qualified veterinarians to travel to the field to certify an animal's cause of death and to approve indemnification is prohibitively costly for smallholder livestock insurance schemes.

If livestock insurance is to be scaled up in ASEAN, low-cost solutions for registering and vaccinating animals will need to be identified. Consequently, AMS may wish to learn from the innovative work being conducted in India, Nepal, and Bangladesh to involve communities and microfinance institutions (MFIs) in these schemes and employ low-cost para-veterinarians (FAO, 2011; World Bank, 2015). Furthermore, insurers should explore the use of radio frequency identification (RFID) microchip technology on individual identified/tagged animals. This modern technology is shown to greatly reduce the incidence of fraudulent claims and the cost of livestock insurance premiums. First used in India, this technology has now been transferred to Africa, and in Rwanda, for example, with the agreement of all stakeholders to adopt RFID, local insurers and their lead reinsurers have decided to waive the policy excess altogether. RFID technology can also lower premium rates because it reduces moral hazard and mortality rates, as well as insurance claims (World Bank, 2020).

In contrast to crop insurance which has experienced the proliferation of more than 150 crop index insurance pilots and programmes over the past 20 years, there are very few examples of livestock index insurance. The micro-level Index-Based Livestock Insurance (IBLI), launched in Mongolia in 2006, is the only

[13] Switzerland to fund an innovative project in agriculture sector. Press Release 17.07.2019. https://www.eda.admin.ch/countries/vietnam/en/home/news/news.html/content/countries/vietnam/en/meta/news/2019/july/riice-phase-3-signing-ceremony.

[14] Report on a workshop organised by the Department of Agriculture and Rural Development No: / CCPTNT-KTHT & TT Dong Thap (author's literal translation from Vietnamese).

[15] For a comprehensive review of different RS technologies and applications for crop yield estimation and agricultural insurance see Coleman et al. (2017).

commercial livestock mortality programme in the world, protecting livestock herders against winter freeze events using a localised regional (*soum*) mortality index (GloblaAgRisk, 2010). Pasture drought satellite index insurance has been commercially marketed since 2000 in countries such as Spain, the USA, Canada, Uruguay, Kenya, and Ethiopia. These pasture drought indexes are based on remote sensing/satellite-monitored normalised difference vegetative indices (NDVI) and designed for commercial ranchers (e.g., in the USA) and/or nomadic pastoralists (e.g., Kenya and Ethiopia). There is very limited opportunity to implement such cover in AMS.

Aquaculture insurance

The biggest issue in aquaculture insurance for fish and shrimps is maintaining water quality to prevent disease outbreak and spread among fish farmers in a locality/region. From the insurer's perspective, each aquaculture applicant must be subject to pre-inspection to confirm all necessary disease prevention, monitoring systems, and procedures are in place before granting any form of disease cover. In Vietnam, the NAIPP1 (2011–2013) scaled up extremely rapidly to several thousand insured fish farmers before rigorous inspection procedures were put in place and field inspectors trained in disease identification. Consequently, many farms were insured with pre-existing disease conditions, contributing to very high insurance claims (FAO, 2016; CAP-IPSARD, 2017). As presented in section 2, under NAIPP2 (2019–21), insurers and their reinsurers have been unwilling to grant disease cover for the aquaculture programme, and without disease protection, fish farmers are reluctant to buy cover. There are no easy solutions to this problem and until the industry can demonstrate it is free of epizootic diseases, with scientific disease prevention monitoring and detection systems in place, (re)insures are unlikely to agree to reinstate disease cover.

In Indonesia, where ACA has been supporting the Jasindo-led APPIK aquaculture insurance programme since 2018, the company advises that the key to the programme's success is their tie-up with JALA, a specialist shrimp farming services contractor which provides modern water quality monitoring, stock monitoring, etc.[16] The future of aquaculture insurance provision in AMS will increasingly rely on the technology provided by local service specialists such as JALA.

3.6.3. Opportunities to develop parametric (index) crop insurance for end users at meso and macro level

Most conventional indemnity-based crop insurance products are designed as individual farmer retail policies (micro-level insurance). These products are promoted and marketed to individual farmers (or farmer groups and cooperatives) who, upon payment of the premium, receive a policy insuring them against physical loss or damage to the crop(s) grown on their own farms. In the event of a loss, the farmer is responsible for notifying the insurer, who then appoints a loss adjuster to visit the farm and conduct an in-field measurement of the loss to verify whether it exceeds the deductible and qualifies for a claim. This is the model used for the PCIC crop MPCI and NPCI programmes as well as the AUTP rice insurance scheme in Indonesia. However, it is extremely costly for insurance companies to operate such a micro-level crop insurance programme on farms of less than 1–2 Ha.

Parametric or index insurance is a very flexible product and can be offered to different clients at various levels of aggregation.

- **Micro level (direct):** Policyholders are individuals, e.g., farmers, market vendors, or fishermen, who hold policies and receive payouts directly. Policies are often sold at the local level and retailed through a variety of channels, including microfinance institutions, farmers' cooperatives, banks, NGOs, and local insurance companies. Premiums are either paid in full by clients or subsidised (or both).
- **Meso level (indirect)**: Policyholders are risk aggregators such as rural banks, MFI's, farmers' associations, cooperatives, mutuals, and value chain actors, such as input dealers and packer processors, and contract farming operations whereby the (re)insurer makes payments to the risk aggregators, who then provide services to individuals.

[16] For further information on JALA see https://jala.tech/about/.

- **Macro level (indirect):** Policyholders are governments or other national agencies. Payouts can be used to manage liquidity gaps, maintain governmental services, or finance post-disaster programmes and relief efforts for predefined target groups. 'Beneficiaries' of these programmes can be individuals. These schemes can be operationalised through regional risk pools (Schaeffer and Waters, 2016).

Opportunities for developing meso-level index insurance are likely to exist throughout ASEAN, particularly involving higher value plantation and fruit crop commodities for export. Several benefits accrue by developing meso-level agriculture insurance cover. Meso insurance may incentivise lenders to take more risks and expand lending to smallholder farmers. Lenders may be encouraged to reach more borrowers, even when there is minimal effort to reduce risk for individual farmers. Insuring a lending portfolio at the regional level reduces the basis risk associated with insurance contracts used to manage portfolio risks. The meso-level cover helps agro-processers by enabling them to remain in production after major shocks affecting other actors in their value chain. Compared to micro-level index insurance products, those at meso level allow for greater design complexity, enabling indemnity schedules to precisely capture the complex relationship between weather and policyholder losses (Miranda and Mulanga, 2016).

There appears to be only one meso-level crop insurance initiative in ASEAN to date, namely a flood index insurance programme for rice growers in the Mekong Delta. The client (risk aggregator), Vietnam Bank for Agriculture and Rural Development (VBARD) provided seasonal loans to many thousands of smallholder rice growers, and faced a major potential loss to their credit portfolio in the event of severe floods (GlobalAgRisk, 2010).

In Indonesia, the potential may exist to complement the existing AUTP rice insurance scheme for individual farmers through the provision of macro-level social protection insurance. The parametric WII offers catastrophe protection cover for purchase by national/provisional governments on behalf of the large number of subsistence farmers owning and cultivating less than 1 Ha of land. This macro-level programme could possibly build on a recent study under which proposals are presented for a satellite rainfall deficit (standardised precipitation index [SPI]) insurance product which would be purchased by provincial governments to protect large numbers of rice farmers from losses caused by severe drought in El Niño years (World Bank, 2018).

Similar opportunities to develop macro-level flood, rainfall deficit (drought), and typhoon indexes appear to exist in other AMS, including Cambodia, Lao PDR, Myanmar, Malaysia, the Philippines, and Vietnam.

3.7. Distributional Considerations: Voluntary vs Compulsory Insurance and Bundling

3.7.1. Issues relating to voluntary insurance

In most countries, agricultural insurance is voluntary, and farmers are free to decide whether or not to purchase an insurance policy. However, in some countries, crop insurance is compulsory by law, such as Kazakhstan and Greece, where the government's rationale is to transfer responsibility for protection against crop failure from the public sector purse to the individual farmer. In many other countries, agricultural insurance is compulsory for farmers who access production credit from state and commercial banks, and this term is commonly referred to as bundling. Countries where crop insurance is mandatory for loanees include Mexico, Brazil, India, the Philippines, Thailand, and Indonesia (Mahul and Stutley, 2010; AgroInsurance International, 2021).

Voluntary agricultural (crop and livestock) insurance may cause major drawbacks for financial institutions and insurers in the following ways:

- **Banks may be very exposed to farmers defaulting on loans** in the event of crop failure or the death of an animal and/or the high expenses of rescheduling loans and loss of interest. Banks are significantly less exposed to catastrophe (covariate loss) if all borrowers are protected by a crop/livestock insurance policy.

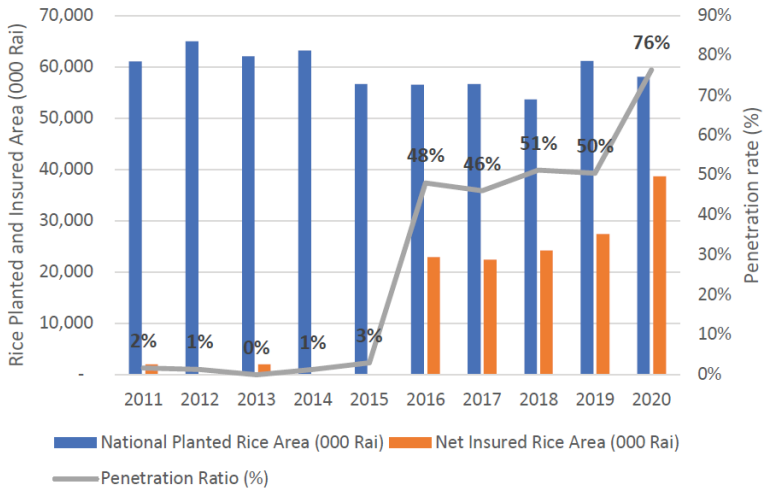
- **Insurers face problems of anti-selection by farmers.** Farmers in high-risk areas tend to purchase crop insurance while those in low-risk areas do not (i.e., they self-insure). Anti-selection is much reduced in instances where banks require all borrowers to purchase parallel insurance as a condition of receiving a loan.
- **Under voluntary programmes, demand and uptake is often very slow,** and it may take many years for a programme to reach scale and financial sustainability. Where demand is low, insurers face the lack of portfolio risk spread, low premium volume to settle large claims years, and difficulties covering their fixed and variable costs out of premiums.
- **Under voluntary insurance programmes, insurers face additional costs for marketing, the promotion of cover, and conducting pre-season inspections** in an attempt to minimise anti-selection. These costs are greatly reduced under a compulsory or bundled programme.

Case Study 7: Voluntary Insurance in Thailand

When insurance is compulsory for loanee farmers, it is much easier for insurers to achieve sufficient levels of demand and uptake by farmers to make them financially viable (to achieve scale and sustainability).

In Thailand, the penetration rate (insured area divided by total planted area) between 2011 and 2015 barely reached 3% for rice. In addition, the scheme suffered from severe anti-selection since rice farmers located in the more flood-prone regions of the country purchased insurance while those outside did not (SwissRe, 2018). However, the decision to make top-up rice insurance, Tier 1 cover compulsory for BAAC loanees in 2016 has led to a huge increase in the number of insured farmers and insured areas such that in 2020 the penetration rate for insured rice was as high as 76% of the total national planted area (Figure 3.13). Similarly, since the scheme became compulsory for BAAC borrowers in 2016, anti-selection has dramatically reduced, and there is much more similarity between the ratio of the insured damaged area and that of the national rice planted area (Table 3.7).

Figure 3.13. Thailand: Rice Crop Area Penetration Ratio Under Voluntary Insurance (2011–2015) and Compulsory Linkage to BAAC Credit (2016–2020



Source: Aon (2019); TGIA (2021)

Table 3.7. Thailand: Analysis of the Effects of Anti-Selection on the Rice Top-up Insurance Scheme

Year	National Rice Damaged Area (%)	Top-up Rice Insured Area Damaged (%)	Rice Insurance Voluntary/ Compulsory for BAAC Loanees
2011	16.5%	52.8%	Voluntary
2012	10.3%	31.8%	Voluntary
2013	5.0%	n.a.	Voluntary
2014	3.1%	17.7%	Voluntary
2015	4.0%	10.6%	Voluntary
2016	2.8%	3.2%	Compulsory
2017	6.6%	7.4%	Compulsory
2018	3.9%	5.9%	Compulsory
2019	n.a.	17.3%	Compulsory
2020	n.a.	1.1%	Compulsory
Total	**5.3%**	**6.6%**	

Source: Author's analysis of national rice refers to damage data and insurance damage data provided by Aon (2019) and TGIA (2021)

3.7.2. Cost issues involved in distributing and managing crop insurance with very small-scale farmers in ASEAN Member States

In AMS, the level of crop or livestock insurance tends to be very small, ranging from about 0.2 Ha of rice in Vietnam, at a small premium of USD11.8 on average per farmer per policy, rising to a maximum in the Philippines of about 1.4 Ha for rice and maize farmers at an average premium of between USD73.1 and USD109.2 for maize (Table 3.8). Since most of the programmes are multi-peril indemnity based, the volume of premiums generated per policy not only has to cover anticipated claims, but also the fixed and variable costs of the insurer's underwriting staff, office and equipment, in-field inspections, and loss assessment.

Table 3.8. ASEAN Member States: Average Level of Crop and Livestock Policies and Premium per Farmer

Country	Insurance Programme	Years	Average Insured Area/Farmer (Ha) or Average Number of Insured Cattle/Policy	Average Premium / Farmer / Policy (USD)	Average Premium Rate (%)
Cambodia	Rice	2016–2019	1.9	55.6	8.6%
Indonesia	Rice	2015–2020	0.65	14.4	na
Philippines	Rice	2009–2018	1.36	73.1	11.1%
	Maize	2009–2018	1.38	109.2	16.9%
Thailand	Rice	2015–2020	2.1	35.3	7.0%
	Maize	2019–2020	2.2	32.1	7.4%
Vietnam	Rice	2020	0.2	11.8	5.1%
	Livestock	2020	1.4	32.1	3.6%

Source: Author's analysis of data provided by each AMS

The average operating expenses of a national agricultural insurer with a mature portfolio range from 7.5% to a maximum 15% of total premiums. However, where programmes are in the pilot phase and have yet to achieve scale and a sizeable premium volume, the insurer's administration and operating overheads may add an excessively high load to the premium rates for farmers. This issue applies to the PCIC in the Philippines.

The PCIC's coverage for nearly three decades was constrained by its small portfolio and the very low government premium subsidy, resulting in low premium volume and significant staff overheads[17]. The PCIC's ratio of total administration and operating expenses to total premiums has ranged from a low of 13% (2013) to a high of 207% (1999), with a weighted premium average of 50% (1981–2014)[18]. This high administration and operating loading has contributed to the very high average commercial premium rates of 11.1% and 16.9% for rice and maize, respectively. However, under the expansion of government premium subsidies since 2014 and the corresponding increase in the size of the PCIC's portfolio and premiums generated, the ratio of total operating expenses to total premiums has fallen considerably to 17.6% in 2017 and 8.6% in 2019, bringing the PCIC in line with mainstream agricultural insurers[19].

3.7.3. Bundling of insurance with other inputs and services to add value for farmers and reduce operating costs for insurers

Over the past 20 years, many voluntary crop insurance (mainly WII) pilots for smallholder farmers in Africa, Asia, and AMS (e.g., the Philippines, Thailand, and Indonesia) have failed to achieve adequate demand and uptake and been subsequently terminated. This is because index insurance by itself offers little value to smallholder farmers faced with a myriad of constraints, including a lack of access to credit and production inputs, knowledge and extension advice, post-harvest storage facilities, and access to markets.

In contrast, successful programmes that have scaled up tend to actively integrate or bundle crop index insurance with the following: (i) savings; (ii) credit; (iii) access to improved inputs (seeds, fertilisers etc); (iv) extension advice and training in climate change adaptation strategies such as minimum tillage, water harvesting, etc; (v) provision of weather information and market price information through SMS texting; and (vi) assistance in output marketing. In Africa, examples of bundled programmes include the Oxfam-America/World Food Programme (WFP) R-4 (which has scaled up to seven countries) and the One Acre Fund programme in East Africa. The PepsiCo programme for contract potato growers in India is a good example of bundling index insurance with credit, input services, and output marketing (WFP and IFAD, 2010).

In AMS, the large-scale subsidised programmes in Indonesia, the Philippines, and Thailand are linked to/bundled with credit. There are potentially major administrative cost savings for the insurer when insurance is bundled with credit and distributed by banks and other financial institutions to their seasonal credit borrowers, and these savings can be passed on in the form of reduced premiums. Insurers potentially gain in three main ways: 1) they acquire an automatic product distribution channel, significantly reducing their marketing, promotion, and sales costs; 2) they can benefit from bank premium financing by adding the premium cost to the loan package, thus providing a major cost saving by not having to collect premiums from individual smallholder farmers; and 3) claims payouts can be channelled through the bank to the individual farmer/loanee account. Insurers typically offer banks commission for administering and processing their insurance programmes. The Thai crop insurance scheme makes huge cost savings by distributing its rice and maize insurance programmes through the BAAC.

In AMS such as Cambodia, Lao PDR, Malaysia, and Myanmar which are either planning to introduce crop and livestock insurance in the near future or have only just started piloting such programmes recently

[17] According to the World Bank (2019b), the PCIC has a relatively large staff of 211 regular and 621 part-time employees (including sales teams, field inspectors, and loss adjusters, etc.) and between 2010–2014 staffing resources accounted for 54% of all costs on average, followed by marketing costs (8.9%), occupancy (8.5%), transport (7.9%), and office equipment (4.4%).

[18] World Bank (2019b).

[19] PCIC 2018 Annual Report. In 2017, the PCIC's total expenses amounted to PHP591 million against premiums of PHP3.365 billion (17.6%), while in 2018, expenses fell to PHP417 million against premiums of PHP4.881 billion (8.6%).

should study the options for bundling their programmes with credit and other services. This would not only add value for farmers but also allow access to large numbers of clients from financial and other institutions.

3.8. Insurance and Reinsurance Considerations

Governments often participate in agricultural reinsurance insurance programmes to reduce the cost for farmers and provide catastrophe cover which may otherwise be too expensive from international reinsurers. The World Bank's 2008 survey of global agricultural insurance provision showed that, after premium subsidies, the most common form of government financial support was the provision of reinsurance (31% of the countries surveyed) through the following: (i) a national catastrophe reinsurer (e.g., China, India, Brazil, and Spain); (ii) a specialist agricultural reinsurer (e.g., Agroasemex in Mexico); or (iii) a special reinsurance agreement between reinsurers and federal and/or state governments (e.g., Portugal, Canada, and USA) (Mahul and Stutley, 2010).

In most countries, governments leave the local insurance market to negotiate with international reinsurers who have the advantage of having a global spread of risk. This is the case in Thailand, where the TGIA pool insurers are reinsured by international companies; in Vietnam, through a combination of the state reinsurer VinaRe and leading international reinsurer SwissRe; while in Cambodia, Forte purchases reinsurance from SwissRe.

In Indonesia, IndonesiaRe currently reinsures the Jasindo AUTP under a 70% quota share (QS) treaty, and the national reinsurer could play an active role in supporting the future expansion of agricultural insurance in the country. If the lack of private commercial reinsurance capacity is a constraint for Jacinda and other agricultural insurers, IndonesiaRe could assist the local market by providing proportional and non-proportional reinsurance and retroceding its excess liability to international reinsurers.

It is understood that in the Philippines, the PCIC has not purchased any reinsurance protection for its crop, livestock, and aquaculture insurance programmes for many years due to the lack of affordability. Although the company has not incurred any underwriting losses from 2009–2019, the significant scale-up of the programme in recent years has left it with unprotected liability in the event of a catastrophe, when the PCIC could be unable to meet its underwriting obligations from reserves and would need to approach the government for recapitalisation. It is recommended that going forward, the PCIC appoints a specialist reinsurance broker to seek suitable terms.

4. Conclusion and Recommendations

This final section presents a series of conclusions and recommendations for AMS to consider in developing and implementing and/or scaling up their existing national agricultural insurance programmes. Where applicable, this section also draws on the recommendations made by the AgroInsurance International study in 2021 on DRF solutions for the agriculture sector, given the major complementary objectives of these two studies.

4.1 Risk Assessment

This report highlights the important roles played by risk modelling and risk assessment in informing government policy for DRF in the agricultural sector and choosing the right mix of risk mitigation, risk coping, and risk transfer instruments, including agricultural insurance. Countries like Cambodia, Lao PDR, Malaysia, and Myanmar are in the early stages of developing and piloting agricultural insurance products and programmes but as yet lacking a national agricultural insurance strategy, are recommended to invest in risk assessment exercises for each priority sector (crops, livestock, and fisheries/aquaculture/forestry) and strategic commodities (food crops, high value export crops, etc). AgroInsurance International (2021)

makes similar recommendations, elaborating the risk profiles for major production regions and crop types in these four countries.

4.2 Aligning National Disaster Risk Management Programmes with Agricultural Insurance

DRF instruments and programmes should be planned to complement each other and avoid overlap. This is often not the case where disaster relief compensation programmes and agricultural insurance are not carefully aligned, with some farmers receiving double indemnities and/or where free disaster relief acts as a disincentive for farmers to purchase private sector insurance.

In order to develop coordinated DRF and agricultural insurance strategies and programmes, it is recommended: 1) establishing working groups and technical committees on agricultural insurance, climate finance and DRM, and DRM under the ASEAN Secretariat; and 2) regional cooperation on DRM could be strengthened with regional risk information, assessment, and modelling systems (AgroInsurance International, 2021).

4.3 Formulating a Long-Term Business Plan, Strategy, and Budget

Agricultural insurance and penetration are a slow process and can take many years before a programme reaches scale and sustainability. Consequently, governments need to have a long-term planning horizon and make a long-term commitment if they decide to support a PPP model with local insurers, specifically for premium subsidy provision. ASEAN governments currently planning their national agricultural insurance programmes are recommended to study the ways in which other countries with long-running national agricultural insurance programmes have refined their legal, regulatory, and planning processes to ensure continuity over time.

4.4 Institutional and Operational Framework

In ASEAN, Cambodia, Lao PDR, Malaysia, Myanmar, and Vietnam will need to decide on the legal and institutional frameworks as well as the organisational and operational model they wish to adopt for their national agricultural insurance programmes.

The Philippines and Indonesia (Member States with large subsidised agricultural insurance markets) have opted to promote a public sector model for agricultural insurance with the PCIC and Jasindo, respectively, the sole insurers authorised to access government premium subsidies. Thailand has also actively promoted private sector involvement through a coinsurance pool open to all interested non-life insurance companies.

Although the PCIC and Jasindo provide extremely important crop, livestock, and fishery products and services for the predominantly small vulnerable producers in their countries, their monopoly over premium subsidies has tended to crowd out insurance market development and participation by private commercial insurers. This is because they need to charge farmers the full premium rates for their products and therefore cannot compete against companies offering 80 to 100% premium subsidies. The various (mainly crop) private sector WII pilot initiatives, often financed by development partners in these countries, have mostly failed to achieve sufficient demand to be financially viable for the insurers, resulting in their subsequent termination.

This report shows that the highly subsidised public sector only agricultural insurance programmes are becoming increasingly expensive for the government as they expand coverage and penetration.

If the governments in Indonesia and the Philippines wish to develop long-term sustainable market-based agricultural insurance programmes, they will need to review the existing legislation and consider opening

up their markets to competition and actively promote entry by private insurance companies under a suitable PPP model. This has been a feature of the markets in China and India over the past 15 years.

In this context, although the AgroInsurance International 2021 report recommends that governments in ASEAN create a legal and regulatory framework to enable the insurance market to grow, it falls short of recommending the most appropriate institutional and implementational model for promoting agricultural insurance.

4.5 Successful Public-Private Partnership National Agricultural Insurance Programmes

International experience indicates that the most successful agricultural insurance programmes are based on PPPs where the private sector plays the leading role in product design, rating, risk acceptance, and underwriting decisions, as well as claims adjustment and settlement. Under these PPPs, the public sector plays an important role in: (i) setting the overall policy for agricultural insurance; (ii) creating an enabling legal and regulatory environment; and (iii) providing financial and operational support in key areas such as data provision and strengthening, farmer awareness and education, as well as assistance in field inspections and loss assessment through its agricultural extension departments. In Thailand, for example, the roles and responsibilities of each public and private partner were carefully appraised and then formalised in the design of the TNCIS.

Those AMS currently in the process of planning their national agricultural insurance programmes are recommended to study the Thai model and division of responsibilities for scheme implementation, along with the PPP models of South Korea, Spain (Agroseguro), Turkey (Tarsim), and the USA (FCIP).

4.6 Premium Subsidies and Government Budgets

Agricultural insurance premium subsidies, if carefully planned, can play an important role in making insurance more affordable to farmers as well as increasing uptake and penetration.

However, governments in ASEAN should be very cautious about offering free insurance (100% premium subsidies) in the start-up of any new micro-level agricultural insurance programme, since while an increase in premium subsidies may be possible over time with experience, it is very difficult to reduce them once farmers have grown accustomed to free insurance (100% subsidies).

Furthermore, with the provision of 100% premium subsidies or free insurance, farmers have no financial interest in managing their risk, potentially reducing the incentive to invest in the correct husbandry and management practices for their insured crops and livestock. Consequently, free insurance may promote moral hazard, and 100% premium subsidies should be avoided wherever possible.

Indonesia offers farmers up to 2 Ha and standard 80% insurance premium subsidies for livestock producers, but in order to incentivise medium and larger farmers to buy crop insurance, it is recommended that they consider differential premium subsidies according to their income levels and ability to pay, as adopted in Vietnam under the NAIPP. Furthermore, if governments wish to promote specific high value but potentially riskier commodities, they could consider offering differential and higher premium subsidies for these.

With the huge growth in crop insurance penetration for subsidised rice and maize in Thailand and the Philippines, and to a lesser extent in Indonesia, the cost to governments of premium subsidies has risen exponentially and this trend will continue in the future. The 2017 ASEAN Summit highlighted the point that realistic financial and budgetary planning is critical with subsidies, since the financial commitment can grow exponentially as programmes scale from pilots with thousands of farmers to full programmes reaching

millions of farmers across the country (With Covid-19 demands, governments in the three countries face significant budgetary pressures to fund these very high levels of premium subsidies.).

Furthermore, the phasing-out of the premium subsidy is often a long-term exit strategy, so farmers do not immediately feel the full cost of the insurance. Innovative distribution strategies and bundling insurance products with credit or inputs can help to decrease the financial impact on farmers. Subsidies can be terminated under pilot programmes with a finite life, but there appear to be no scaled-up national subsidised agricultural insurance programmes in the world where governments have been able to reduce and phase out premium subsidies over time. On the contrary, the tendency across the globe is for premium subsidy levels to increase over time, as is the case with ASEAN where premium subsidy levels are extremely high, especially for resource-poor farmers.

Countries like Cambodia, Lao PDR, Malaysia, and Myanmar which are only now preparing plans to introduce agricultural insurance should study very carefully the budgetary implications of premium subsidies over time.

4.7 Underwriting Principles for Generating Profits

The long-term viability of any agricultural insurance programme in ASEAN depends on its ability to scale up over time and demonstrate profitability over an insurance cycle and in the longer term. Insurers in AMS must be free to adjust the premiums on an actuarial basis (i.e., in accordance with actual underwriting results) and the Thai NCIS provides a good example of insurers reviewing their rates on an annual basis and adjusting them accordingly. In addition, insurers must be permitted to adjust the terms and conditions of cover according to experience. A good example of this is Vietnam where, due to the catastrophic disease losses incurred on the aquaculture programme between 2011 and 2013, insurers and their reinsurers excluded disease cover in the second phase.

4.8 Developing Innovative Agricultural Insurance Products in ASEAN

This report demonstrates that the large-scale micro-level (individual farmer) crop insurance programmes in Indonesia, the Philippines, and Thailand are all indemnity-based, either loss of yield MPCI or damage-based NPCI, mainly implemented on a narrow range of food crops such as rice and maize, targeting small farmers. These indemnity-based products were originally designed for large-scale commercial crop producers in HICs and are not ideally suited for small-scale and subsistence farmers due to the very high operating costs, especially the requirement to conduct farmer-by-farmer, field-by-field, loss adjustment.

Several countries are experimenting with index-based crop insurance such as WII and AYII. These products are more suited to small-scale cereal producers. It is strongly recommended that public and private sector stakeholders in all AMS incorporate R&D into these alternative index insurance products with a view to their gradual introduction over time. The current constraints to implementing AYII in AMS centre on the lack of crop production and yield data at local level on which basis such programmes are designed and rated. There is also a lack of trained staff and personnel available to measure area yields during harvest time. However, major technological advances have been made in remote sensing technology for crop area measurement, damage assessment, and area yield estimation. For example, in 2020–2021 under the RIICE initiative, Vietnam used RS technology to trigger payouts on its rice AYII programme.

Development of crop insurance products for commercial value crops and plantation exports

Insurers in AMS need to be incentivised (e.g., through data strengthening, premium subsidies, and insurance-tax incentives) to develop new crop insurance products and programmes for semi-commercial

and commercial farmers, rather than merely subsistence food crop farmers as part of each country's plans to transform and modernise the agricultural sector and reduce risk.

Livestock and aquaculture

This report shows that livestock insurance is commercially available in the Philippines (backed by 100% premium subsidies for special programme beneficiaries only) and Indonesia (all producers qualify for subsidies) while being piloted in Vietnam and Thailand. All livestock insurance provides standard individual animal indemnity-based accident and mortality cover but several programmes also offer epizootic disease protection. Aquaculture insurance is also available in the Philippines, Indonesia, and Vietnam where the NAIPP1 (2011–2013) experienced major disease-related underwriting losses.

In the short term, there are probably no options for developing commercial index-based livestock and aquaculture products, but insurers can adopt innovative technology such as microchip identification for cattle and other animals along with improved husbandry and water management in fish farms to prevent diseases.

4.9 Meso- and Macro-Level Agricultural Insurance Solutions

This study focuses on a review of the micro-level (individual farmer) crop, livestock, and aquaculture insurance programmes in AMS. To date, there have been very few initiatives to develop meso-level (e.g., for risk aggregators such as banks, value chain input and output actors) or macro-level programmes (e.g., sovereign risk finance for early disaster response or social protection for the most vulnerable farmers) for the agricultural sector. However, going forward it is recommended that all public and private sector stakeholders invest in the research and development of such products and programmes. The AgroInsurance International 2021 report contains specific recommendations for governments to consider when developing catastrophe insurance products specifically for smallholder farmers in the AMS. Furthermore, the Southeast Asia Disaster Risk Insurance Facility (SEADRIF) may offer AMS an opportunity in the future to pool catastrophe climatic risk in agriculture such as excess rain, flood, typhoon, and drought.

4.10 Distribution: Voluntary vs Compulsory Insurance and Bundling

International experience shows that many purely voluntary agricultural insurance programmes fail to achieve demand and scale up. For instance, voluntary insurance programmes covering floods, pests, and diseases often experience severe problems of anti-selection (e.g., only the farmers in the most flood-prone areas purchase cover) and moral hazard (e.g., in the case of a pest or disease outbreak farmers do not apply expensive chemical control measures but wait to claim on their policy). Between 2011 and 2015, the Thai NCIS was purely voluntary and suffered from low uptake and severe anti-selection.

For small-scale farmers, experience shows that insurance linked or bundled with other products and services (e.g., credit and inputs, and sometimes assistance with output marketing) provides a much better value proposition and farmers are generally responsive to accepting that crop insurance and credit are provided on a mandatory or compulsory basis. The large-scale crop insurance programmes in the Philippines, Indonesia, and Thailand all feature compulsory crop-credit insurance. The decision by stakeholders in Thailand to make crop insurance compulsory in 2016 for all BAAC borrowers of seasonal loans has led to a huge increase in the penetration levels and significantly reduced the problem of anti-selection. However, the decision by the BAAC to subsidise the remaining 40% of premiums for Tier 1 cover for the loanee farmers now obliged to have crop insurance is debatable since it allows them to receive free cover (100% subsidised). As an alternative, the BAAC could have agreed to reduce the rate of interest on the loan package since it would now be protected by the compulsory crop insurance cover.

Other AMS currently developing their own national agricultural insurance programmes are recommended to study the Thai compulsory crop-credit programme.

4.11 Capacity Building, Knowledge Sharing, and Regional Technical Support within ASEAN

Under this study, respondents from AMS currently developing their own agricultural insurance programmes, identified the lack of local insurance market knowledge and experience in the design, rating, and implementation of agricultural insurance as a major challenge or constraint. This is supported by findings of the earlier study by AgroInsurance International (2021) and the recommendation to establish a regional knowledge platform at the ASEAN level to exchange knowledge on best practices, building skills and capacity in agricultural insurance DRM, and developing products to build capacity and knowledge on agricultural insurance. A complementary regional Insurance Technical Support Unit (TSU) could be established. The unit would be staffed by a small group of qualified and experienced actuaries, risk modellers, and agricultural insurance specialists who could provide on-demand, in-country technical assistance, feasibility studies, product design, and rating services, as well as capacity building and training for insurers and other stakeholders.

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Annexes

Annex 1. ASEAN Respondents Participating in the Study

Country	Contact person	Designation	Organisation
Brunei	Mr. Klaus Tomalla	Chairman	Brunei Insurance and Takaful Association (BITA)
	Mr. Jack Gan	Senior Insurance Specialist	Brunei Insurance and Takaful Association (BITA)
Cambodia	Mr. Youk Chamroeunrith	CEO	Forte Insurance (Cambodia) plc
	Mr. Suy Channtharong	Assistant Vice-President	Forte Insurance (Cambodia) plc
	Mr. Som Phay	Deputy Director General	Insurance and Pension Department, General Department of Financial Industry, Ministry of Economy and Finance
	Mr. Huy Vatharo	Chairman	Insurance Association of Cambodia
	Dr. Mak Soeun	Deputy Director General	General Directorate of Agriculture (GDA), Ministry Agriculture Forestry & Fisheries (MAFF)
Indonesia	Mr. Jakub Nugraha	Head MicroInsurance and Agriculture Insurance	PT Asuransi Central Asia (ACA)
Lao PDR	Mr. Somxay Keovandy	Deputy Director	Insurance Supervision Department, Ministry of Finance
	Ms. Lattana Keobounma	International Coordinator	Insurance Supervision Department, Ministry of Finance
	Mr. Guy Apovy	CEO	Allianz General. (Also Secretary General, Lao Insurance Association)
	Mr. Piya Wongpit	Researcher	National University of Lao PDR
Malaysia	Mr. Khalid Ibrahim	Undersecretary	Insurance Development and Investment Division, Ministry of Agriculture Food and Irrigation (MAFI)
	Mr. Md. Mahamad Zakari	Chief Strategy Officer	AgroBank
Myanmar	Mr. Soe Win Thant	Managing Director	Global World Insurance Company Limited
	Mr. May Zin	Insurance Specialist	Global World Insurance Company Limited
Philippines	Mr. Geric laude	Head of Non-Life Retail	Pioneer Insurance
	Mr. Allan Paul Borres	Senior Insurance Specialist	Brokers & insurance Pools Division, Insurance Commission
Thailand	Dr. Margaret C. Yoovatana	Director	International Agricultural Affairs Group (IAAG), Planning & Technical Division, Department of Agriculture (DOA)
	Mr Chawee Lomiek	Senior Policy and Plan Specialist	International Agricultural Affairs Group, Planning & Technical Division, Department of Agriculture (DOA)
	Mr. Thanapol Treehut	Senior Technical Insurance Officer	Thai General Insurance Association (TGIA)
	Ms. Kodprapat Boontiemtad	Director, Insurance Business Development Office	Bank for Agriculture and Agricultural Cooperation (BAAC), Ministry of Finance
	Mr. Pongtorn Pornpanutsri	Assistant Director, Insurance Business Development Office	Bank for Agriculture and Agricultural Cooperation (BAAC), Ministry of Finance
	Mr. Pasut Tuomsen	Economist, Insurance Policy Division	Bureau of Policy on Fiscal Protection System, Fiscal Policy Office (FPO), Ministry of Finance
Vietnam	Ms. Vu Thi Du	Deputy Head Department	Research & Development, Underwriting Block, Military Insurance Corporation
	Mr. Hoang Xuan Dieu	Agricultural Insurance Underwriter and Claims Manager	Bao Viet Insurance Company
Singapore	Ms. Anna Chieng	Senior Client Manager, South East Asia	Public Sector Solutions, Swiss Re Asia Ltd
UK	Mr. Julian Roberts	Managing Director	Risk & Analytics (Alternative Risk Transfer Solutions), Willis Towers Watson, London, UK
Italy	Mr. Andrea Stoppa	Agricultural Insurance Specialist	Independent Consultant
UK	Mr. William Dick	Agricultural Insurance Specialist	Independent Consultant

Country	Contact person	Designation	Organisation
UK	Mr. David Gregori	Head of APAC, Agriculture	Willis Towers Watson, London, UK
NZ	Mr. Rob. Solloway	Former Head Asia-Pacific Agriculture Specialty Practice	Guy Carpenter Reinsurance Brokers
Vietnam	Mr. Nguyen Hong Ninh	RIICE Project Coordinator	RIICE

Annex 2. Country Specific Recommendations Made by AgroInsurance International 2021

The country-level recommendations made by AgroInsurance International (2021) for strengthening the agricultural insurance market are summarised as follows:

Cambodia

1. Before selecting an insurance platform for managing risks in Cambodia, elaborate on the risk profiles for major production regions and crop types.
2. Provide extensive technical assistance for agricultural insurance and disaster management.
3. A CAT-level weather index insurance programme may be the most suitable solution for addressing the disaster management challenges of smallholder farmers. Due to the rapid commercialisation of rural smallholders, Cambodian insurance companies and the national government may consider developing top-up coverage options for a CAT-level programme to better address farmers' needs. Stand-alone index/indemnity insurance solutions for SMEs and large-scale agricultural producers may also be in demand within the next five years.

Indonesia

1. Clearly define the purpose of the government's agricultural insurance programme to align it with Indonesia's general agricultural policy.
2. Consider shifting the rice insurance programme from production cost insurance to yield insurance.
3. Better data management is needed for insurers to understand the key challenges faced by farmers to gain more control over their agricultural insurance activities. Loss assessment procedures and protocols require significant development to ensure loss adjustments are accurately calculated, and insurers may require technical assistance with key aspects, such as underwriting, programme administration, and rate setting. Adherence to the recommendations related to AUTP underwriting and loss adjustment guidelines is advised.

Lao PDR

1. Elaborate the risk profiles of major crops and production regions to guide the selection of appropriate insurance solutions.
2. CAT-level sectoral weather index solutions may be a preferred option when starting an agricultural insurance programme, but more in-depth research and technical assistance are needed.
3. Technical assistance and capacity building are needed to move forward with CAT-level index and indemnity insurance solutions.

Malaysia

1. Formulate the objectives of the country's disaster management policy, focusing on major crops and livestock and the greatest risks to Malaysian agriculture.
2. Consider index solutions for starting an agricultural insurance programme.
3. Complete risk profiles for major crops, livestock, and key production areas.

4. Select options for DRM/insurance/financing based on profiles reflecting actual risk exposure.

Myanmar

Technical assistance and capacity building for the government and national re(insurer) are required if agricultural insurance and DRF programmes are to be developed further.

The Philippines

The national insurer may need to consider enhancing cover features for key crops, moving from production cost insurance to production guarantee or even income/revenue protection.

Singapore

Since the agricultural sector is small, there is no need to develop special risk solutions. It would be best to target agricultural production risks through existing DRM arrangements.

Thailand

1. Revise the coverage structure under the ongoing rice insurance programme to move from production cost insurance to yield insurance.
2. Technical assistance may be needed to revise the coverage structure of the current rice insurance programme. Capacity building and technical assistance are required to build the technical skills of insurance companies and government agencies.
3. Consider a CAT-level weather index programme to offset CAT risks more efficiently while also increasing coverage for farmers under future insurance programmes.

Vietnam

1. The government and insurers need technical assistance to strengthen their capacity to develop and manage agricultural insurance programmes.
2. Consider rice yield guarantee or yield insurance cover to enhance future programmes.

Source: AgroInsurance International (2021)

Annex 3. Review of Agriculture Insurance Provision in ASEAN

Overview of Agricultural Insurance Provision in 2021

Over the past decade, the Asia-Pacific region has experienced major growth in agricultural insurance provision with a focus on smallholder farmers and major staple food crops such as rice and maize. Governments in China and India have introduced market-based reforms to open up their former state monopoly agricultural insurance markets to competition by private commercial insurers and scale up their premium subsidy support. In 2007, China was ranked as the sixth-largest agricultural insurer in the world with premiums of USD682 million while India was outside the top ten countries with crop insurance premiums of USD132 million (Mahul and Stutley, 2010). China was the second-largest agricultural insurance market in the world during 2019 with a premium volume of USD9.2 billion followed by India with a premium volume of about USD4 billion.

Many AMS have also seen major expansion in agricultural insurance provision over this period. In 2007, the only national agricultural insurance programme to attract government premium subsidy support was

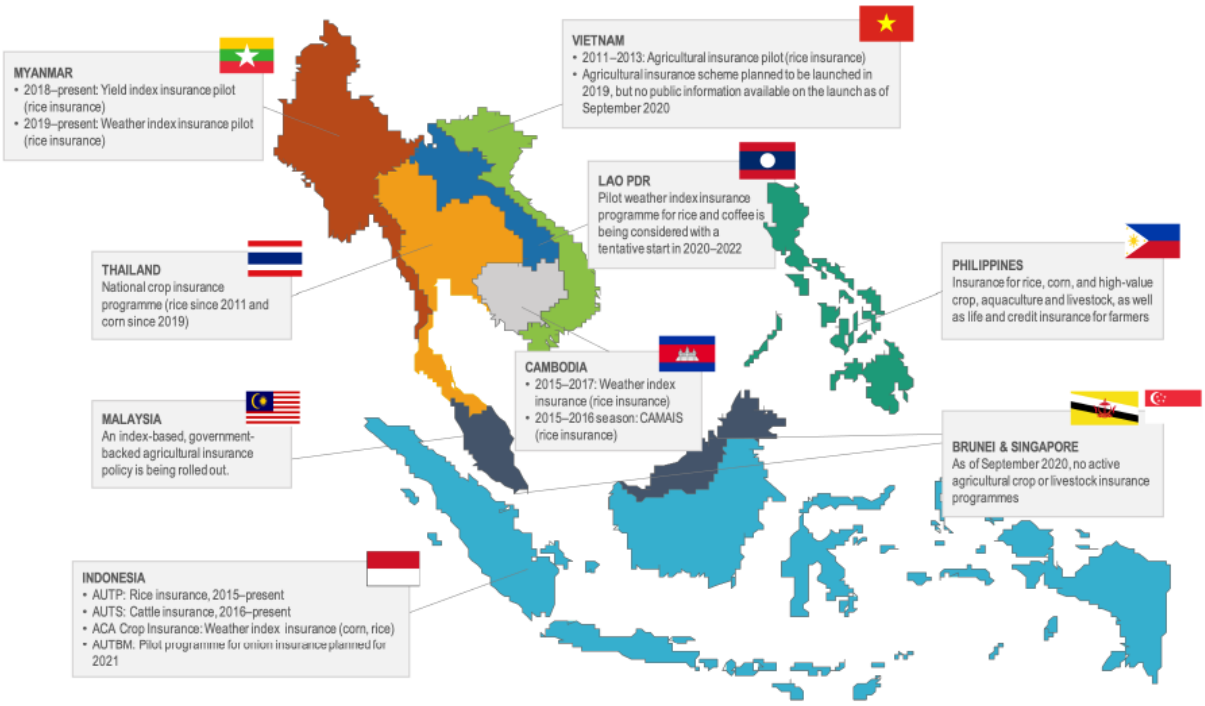
that provided in the Philippines by PCIC and this only achieved very low penetration with the coverage of 38,000 rice and maize farmers and total premium income of USD2.4 million. Other countries such as Thailand, Vietnam, Indonesia, and Malaysia had very limited private sector crop or livestock or forestry insurance provision which did not attract premium subsidies and no agricultural insurance provision at all existed in Cambodia, Myanmar, Lao PDR, Brunei, and Singapore (Mahul and Stutley, 2010, FAO, 2011; World Bank, 2011).

In 2020, the Philippines significantly scaled up its subsidised public sector agricultural insurance through PCIC, the state-owned specialist agricultural insurer. Thailand introduced a PPP in 2011 under the TNCIS for rice and maize, underwritten by a pool of co-insurers, attracting major premium subsidy support. Indonesia also introduced a subsidised crop, livestock, and aquaculture insurance in 2015.

Vietnam is now in the second phase of its pilot implementation of PPP subsidised crop, livestock, and aquaculture insurance. In Cambodia and Myanmar, private sector insurers are piloting crop insurance while in Lao PDR and Malaysia the launch of an agricultural insurance pilot programme is imminent.

There is no agricultural insurance programme in Brunei or Singapore given the small size of the agricultural sector in these two countres (Figure A3.1).

Figure A3.1. Agricultural Insurance Initiatives in AMS



Source: AgroInsurance International (2020; 2021)

The AMS agricultural insurance programmes relating to crops, livestock, and fisheries have been subject to a series of reviews (Mahul and Stutley, 2010; World Bank, 2011; FAO, 2011) and more recently, the crop insurance market has been reviewed by GIZ (2019) and AgroInsurance International (2020; 2021), as part of GIZ's support for ASEAN. This report aims to build on the recent studies and extend the review to include crop, livestock, and aquaculture, insurance provision in AMS, presenting information relating to insurance penetration and performance (results), institutional and operational frameworks, and

highlighting the key issues, challenges, and lessons learnt which have contributed to scale up or otherwise.

Crop Insurance Provision and Experience

ASEAN Member States with Commercial and Pilot Crop Insurance Programmes (2021)

The Philippines, Thailand, and Indonesia are currently operating large-scale national crop insurance programmes, heavily subsidised by their respective governments. Pilot crop insurance programmes are also being implemented in Vietnam (backed by premium subsidies) as well as Cambodia and Myanmar (no premium subsidies). Currently, there is no crop insurance in Lao PDR and Malaysia but research and development (R&D) is being conducted with a view to launching these programmes in 2022 (GIZ, 2019)[20], while no crop insurance exists in Brunei and Singapore (Table A3.1).

The large-scale (national) commercial crop insurance programmes in the Philippines, Thailand, and Indonesia are all based on traditional micro-level (individual) farmer indemnity-based insurance products. The Philippines offers multiple peril crop insurance (MPCI which is a loss-of-crop-yield policy for rice and maize crops and damage-based named peril crop insurance (NPCI) for high value crops (HVC) including fruit and horticulture. Thailand and Indonesia also operate damage-based NPCI cover for rice and maize, and rice only, respectively. Myanmar is the only other country piloting an MPCI loss of yield cover for rice. Forestry/plantation crop fire plus allied peril insurance is also available on a restricted basis in Indonesia, Malaysia, and Vietnam while in the Philippines, the PCIC offers greenhouse insurance (Table A3.1).

Index-based crop insurance has been piloted by mainly private sector insurers without any government premium subsidies or other support in various AMS for a number of years. For example, in 2007, Thailand introduced World Bank funded rainfall cover for rice, and similar pilots have been implemented in the Philippines over the past decade. Cambodia has been piloting WII since 2015. Area yield index insurance (AYII) was piloted in Vietnam between 2011 and 2013 under the first NAIPP (2011–2013) when a significant number of farmers purchased rise AYII on a voluntary basis. However, under the NAIPP Phase 2 (2019–2021), uptake of AYII has been very low and programme implementation adversely impacted by Covid-19 restrictions. The Philippines started piloting AYII for rice in Leyte Island in 2014 under a partnership with GIZ and there have been small private sector AYII pilots for maize in Indonesia and Cambodia. Very few of these mainly private sector unsubsidised crop index pilots have been able to achieve scale-up and sustainability for insurers (Table A3.1).

Table A3.1. Crop Insurance Provision in ASEAN Member States (2021)

Country	Traditional Indemnity Based					Index Based		
	Named Peril Crop Insurance (NPCI)	Multi-Peril Crop Insurance (MPCI)	Crop Revenue Insurance	Crop Greenhouse	Forestry	Area Yield Index Insurance (AYII)	Weather Index Insurance WII (Ground Stations)	Weather Index Insurance (Remote Sensing)
Brunei								
Cambodia						PILOT	PILOT	PILOT
Indonesia	COM				COM	PILOT	PILOT	
Lao PDR					R&D		R&D	
Malaysia					COM			R&D
Myanmar		PILOT						
Philippines	COM	COM		COM	COM	PILOT	PILOT	PILOT
Singapore								
Thailand	COM						COM	PILOT

[20] GIZ. 2019. Stock-taking of Country Profiles on Crop Insurance in ASEAN. https://www.asean-agrifood.org/stock-taking-asean/.

Country	Traditional Indemnity Based					Index Based		
	Named Peril Crop Insurance (NPCI)	Multi-Peril Crop Insurance (MPCI)	Crop Revenue Insurance	Crop Greenhouse	Forestry	Area Yield Index Insurance (AYII)	Weather Index Insurance WII (Ground Stations)	Weather Index Insurance (Remote Sensing)
Vietnam					COM	PILOT	PILOT	

Source: ASEAN 2021 study interviews and literature review
Notes: COM: Insurance product available on a commercial basis
PILOT: Insurance product is being implemented on a pilot basis
R&D: Insurance product is under research and development by governments/development partners/insurers

In the Philippines, the PCIC (a state-owned specialist agricultural insurer) has underwritten loss of yield MPCI cover for individual farms for over 40 years. Such insurance is unusual for smallholder rice and maize farmers cultivating less than 1.5 Ha on average[21] due to the very high unit costs of administering and implementing MPCI, including the need for field-level inspections and yield assessments at harvest time and issues of moral hazard and adverse selection. The PCIC's average premium rates for MPCI cover are expensive (about 10% in 2019 but in the past, 19% for maize and 15% for rice), reflecting the high loading the company was forced to add to its premium rates to cover operating costs.

In Thailand, the Thai National Crop Insurance Scheme (TNCIS) for rice (since 2011) and maize (since 2019) is managed by the Thai General Insurance Association (TGIA) on behalf of a coinsurance pool of 11 local private insurance companies. The TNCIS is explicitly aligned with Thailand's National Disaster Risk Management Plan for these two crops (as well as cassava, sugar cane, and rubber), providing basic compensation to affected farmers, if a national disaster is declared in a specific location of BHT1,113/Rai (USD222/Ha) for rice and BHT1,148/Rai (USD229/Ha) for maize. The TNCIS then provides top-up protection against a wide range of perils in two layers: Tier 1 premium rates were 6.8% and 10.7% for rice and maize, respectively in 2021.

Indonesia implemented a national subsidised crop insurance programme during 2015–2016. The programme *Asuransi Usaha Tani Padi* (AUTP) (Paddy Farming Business Insurance) for rice farmers is governed by Indonesian law, vesting PT Asuransi Jasa Indonesia (Jasindo), the state insurance company, the exclusive right to implement subsidised crop insurance in the country[22]. The AUTP is an indemnity-based named peril crop insurance (NPCI) policy, providing catastrophe protection to rice farmers when damage or losses caused by flood, drought, pests, and diseases exceed 75% of the crop. The Japan International Cooperation Agency (JICA) and United Nations Food and Agriculture Organization (FAO) provided Jasindo with technical assistance to develop the rice insurance scheme. The programme provides a fixed sum insurance policy for rice of IDR6 million/Ha (USD425/Ha) and carries a fixed premium rate of 3%. This low rate reflects the 75% deductible on the first loss or damage.

Table A3.2. Features of the Large-Scale Subsidised National Crop Insurance Programmes in Indonesia, the Philippines, and Thailand

Item	Indonesia	Philippines	Thailand
Name of Scheme	AUTP (Paddy Farming Business Insurance)	Philippines Crop Insurance Corporation Rice and Maize programme	Thai National Crop Insurance Top-up Scheme (TNCIS)

[21] Over the 11-year period from 2009–2019, PCIC insured an average of 1.36 Ha and 1.38 Ha per policy for rice and maize, respectively.

[22] The law of the Republic of Indonesia no. 19/2013 – Protection and Empowerment of Farmers, article 38, verse (1): 'The government and the local government in accordance with its duty assign state-owned enterprises and/or business entity belonging to the local government in insurance sector to carry out Agriculture Insurance.' Two products were released under this law for the agricultural insurance business: AUTP for rice and AUTS for cows, with the central government subsidising 80% of the premium and the remaining 20% payable by the farmers, but in reality, mostly paid by the local government.

Item	Indonesia	Philippines	Thailand
Insurance Company	PT Asuransi Jasa Indonesia (Jasindo) (state insurer)	Philippines Crop Insurance Corporation PCIC (state insurer)	Thai General Insurance Association (TGIA) on behalf of a pool of 11 Co-insurers (Private commercial insurers)
Type of Crop Insurance Product	Indemnity-based	Indemnity-based	Indemnity-based
Product Details	Named Peril Crop Insurance (NPCI) – Damage-based	Multiple Peril Crop Insurance (MPCI) – Loss of Crop Yield	Named Peril Crop Insurance (NPCI) – Damage-based
Insured Crops	Rice	Rice and Maize	Rice and Maize
Insured Perils	Flood, drought, pests, and diseases	Natural and climatic catastrophes including typhoon, drought and flood, pests, and diseases	Flood, dry spell, drought, windstorm, drop in temperature, pest and disease, fire, hailstorm, elephant attack
Coverage/Protection Provided	Constructive Total Loss (CTL) cover for damages exceeding 75% of crop sown area/expected production	Loss of crop yield, subject to a first loss deductible	Top-up Insurance Cover (2 Tiers) over and above the 'Thai Government Disaster Relief Fund'
Basis of Valuation/Sum Insured	Fixed basis IDR 6,000,000/Ha (USD 425/Ha)	Costs of Production basis: average about PHP 20,000/Ha or USD 400/Ha	Fixed Basis: Rice BHT 1,260/Rai (T1) + BHT 240/Rai (T2) or USD 300/Ha: Maize BHT 1,500/Rai (T1) + BHT 240/Rai (T2) or USD 347/Ha
Premium Costs	Fixed basis IDR 180,000/Ha (USD 12.8/Ha)	Premium rates vary by crop type and region: 2019 average about PHP 2,000/Ha, USD 40/Ha	Premium rates vary by Risk Zone: low, Medium and High Rice: Tier 1 BHT 96/Rai (USD19.2/Ha); Rice: Tier 2 Low Risk Zone BHT 24/Rai or USD4.8/Ha
Premium Rates	3.0%	2019 averages: Rice = 10.0%; Maize = 10.3%	Rice, Tier 1: 7.6%
Basis of Loss Adjustment	Damage-based; individual farmer's plots	Loss of Yield; individual farmer's plots	Damage-based; individual farmer's plots
Organisation Responsible for In-field Loss Assessment	Department of Agriculture + Jasindo Insurance Company	Department of Agriculture + PCIC	Department of Agricultural Extension (DOAE)
Government Premium Subsidy Support	80% of Rice Insurance Premium	100% for Special Programmes for subsistence farmers; 50% for PCIC Regular Rice and Maize Insurance Programme	60% Government premium for Tier 1 cover. PCIC offers additional 40% premium subsidy for loanee farmers

Source: Author, based on information provided from interviews, reports, and documents (see the sections on each country below for further details)

Government Premium Subsidy Support for Crop Insurance

Governments finance crop insurance premium subsidies in four AMS namely, Indonesia, the Philippines, Thailand, and Vietnam. Such support ranges from 60% of the commercial premium in Thailand (Tier 1 cover only) and 80% in Indonesia for programmes insured by Jasindo. In the Philippines, 50% premium subsidies are provided under the PCIC for regular rice and maize programmes and 100% for subsistence

farmers listed under the Registry System for Basic Sectors in Agriculture (RSBSA) and other special programmes of the Department of Agriculture.

In the Philippines, the PCIC has been the only insurance company authorised to offer government premium subsidies on its agricultural insurance programmes over the past 40 years. This has acted as a barrier to entry into the agricultural insurance arena by private commercial insurers due to their higher, unsubsidised premium rates. However, it should be noted that in 2021, the Insurance Commission published Advisory No. 2021-09 titled 'Guidelines on the Adoption of a Regulatory Sandbox Framework for Piloting Agriculture Insurance'. This appears to open the market up to private sector collaboration with the PCIC, the state insurer in underwriting (co-insuring), offering subsidised agricultural insurance products and programmes (Insurance Commission, 2021).

In Thailand, since 2016, rice and maize farmers taking out seasonal loans with the BAAC have been required to purchase Tier 1 crop insurance on a mandatory (compulsory) basis. As an incentive, the BAAC offers a 40% premium subsidy to its loanees such that Tier 1 crop insurance cover is free (100% subsidised). Farmers wishing to purchase Tier 2 additional voluntary cover must bear the full cost of premiums; in other words, there are no premium subsidies.

Current legislation in Indonesia only permits the state insurance company, Jasindo, to provide premium subsidies. Similarly, the PCIC, as the state insurer in the Philippines, is the only insurer eligible to offer premium subsidies on crop, livestock, and aquaculture insurance. In other words, private sector crop insurers in these countries are not eligible to receive premium subsidy support from central government for any independent crop insurance programmes they may launch.

In Thailand, government premium subsidies are only available for rice and maize top-up insurance schemes underwritten by the TGIA on behalf of private co-insurers.

Vietnam also provides premium subsidies to farmers under its pilot national AYII crop insurance programme for rice, underwritten by Bao Minh and Bao Viet joint-stock[23] insurance companies. The government provides differential premium subsidies according to farmers' income levels and their ability to afford premiums. In Phase 1 (2010–2013), premium subsidies ranged from 20% for non-poor farming households, agricultural organisations, and cooperatives, to a maximum of 100% for poor farming households – the main target of the programme. During the second phase (2019–2021), the maximum premium subsidy was reduced to 90% for poor rice farmers.

None of the mainly private sector-led crop insurance pilot programmes attract government premium subsidies, namely the Forte WII pilot programmes for rice in Cambodia; ACA AYII and WII programmes in Indonesia; GWI Myanmar (crop MPCI for rice); Card-Pioneer-Microinsurance WII programme in the Philippines and the various crop WII programmes for rice, maize, and longan in Thailand. However, in Cambodia, the Asian Development Bank (ADB) is funding premium subsidies under a rice WII programme with Forte Insurance from 2019–23.

Crop Insurance Penetration

Over the past decade, the coverage of national subsidised crop insurance programmes in the Philippines and Thailand has grown considerably.

In 2013, the Philippines government decided to provide free (100% subsidised) agricultural crop, livestock, and fishery insurance to small-scale subsistence farmers mainly registered under the Registry System for Basic Sectors in Agriculture (RSBSA)[24]. In 2019, the PCIC crop rice, maize, and high value

[23] Part private and public insurers with majority state company shareholding.

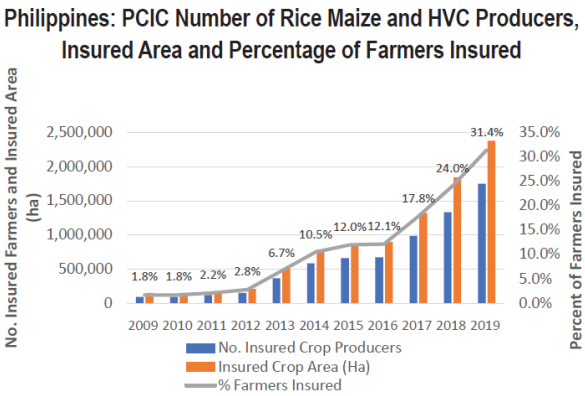
[24] The RSBSA holds a list of over 10 million subsistence farmers involved in agriculture, including crop and livestock production, aquaculture, and fisheries. This special programme fully subsidises the insurance premium of all subsistence

crop insurance programmes insured a total of 1.75 million crop producers, covering an area of 2.4 million Ha. This represents a penetration rate of 31.4% of the 5.56 million registered farming households in the Philippines according to the Census of Agriculture and Fisheries (CAF) 2012 Census data (Figure A3.2.a). However, caution must be exercised, in interpreting this figure since over 10 million subsistence farmers are registered under the separate RSBSA.

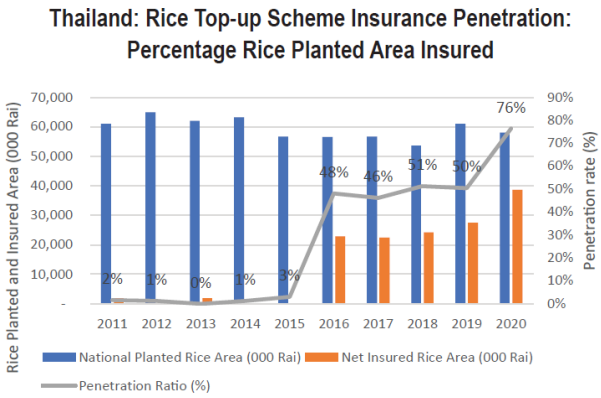
In Thailand, between 2011 and 2015, the TNCIS voluntary uptake rates for rice producers were very low. Following the government's decision in 2015 to bundle the TNCIS rice top-up insurance scheme with the BAAC rice production loans, the level of uptake and coverage has increased significantly, such that in 2020 a total of 3.87 million rai was insured in the main season, equivalent to 76% of the total planted rice area of 5.81 million rai (Figure A3.2.b). This level of penetration is similar to that experienced by developed countries which have implemented subsidised crop insurance for more than 40 years.

Figure A3.2. Agricultural Insurance Penetration Rates for the National Crop Insurance Programmes in the Philippines and Thailand

a) The Philippines



b) Thailand



Source: Author's analysis of PCIC Annual Reports and data provided by TGIA

In Vietnam, under Phase 1 (2011–2013) of the subsidised national subsidised agricultural insurance programme, Boa Viet and Bao Minh insured a total of 236,397 mainly small, poor rice farmers with a rice area of 65,297 Ha at an average of 0.28 Ha per farmer. This was a significant achievement for a two-year voluntary crop insurance pilot programme. However, under Phase 2 (2019–2020), implementation has been disrupted, first by delays in agreeing to the terms and conditions of coverage provided, and then the Covid-19 pandemic. Consequently, Bao Viet is the only insurer to have sold any rice policies in two provinces, with total sales to date of only 7,291 policies with an insured area of 1,465 Ha (Figure A3.3.a).

In Indonesia, the government has targeted (and budgeted for premium subsidies) 1 million Ha of insured rice per annum under the Jasindo AUTP programme. Since the scheme was launched in 2015, these targets have been closely approximated over the past four years. In 2020, the insured area of rice was 1,000,001 Ha (100% of target), equivalent to about 13.4% of Indonesia's net cultivated paddy field area of 7.46 million Ha[25]. During this period, an average of almost 1.2 million rice farmers have been insured under the programme each year with an average of 0.65 Ha per farmer, indicating the small number of

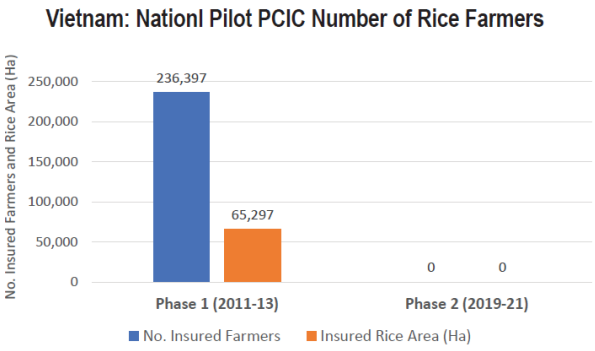
farmers and fisherfolk registered under the RSBSA for all product lines offered by the PCIC, except the term insurance packages (PCIC, 2019).

[25] https://www.statista.com/statistics/1228343/indonesia-area-for-agriculture-by-type/.

rice farmers in the country. This level of penetration represents a significant achievement since the programme is only six years old (Figure A3.3.b).

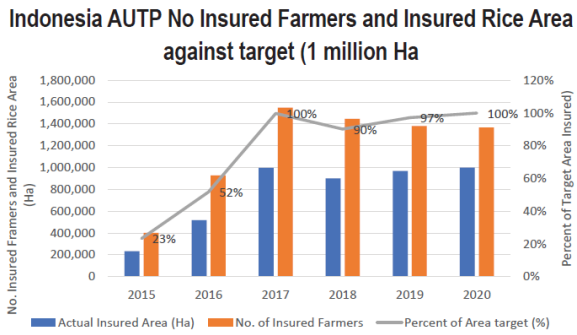
Figure A3.3. Agricultural Insurance Penetration Rates in Vietnam and Indonesia (National Programmes)

a) Vietnam



Source: Vietnam FAO-CAP (2016) and Bao Viet (2021)

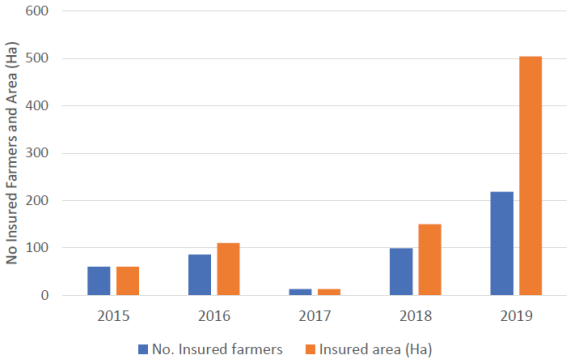
b) Indonesia



Source: Indonesia survey interviews, August 2021

Crop insurance is still at a very early stage of development in Cambodia and Myanmar, led by the private sector without any premium subsidy support from the government. In 2015, Forte Insurance (Cambodia) Plc started piloting weather index insurance WII (covering excess and deficit rainfall, and number of dry days) using ground weather stations for wet season rice. Subsequently, in 2017, with the assistance of SwissRe, it switched to a satellite soil moisture (SM) index (insuring excess/deficit SM), again for wet season rice. The voluntary pilot programme struggled to achieve adequate demand and uptake and in its five years of operation (2015–2019) only insured a total of 477 rice farmers and 838 Ha of rice (Figure A3.4). Forte has since embarked on a new project (2018–2023) to launch WII insurance for rice growers, attracting a 50% premium subsidy funded by the ADB.

Figure A3.4. Private Sector Unsubsidised Crop Insurance Penetration Rate in Cambodia



Source: Forte Insurance (Cambodia)Plc (2019)

In Myanmar, following approval from the Insurance Business Regulatory Board (IBRD) in 2018, Global World Insurance Company Ltd (GWI) recently launched a two-year pilot loss of yield policy for individual rice growers, designed to protect against excess rainfall, flood, drought, and uncontrollable pests and diseases. The policy carries a fixed 2% premium rate and is being piloted in four important rice growing regions of Myanmar (Yangon, Mandalay, Irrawaddy, and Magway). In 2021, GWI insured 37 paddy farmers, covering approximately 80.93 Ha in five villages with no reported claims to date[26].

[26] GWI interview (August 2021).

Over the past 15 years, several private sector WII crop insurance pilots introduced in Thailand, Indonesia, and the Philippines have not received any government premium subsidy support, demonstrating limited demand and uptake. Some of these have been suspended due to lack of interest from farmers, significant basis risk, limited risk coverage, and the cost of insurance premiums (GIZ, 2020).

Livestock Insurance Experience in ASEAN

Livestock insurance has a long history, dating back to the eighteenth century when groups of livestock producers in Europe formed mutual insurance schemes to insure their animals against accidental death due to natural and climatic perils, and under certain conditions, to provide cover against epidemic diseases of livestock. The World Bank survey of livestock insurance provision in 2007 showed that two-thirds of surveyed countries offered livestock insurance for beef and dairy cattle, shoats, pigs, and poultry (Mahul and Stutley, 2010). The most common form of livestock insurance underwritten by insurers and their reinsurers is a standard indemnity-based named peril accidental death policy covering natural perils such as fire, lightning, flood, landslide, and earthquakes. Sometimes additional perils can be insured such as theft, food poisoning, birth-related complications leading to death, and named diseases of livestock. In some markets, insurers also offer all-risk mortality cover including epidemic diseases, through to specialist epidemic disease/business interruption covers and bloodstock insurance. To date, only one commercial index-based livestock insurance, the Monitoring Index-Based Livestock Insurance (IBLI) programme in Mongolia, covers against extreme winter freeze events leading to the death of livestock. Furthermore, for the past 20 years, insurers have developed pasture drought satellite index insurance programmes, either based on rainfall (USA) or vegetation quality indices for commercial livestock producers (Spain, Canada, Uruguay) or nomadic pastoralists (Kenya and Ethiopia).

Only two AMS currently offering commercial livestock insurance products have achieved a measure of scale-up, namely the Philippines and Indonesia, while Vietnam has piloted livestock insurance since 2011 and Thailand started a pilot dairy programme in 2018 (Table A3.3). All these programmes are indemnity-based named peril accidental death policies, but also insure named class A epidemic diseases of livestock.

Table A3.3. Livestock (and Aquaculture) Provision in ASEAN (2021)

Country	Traditional Indemnity Based						Index Based	
	Livestock Accident & Mortality	Livestock All-Risks Mortality	Livestock Epidemic Disease/ Business Interruption	Livestock Bloodstock Insurance	Aquaculture (Fin Fish)	Aquaculture (Shellfish)	Index-based Livestock Insurance (IBLI)	Satellite (Pasture) Index Insurance
Brunei								
Cambodia					R&D			
Indonesia	COM				COM	COM		
Lao PDR								
Malaysia								
Myanmar								
Philippines	COM				COM	COM		
Singapore								
Thailand	PILOT					R&D		
Vietnam	PILOT				PILOT	PILOT		

Source: ASEAN 2021 study interviews and literature review

Notes: COM: Insurance product available on a commercial basis
PILOT: Insurance product is being implemented on a pilot basing implemented on a pilot basis
R&D: Insurance product is under research and development by governments/development partners/insurers

In the Philippines, the PCIC participated in a livestock insurance pool (Philippines Livestock Management Services Corporation [PLMSC]) between 1988 and 2005 but left to gain more control over underwriting its own livestock insurance portfolio (Mahul and Stutley, 2010). The PCIC offers named peril accidental death and disease cover for carabao, cattle, horses, swine, goats, sheep, poultry, and game fowl. During 2021, the Philippines suffered severe outbreaks of African swine fever and the government encouraged swine producers to purchase swine insurance cover from the PCIC to protect them against this highly contagious disease which can lead to catastrophic losses in the pig industry. The PCIC is authorised by the government to provide free livestock insurance to subsistence livestock producers insured under the special programmes, but under its regular programme, livestock producers are not offered any premium subsidies.

In Indonesia, the government launched a subsidised livestock insurance programme in 2016, governed by Indonesian law, granting Jasindo, the state insurance company, the exclusive right to implement this type of insurance in the country. The programme *Asuransi Usaha Tani Sapi* (AUTS) or Cattle Business Insurance was launched in 2018, covering heifers and cows more than one-year old against death due to accidents and disease, birth-related complications (calving), and theft. The policy offers 12-month cover subject to annual renewal. The insurance covers the replacement cost of the cow, subject to a maximum value of IDR10 million (about USD725) per cow. A standard (fixed) premium rate of IDR200,000 (about USD14) per cow is charged for the policy, equating to 2% for maximum coverage. This premium rate is very low compared to the international norm where rates are commonly between 5% and 10% for individual animal cover, including epidemic diseases. The AUTS livestock insurance policy is backed by an 80% government premium subsidy. The government pays a subsidy of IDR160,000 per cow while the cattle producer only pays a premium of IDR40,000 (less than USD3) per cow. The livestock insurance programme adopts standard terms and conditions of insurability: all animals belonging to the producer must be declared and insured (to minimise anti-selection and moral hazard); each animal must be clearly identified (ear tag; brand, microchip, etc); each animal must be in good health prior to cover inception as certified by a qualified veterinarian and vaccinated against named diseases. Compensation is based on the sum insured value of the animal minus any carcass salvage value[27] (It is not known if the policy includes a coinsurance [deductible] to be borne by the insured.).

Thailand launched a dairy cattle insurance programme in 2018. Unlike the Philippines and Indonesia, this programme is implemented by the private insurance sector in collaboration with the BAAC and does not attract government premium subsidies. The policy provides a series of optional cover packages, starting with basic accidental death and named disease cover restricted to foot and mouth disease, through to mastitis cover preventing the sale of milk. Basic cover provides compensation for the death per cow of BHT16,500 (USD527), rising to a maximum of BHT18,000 (USD575) for Plan 4 comprehensive cover with corresponding premium rates of 3.6 to 7.0% (Box A3.1).

Box A3.1. Thailand: Accident and Mortality Insurance for Dairy Cattle

Item	Conditions
1. Beneficiaries	Dairy cattle breeders that supply products to a dairy purchase centre (public, private or co-op)
2. Insurers – Dairy cattle's qualifications	Dairy cattle aged 18 months to 8 years old
	Register with the Department of Livestock Development (DLD) or Dairy Farming Promotion Organization of Thailand
	Healthy and no disease when applying for the insurance
	Must be certified by vet or responsible person/organisation
3. Type of insurance	All cattle in the farm need to be insured

[27] Jasindo website.

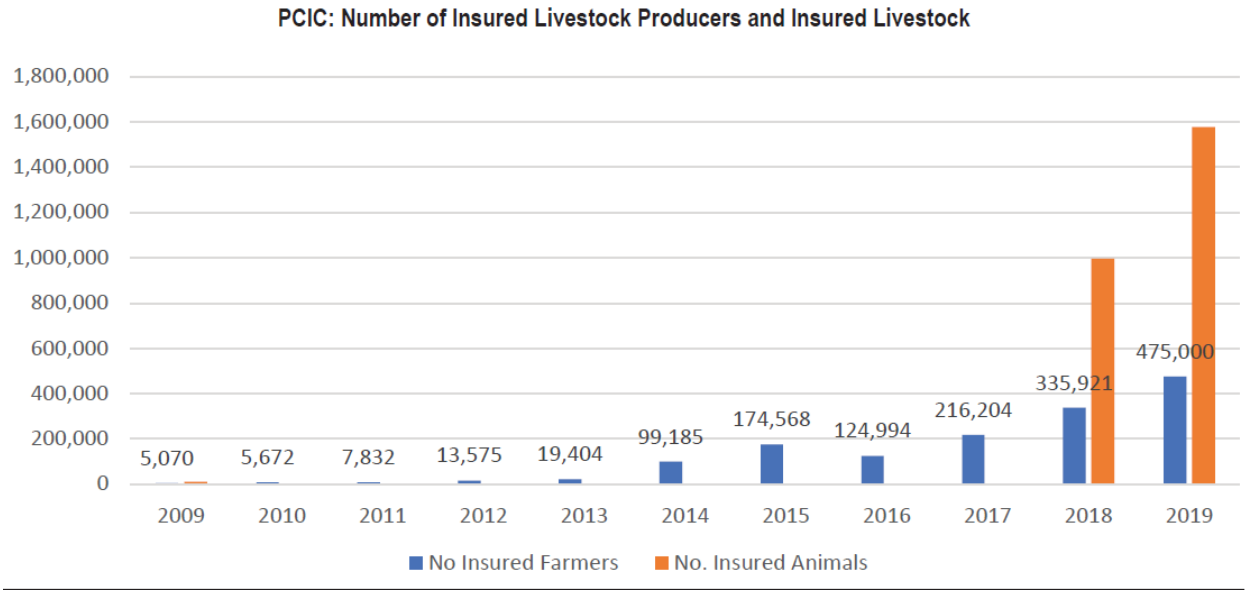
Item	Conditions			
4. Window period	30 days			
5. Insurance coverage period	1 year starting from the day applying for the insurance			
6. Insurance premium and policy				
Policy: unit (BHT/cattle/year) Insurance coverage (sum insured)	**Plan 1**	**Plan 2**	**Plan 3**	**Plan 4**
6.1.1. Died from accident – fires, lightning, floods, landslide, storms, and earthquakes	16,500	18,000	16,500	18,000
6.1.2. Died from sickness	16,500	18,000	16,500	18,000
6.1.3. Foot & Mouth Disease (FMD)	3,300	3,600	3,300	3,600
6.1.4. Cannot produce milk due to mastitis			1,650	1,800
6.2. Insurance premium				
6.2.1 Annual premium (Rate%)	600 (3.6%)	651 (3.6%)	1149 (7.0%)	1257 (7.0%)
6.2.2. Premium paid in three instalments	200	217	383	419
7. Support measures from the bank: bank will pay top-up in the case of the following:	Insurance applicants who take loans from the BAAC for dairy cattle purposes or those who deliver milk to the milk gathering centres belonging to either the government, private sector, or co-op who are BAAC loanees.			
8. Loss/Claim assessment criteria	Must be certified/assessed by vet or trained staff from the Department of Livestock Development.			

Source: BAAC (2019)

Livestock Insurance Uptake and Penetration

The PCIC offered voluntary unsubsidised livestock insurance for many years but with relatively low demand up to 2013 (less than 20,000 insured livestock producers per annum). Since 2014, the government has provided a major impetus by offering 100% premium subsidies to small-scale livestock producers registered under the special programmes including RSBSA and insured on a semi-automatic basis. Figure A3.5 shows that since 2014, livestock insurance policy sales have risen dramatically and in 2019, 475,000 livestock producers and 1.58 million livestock were insured by the PCIC. Table A3.4 shows that the bulk (97%) of insured livestock producers came under the free (100% subsidies) special programmes, while sales of unsubsidised livestock insurance to regular PCIC clients were very low (no higher than pre-2013 sales levels). The average livestock premiums charged by the PCIC in 2019 were very low at 3.3% on average for regular clients and 4.5% for special programme clients.

Figure A3.5. Uptake of Subsidised Livestock Insurance in the Philippines



Source: PCIC Annual Reports
Note: Insured livestock (only available for 2009, 2018, and 2019)

Table A3.4. Livestock Insurance Portfolio for the Philippines (2019)

Programme	No. Insured Livestock Producers	Percent of Total Producers	No. of Insured Head of Animals	Average No. Insured Animals/ Producer	Sum Insured (PHP Million)	Premium PHP Million	Premium Rate%	Premium Subsidy (PHP Million)	Percent Subsidy	Average Sum Insured Per Animal (PHP)	Average Premium PHP/Animal
Special Programmes	458,941	97%	1,410,739	3.07	11,398	511	4.5%	511	100.0%	8,079	362
PCIC Regular	16,059	3%	167,546	10.43	421	14	3.3%	0	0.0%	2,515	84
Total	475,000	100%	1,578,285	3.32	11,819	525	4.4%	511	97.3%	7,489	332

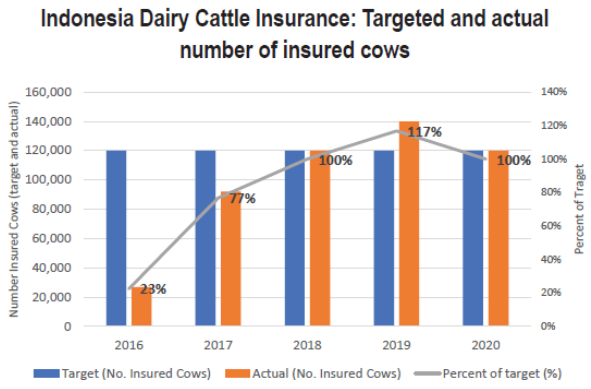
Source: PCIC Annual Report 2019

Indonesia has made an encouraging start to its subsidised AUTS programme for dairy cattle underwritten by Jasindo, and over the past three years, the company has either achieved or exceeded its budgeted targets of 120,000 insured head of livestock per year (Figure A3.6a). In Vietnam, under the NAIPP Phase 1 (2011–2013), Bao Minh and Bao Viet achieved insurance sales of 60,133 to livestock producers, covering more than 600,000[28] animals across nine provinces. However, sales have been very disappointing in Phase 2 with Bao Viet achieving only 3,483 livestock policy sales, covering a total of 4,793 insured animals (Figure A.6b).

[28] Note this figure applies to 31/03/2013 and the number of insured livestock is likely to be very much higher at the end of NAIPP Phase 1 in December 2013.

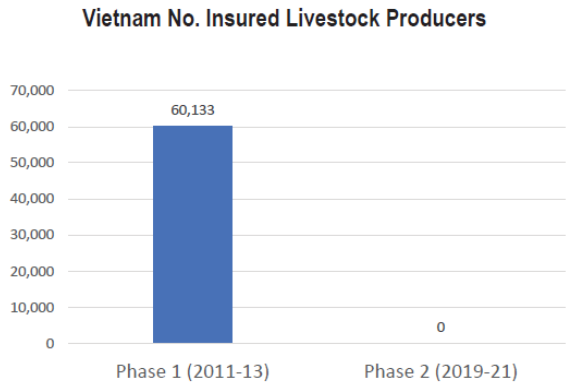
Figure A3.6: Livestock Insurance Uptake in Indonesia and Vietnam

a) Indonesia



Source: ACA Insurance company (August 2021)

b) Vietnam



Source: Bao Minh Insurance Company (August 2021)

Aquaculture Insurance in ASEAN

Aquaculture Production in ASEAN

Aquaculture production is extremely important in Asia. In 2018, Asia produced 72.8 million tons from inland, marine, and coastal fish farms, representing 89% of the total global production of 82.1 million tons. The Asian market is dominated by finfish production, followed by molluscs (22%) and crustaceans including shrimps and prawns (12%). China is the largest aquaculture producer accounting for 29.7% of the total global aquaculture production in 2018. Many AMS are leading aquaculture producers and exporters: Vietnam contributed 55% to total fish production in 2018, followed by Indonesia (43%) (capture and aquaculture), Myanmar (36%), Thailand (34%), and Cambodia (17%) (FAO, 2020). Aquaculture is a very important source of employment and export revenue in these countries. Much of the aquaculture is produced from freshwater and brackish ponds located in coastal regions and very exposed to loss by tsunamis, storm surges, saline intrusion associated with typhoons, and rises in sea levels. It is also subject to diseases.

Features of the Global Aquaculture Insurance Market

Aquaculture insurance is a specialist class of livestock cover and its availability is much more restricted than for cattle, shoats, pigs, and poultry. The specialist global aquaculture insurance and reinsurance market insures both onshore freshwater and offshore marine aquaculture, covering a wide range of finfish, crustaceans, and shellfish species. This market is dominated by a small group of reinsurers, including large general such as SwissRe, MunichRe, AllianzRe, SCOR, HannoverRe, and PartnerRe, as well as specialist aquaculture reinsurers such as Sunderland Marine and GAIC (the Global Aquaculture Insurance Consortium; a Lloyd's of London facility established to underwrite fish and shellfish). According to the World Bank (2007), aquaculture insurance was available in about a third of all countries surveyed, the largest markets being Norway, Canada, and Chile, which have extensive marine salmon insurance programmes, while the highest concentration of aquaculture insurance is in Europe, where nearly 50% of countries have this class of insurance. Conversely, with the exception of China and Japan, aquaculture insurance was relatively underdeveloped or unavailable in any Asian country or AMS at that time (Mahul and Stutley, 2010).

The international aquaculture insurance industry offers two main types of mortality cover for fish stock: (1) named peril cover and (2) all-risks cover. Named peril cover is typically restricted to natural perils

such as storms, tidal waves, and flooding resulting in the death of fish stock and usually excludes all diseases. All-risk mortality cover typically includes diseases of fish stock, pollution, algae bloom, theft, machinery breakdown, etc. Cover may also extend to loss or damage to aquaculture installations (fishponds, fish cages, and buildings), as well as the machinery and equipment (pumps, oxygenators-aerators, feeding equipment, and feed stocks). All-risk cover can be offered only at high premium rates and/or high event deductibles. All-risk aquaculture policies typically carry per event deductibles of between 10% and 30% of the total sum insured or value at the time of loss, while premium rates typically vary from about 2.5 to 10% according to the location, management, and technology levels of the insured risk and species of insured fish (World Bank, 2015).

The shrimp insurance market is much more restricted than for finfish species and mainly provided to semi-intensive and intensive commercial shrimp farms. The major issues for shrimp insurance are as follows: (1) shrimps and prawns are highly susceptible to epizootic diseases and disease outbreaks such as white spot syndrome virus (WSSV)[29] and early mortality syndrome (EMS)[30] potentially causing catastrophic losses; (2) shrimp production and yields are highly influenced by technology and management factors, especially relating to the feeding regime and disease control, and consequently, production is very exposed to moral hazard; (2) once the shrimp larvae have been sown in the ponds, it is very difficult for the insurer to objectively monitor growth and productivity levels and causes of loss, with normal mortality rates being extremely high, possibly accounting for two-thirds of all sown larvae; and (3) loss adjustment can usually be conducted only at harvest time when the actual yield can be compared with the pre-agreed insured yield and any shortfall indemnified, as such it is difficult to indemnify partial loss events.

Aquaculture Insurance in ASEAN

Aquaculture insurance is currently available on a commercial basis in both Indonesia and the Philippines for finfish and shrimps and has also been piloted in Vietnam since 2011, again for finfish and shrimps. Pilot aquaculture programmes are also under preparation in Cambodia and Thailand.

In the Philippines, the PCIC offers aquaculture insurance to fish farmers/fisherfolk against losses in growing (unharvested) fish stock in fisheries due to natural catastrophes and accidental events. Subsistence fish farmers registered under the RSBSA, and other special programmes are eligible for 100% premium subsidies, but under the PCIC's regular aquaculture insurance programme, commercial fish farmers are not eligible for any premium subsidies. The current average rate for aquaculture insurance is about 5%.

Indonesia launched a PPP pool aquaculture insurance scheme in 2017 under the law of the Republic of Indonesia no. 7/2017 – Protection and Empowerment of Fishermen, Fish Raisers and Salt Farmers; a joint initiative by the Ministry of Maritime Affairs and Fisheries, Indonesia Financial Services Authority (OJK), and General Insurance Association of Indonesia. The programme APPIK (*Asuransi Perikanan bagi Pembudidaya Ikan Kecil*), fishery insurance for smallholder fish farmers, covers five commodities, shrimp, tilapia, pangasius, milkfish, and catfish. It was launched in 2017 as a pool of eight general insurance companies led by PT Asuransi Jasa Indonesia (Jasindo). The remaining members being PT

[29] WSSV was first observed in East Asia from 1992–1993, and between 1993 and 1994 it spread to China, Thailand, Japan, Taiwan, Indonesia, India, and Bangladesh, causing severe mortality levels in penaeid shrimp, including *Penaeus monodon.* WSSV is one of at least 13 viral diseases of cultured penaeid shrimps, some of which cause relatively low levels of disease and mortality, while others are highly pathogenic and can result in 100% mortality levels in the affected shrimp. In the case of *Penaeus monodon*, the disease causes acute infection and high mortality levels within two weeks (Sangamaheswaran and Jeyaseelan, 2001).

[30] EMS was first reported in China during 2009, spreading to Vietnam, Malaysia, and Thailand. It now causes annual losses of more than USD1 billion. EMS outbreaks typically occur within the first 30 days of stocking a newly prepared shrimp pond, while mortality can exceed 70% (Global Aquaculture Alliance, 2013).

Asuransi Bringin Sejahtera Artamakmur, PT Asuransi Asei Indonesia, PT Asuransi Binagriya Upakara, PT Asuransi Central Asia (ACA), PT Sompo Insurance Indonesia, PT Asuransi Jasa Tania (Jastan), and PT Asuransi Bhakti Bhayangkara. Its key feature is that 100% of the premium is subsidised by the government. More recently, Jasindo launched a separate aquaculture programme for Shrimp Cultivation Business Insurance *or Asuransi Usaha Budidaya Udang* (AUBU) which is also governed by the same law.

In Vietnam, a pilot aquaculture insurance programme was first introduced in 2001 when the government licensed a French mutual insurance company, Groupama, to develop crop, livestock, and aquaculture insurance, although it did not pass beyond the pilot scale due to very low policy sales (Mahul and Stutley, 2010). In 2011, under the NAIPP, the Vietnamese government relaunched aquaculture insurance under named peril mortality cover, insuring catfish and shrimps against natural perils and a wide range of diseases on a voluntary basis. It was underwritten by Bao Minh and Bao Viet under Decision No. 315QD-TTg and attracted high government premium subsidies. The key features of the aquaculture policy and programmes are summarised in Box A3.2.

Box A3.2. Key Features of the Aquaculture Insurance Programme in Vietnam (2011–2013)

The aquaculture policy was an indemnity-based named peril mortality product for insuring pangasius catfish (*Pangasius bocourti* and *Pangasius hypophthalmus*); black tiger shrimp (*Penaeus monodon*) and Whiteleg shrimp (*Litopenaeus vannamei*).

Aquaculture pilot insurance was implemented in five Mekong River Delta provinces: Ben Tre, Bac Lieu, Ca Mau, Soc Trang, and Tra Vinh, covering 7,487 households between 2011 and 2013.

The natural risks covered were typhoon, flood, drought, frost, saltwater intrusion, tsunami, and a series of catastrophic bacterial and viral diseases of shrimp (listed below). The diseases covered pangasius (freshwater catfish) for liver and kidney bacterial diseases, and black tiger shrimp for white spot syndrome, yellow head disease, infectious hypodermal, and haematopoietic necrosis virus, as well as acute hepatopancreatic necrosis disease (AHPND) or early mortality syndrome. For Whiteleg shrimp, the same diseases as black tiger shrimp were covered plus Taura syndrome and infectious myonecrosis virus.

NAIPP Aquaculture Policy: Insured Diseases

Aquaculture Insured fishstock	Location (Province)	Main Insured Diseases
Pangasius (catfish)	Ben Tre, Tra Vinh	Enteric Septicaemia
Black Tiger Shrimp	Ben Tre, Bac Lieu, Ca Mau, Soc Trang, Tra Vinh	White Spot Disease, Yellow Head Disease, Acute Hepatopancreatic Necrosis Syndrome, Necrosis Disease
White-leg Shrimp	Ben Tre, Bac Lieu, Ca Mau, Soc Trang, Tra Vinh	White Spot Disease, Yellow Head Disease, Taura Syndrome, Acute Hepatopancreatic Necrosis Syndrome, Necrosis Disease, Infectious Myonecrosis Disease

The aquaculture sum insured was based on the cost of production per hectare for each species as opposed to the loss of revenue from the death of fish stock. Insured production costs included the purchase price of breeding stock and the cost of fish/shrimp feed for each production cycle.

The aquaculture pilot insurance programme attracted the highest average premium rates of all NAIPP products, reflecting the very high exposure of finfish, and especially shrimp, to epidemic diseases. The average premium rate for the aquaculture scheme was 8.4% ranging from a low average of 4% in Tra Vinh Province to a high average of 13.8% in Bac Lieu Province.

Under Government Decision No. 315QD-TTg, the pilot aquaculture insurance programme attracted premium subsidies ranging from 100% for poor households, 90% for near poor households, 60% for non-poor farmers, and 20% for organisations/enterprises.

Sources: FAO (2016); CAP-IPSARD (2017)

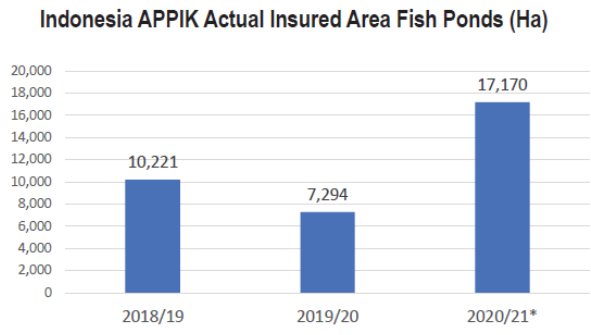
Aquaculture Uptake and Penetration

In Indonesia, the fully subsidised APPIK aquaculture coinsurance programme led by Jasindo has made steady progress since its launch in 2017, with the total insured fishpond area being 17,170 Ha in 2020/2021 (Figure A3.7a).

The PCIC commenced voluntary unsubsidised aquaculture insurance in 2011 but with relatively low demand until 2017 when the government started to offer 100% premium subsidies to small-scale aquaculture producers registered under the special programmes (including RSBSA) and insured on a semi-automatic basis. Since 2017, aquaculture insurance policy sales have risen significantly, and PCIC insured 55,475 mainly small fish farmers with a total fishpond area of 8,782 Ha at an average of 0.16 Ha per farmer (Figure A3.7b). The pattern of sales was similar to the PCIC's livestock insurance programme, in that 95% of fish farmers fell under the special programmes and received free (100% subsidised) aquaculture insurance, while demand from the bigger commercial aquaculture producers for unsubsidised insurance under PCIC's regular programme was very low (5% of total aquaculture policy sales). Average aquaculture insurance premium levels charged by the PCIC in 2019 were very low at 3.2% for regular clients and 5.2% for special programme clients (Table A3.5).

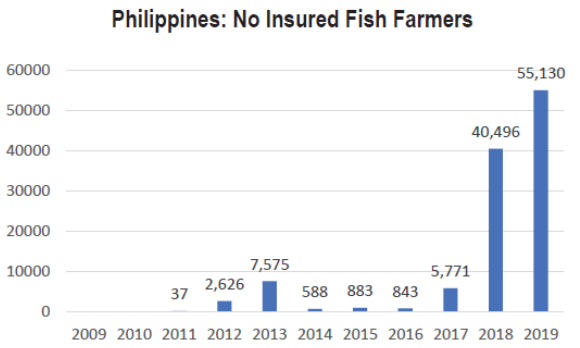
Figure A3.7. Aquaculture Insurance Uptake in Indonesia and the Philippines

a) Indonesia



Source: Asuransi Central Asia (ACA)

b) The Philippines



Source: PCIC Annual Reports

Table A3.5. The Philippines: Coverage of PCIC Aquaculture Programme (2019)

Programme	No Insured Fish Farmers	% of total farms	Insured Area (Ha)	Average Insured Area (Ha/Farmer)	Sum Insured (PHP Million)	Premium PHP Million	Premium Rate%	Premium Subsidy (PHP Million)	Percent Subsidy	Average Sum Insured Per Farmer (PHP)	Average Premium PHP/Animal
Special Programmes	52,599	95%	8,346	0.16	1,919	99	5.2%	99	100.0%	229,913	11,864
PCIC Regular	2,531	5%	436	0.17	153	5	3.2%	0	0.0%	351,429	11,200
Total	**55,130**	**100%**	**8,782**	**0.16**	**2,072**	**104**	**5.0%**	99	**95.3%**	235,946	11,831

Source: PCIC Annual Report (2019)

In Vietnam, the pilot aquaculture programme offering natural and disease mortality cover proved popular with fish farmers in the five pilot provinces with 7,487 policies covering 5,803 Ha being issued. However, the programme performed badly due to the widespread outbreak of disease, mainly in insured shrimp farms, with the insurers/reinsurers incurring significant underwriting losses (see below for further details). Consequently, insurers/reinsurers were not willing to grant aquaculture disease cover in Phase 2 (2019–2021) with cover restricted to natural perils only. In response, fish farmers have declined to purchase

aquaculture insurance with zero sales being recorded to date in Phase 2.[31] This represents a major setback for all the stakeholders, insurers, and reinsurers involved.

Underwriting Performance of Agricultural Insurance Programmes in ASEAN

For agricultural insurance programmes to be financially sustainable in ASEAN, they must: 1) demonstrate growth over time and achieve scale-up to enable insurers to cover their operational and administrational costs; 2) achieve a geographical spread of risk; and 3) cover the farmers' claims and O&A costs out of premiums received over an insurance cycle (usually 7–10 years), and generate reasonable profits (return on equity) for shareholders of commercial insurance companies. This section presents the underwriting results of the crop, livestock, and aquaculture programmes in ASEAN, and highlights the cost burden of premium subsidies on governments.

The Philippines

Over the past 11 years, the PCIC agricultural insurance programme has expanded significantly on the back of government premium subsidies, covering a total of 2.3 million crop, livestock, and fishery producers in 2019 (41% of all farms as per the 2021 census) (Figure A3.8a). The same year, PCIC also insured a total crop area of 2.4 million Ha, with protection (sum insured) of PHP72.5 billion (USD1.4 billion), generating total premiums of PHP5.6 billion (USD108 million), with paid claims of PHP4.1 billion (USD79.2 million) and an average premium rate of 7.7%.

Between 2009 and 2019, the PCIC achieved sound underwriting results with a long-term average loss ratio (LTALR)[32] of only 59%, the worst year being 2011, when a loss ratio of 88% was incurred, one of the lowest on average for any national agricultural insurance programme in the world, underwriting crop MPCI and disease cover for livestock and aquaculture (Figure A3.8b). In terms of individual programmes, the rice MPCI programme has incurred the highest claims over the past 11 years with an LTALR of 77%, followed by maize (LTALR 60%), HVC (LTALR 16%), livestock (LTALR 10%), and fisheries/aquaculture (LTALR 19%). Given the extremely high exposure of the Philippines to natural/climatic/biological disasters, the very low claims on the HVC, livestock, and fishery/aquaculture programmes are most unexpected.

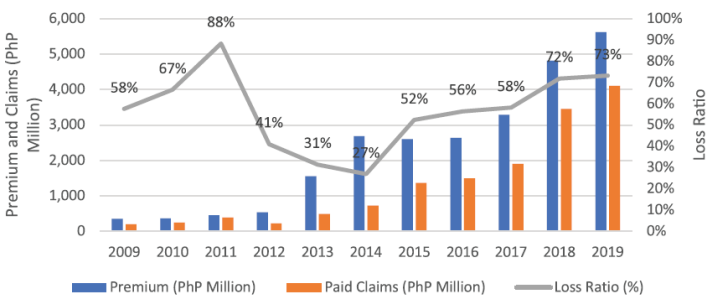
However, the increasing cost of the PCIC's premium subsidies represents a major fiscal commitment for the government as the programme expands each year. In 2019, premium subsidies amounted to PHP5.5 billion (USD106 million) or 96% of total premiums, while over the past 11 years, the total cost to the government (and PCIC) has reached PHP22.4 billion (USD460.1 million).

[31] Bao Viet (August 2021).

[32] The LTAR is calculated as the sum of the total claims paid over all years, divided by the total premiums, and expressed as a percentage. This compares with the simple average loss ratio more generally used by actuaries, representing the average actual loss ratio each year.

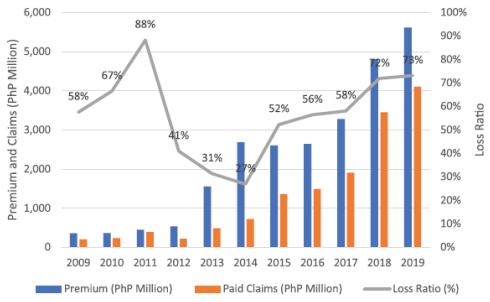
Figure A3.8. The Philippines: PCIC Agricultural Insurance Penetration and Underwriting Results (crops, livestock, and fisheries) 2009–2019

a) Penetration Rate (%)



Source: PCIC Annual Reports

b) Annual Premium and Claims and Loss Ratio



Source: PCIC Annual Reports

Thailand

The TNCIS has now been operational for 10 years, scaling up significantly since the government decided to link Tier 1 crop insurance with crop-credit provision by the BAAC on a compulsory basis. It is the largest agricultural insurance programme by premium volume in ASEAN. In 2020, the programme insured a total of 3.4 million rice and maize farmers, covering an area of 41.6 million rai (6.6 million Ha, equivalent to a penetration rate of 76% of the cultivated area for these crops) with a total sum insured of BHT51 billion (USD1.6 billion), generating premium income of BHT3.5billion (USD112.7 million). The year 2020 was exceptionally good with below-average claims of BHT0.5 billion (USD17.7 million) and a loss ratio of only 16%. Over the past five years, the TNCIS has insured 10.8 million rice and maize farmers on 22.1 Ha of cultivated area and paid out claims worth USD325 million.

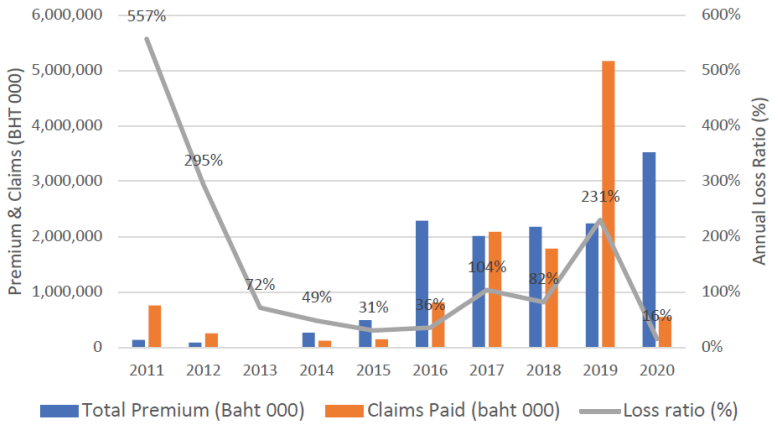
Main season rice and maize production in Thailand is very exposed to natural disasters, with the floods in 2011 and 2012 causing huge losses for insured rice farms with loss ratios of 557% and 295%, respectively. It should be noted that these losses were accentuated because the programme was very small and highly concentrated in flood-prone areas. The major drought and flood experienced by Thailand in 2019 resulted in claims on 5 million Ha of insured rice and maize with paid claims amounting to BHT5.2billion (USD167 million and an annual loss ratio of 231%) (rice loss ratio 233%; maize 456%)[33] (Figure A3.9).

During the 10 years the TNCIS has been operational, the overall rice and maize LTALR at the end of 2020 stands at 89% (84% for rice, 10 years; 125% for maize, 2 years). Thai co-insurers, and their reinsurers, are likely to be operating at a loss (defined as the combined ratio including paid claims + operating expenses >100%) due to the 2019 drought and flood claims and will be hoping for several good years with below-average claims such as 2020, to return to profitability.

Given the major scale and spread of risk achieved by the TNCIS, the programme results in recent years have been much less volatile (as measured by the annual loss ratio) than in the past, and while severe losses were experienced in 2019, the programme remains financially stable. Despite several pool co-insurers electing to withdraw from the scheme, the remaining 11 and their reinsurers remain fully committed going forward.

Figure A3.9: Thailand: TNCIS Underwriting Results for Rice (since 2011) and Maize (since 2019)

[33] Due to the severe losses, average premium rates for rice and maize were increased by 8% and 173%, respectively in 2020.



Source: Author's analysis of results data (Aon 2019; TGIA 2021)

Indonesia

The AUTP rice insurance scheme in Indonesia has made steady progress in achieving scale and sustainability since its launch in 2015, and more recently in 2020, insuring 1.4 million rice farmers with premium volume of IDR180 billion (USD12.8 million). Over the past six years, AUTP has insured 7.7 million rice farmers and 4.6 million Ha of rice or 77% of the target of six million Ha (1 million Ha per year). Over this period, the programme has generated total premiums of IDR832billion (USD59.8 million) against total paid claims of IDR488 billion (USD35.2 million) equivalent to an LTALR of 58.7%. There have been no catastrophes during this period and the annual loss ratio has oscillated between 45% and 83% in the worst year (Table A3.5). On this indemnity-based smallholder rice scheme, it is likely that Jasindo is targeting an average loss ratio of no more than 65% over time, to cover the high operating costs of in-field loss assessment, etc. Therefore, the AUTP underwriting results are favourable at the end of 2020. Conversely, the results of the AUTS cattle insurance programme show more volatility and in three of the past five years, the programme has incurred an underwriting loss with loss ratios of between 163% (2017) and 214% (2016) and an overall LTARL of 119%. The APPIK aquaculture programme has also operated at an underwriting loss over the past four years with an LTALR of 102% (Table A3.6). Both programmes are currently much smaller than the AUTP rice scheme and have yet to reach scale and sustainability.

It is not possible to report the actual government expenditure on premium subsidies over the past six years. However, on the understanding that the AUTP and AUTS programmes attract an 80% premium subsidy and the APPIK programme a 100% subsidy, it is estimated that in 2020 the total premium subsidy budget for the three programmes amounted to IDR171.2 billion (USD12.1 million), with the total cost of premium subsidies over the past six years being IDR760 billion (USD54.6 million). As the knowledge and understanding of agricultural insurance by farmers increases along with demand, the cost of premium subsidies will rise accordingly.

Table A3.6. Indonesia: Underwriting Results for National Crop, Livestock, and Fishery Programmes

Year	AUTP Rice Insurance			AUTS Cattle Insurance			APPIK Aquaculture Insurance		
	Gross Premium (IDR Million)	Claim Paid (IDR Million)	Loss Ratio (%)	Gross Premium (IDR Million)	Claim Paid (IDR Million)	Loss Ratio (%)	Gross Premium (IDR Million)	Claim Paid (IDR Million)	Loss Ratio (%)

2015	42,000	125	0.3%						
2016	93,330	55,500	59.5%	5,405	11,577	214.2%			
2017	179,820	149,640	83.2%	18,435	30,048	163.0%	1,485	666	44.9%
2018	161,730	73,160	45.2%	24,000	22,223	92.6%	2,988	3,278	109.7%
2019	174,820	82,870	47.4%	28,038	15,565	55.5%	2,851	2,798	98.1%
2020	180,000	126,880	70.5%	24,000	39,363	164.0%	7,974	8,908	111.7%
Total	**831,700**	**488,175**	**58.7%**	**99,878**	**118,777**	**118.9%**	**15,297**	**15,649**	**102.3%**

Source: Various

Vietnam

Under NAIPP Phase 1 (2011–2013), a total of 304,017 insurance policies were sold on a voluntary basis by Bao Minh and Bao Viet, the bulk of which, (236,397; 78%) were purchased by rice farmers, followed by livestock producers (60,133; 20%) and aquaculture producers (7,487; 2%) (Table A3.7).

The total sum insured under the NAIPP1 (2011–13) was VND7,748 billion (USD387.4 million) with corresponding premiums of VND394 million (USD19.7 million) at an overall average rate of 5.1%, ranging from 3.1% for livestock to 7.6% for aquaculture. In terms of liability, aquaculture insurance accounted for 37% of the total sum insured (TSI), generating 55% of total premiums, followed by livestock and rice.

The paid claims under NAIPP1 (2011–13) amounted to VND702 billion (USD35.1 million) with an implied loss ratio of 178%. The rice and livestock insurance programmes exhibited favourable underwriting results in the pilot years with loss ratios of 21% and 16%, respectively. However, severe losses were experienced on the aquaculture programme, due mainly to epidemic disease outbreaks in shrimps and pangasius[34] resulting in large-scale mortality. The aquaculture insurance programme accounted for 95% of all paid claims and experienced a very high loss ratio of 307% (Table A3.7).

A premium subsidy budget of about VND358 billion (USD70 million) was established for the NAIPP pilot period from 2011–2013 (Quang Hong, 2010), but as indicated by Table A3.7, the actual total premiums amounted to only VND99.8 billion (USD19.7 million). Therefore, only a fraction of the premium subsidy was utilised during this phase.

Table A3.7. Vietnam Underwriting Results NAIPP1 (2011–2013)

Sector/ Class of Insurance	Insured Commodity	No. of Insured Households	Insured Area (Ha)	Sum Insured (VND Billion)	Premium (VND Billion)	Average Premium Rate (%)	Claims (VND Billion)	Loss Ratio (%)
Crop	Rice	236,397	65,297	2,151	92	4.3%	19	21%
	Percent Total	78%	92%	28%	23%		3%	
Livestock	Buffalo, dairy cow, pig, poultry	60,133			84	3.1%	13	15%
	Percent Total	20%			21%		2%	
Aquaculture	Pangasius, Black tiger shrimp, Whiteleg shrimp	7,487	5,803		218	7.6%	670	307%
	Percent Total	2%	8%		55%		95%	
Total	Total	304,017	71,100		394	5.1%	702	178%
	Percent Total	100%	100%	100%	100%		100%	

Source: FAO (2016) based on MoF (2014)

[34] Shrimp mortality was mostly caused by AHPND. In pangasius, the major causes were liver and kidney bacterial diseases (FAO, 2016).

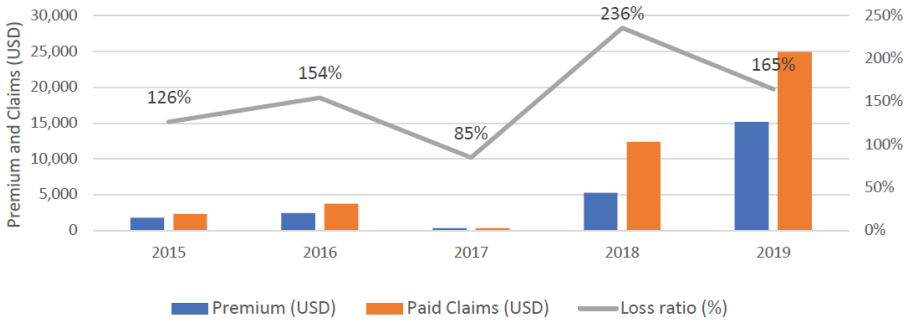
On completion of the two-year NAIPP pilot, government premium subsidy support ended, and the programme was suspended, leaving insurers and their reinsurers with substantial underwriting losses. There then followed nearly six years of discussions between public and private stakeholders on ways to strengthen the programme. Over this period, two detailed programme reviews were carried out by FAO (2016) and CAP-IPSARD (2017).

The programme was finally relaunched in 2019[35] as NAIPP2 (2019–2021). However, policy sales did not commence until 2020 with implementation being severely hindered by Covid-19 and a lack of voluntary demand by farmers. Figures provided by Bao Viet in August 2021 show a total of 10,775 policy sales to rice farmers insured under the AYII programme and livestock producers insured under the named peril accident and disease policy, equating to a TSI of VND111 billion (USD4.8 million), premiums of VND4.6 billion (USD198,000), and an implied average rate of 4.1%. To date, minor claims have been incurred on the rice programme and the loss ratio stands at 3.2%. While it is not possible to report separate figures for Bao Minh, it is understood that sales have been restricted to a small number of livestock policies. After the major investments made by all stakeholders in Phase 1 (2011–2013), the uptake and penetration of agricultural insurance under NAIPP2 (2019–2021) has been very disappointing with minimal sales of the rice AYII and livestock policies and zero sales of the aquaculture policy. Since diseases of shrimps and catfish have now been excluded from the aquaculture policy, it appears that this cover is no longer of interest to farmers.

Cambodia

In Cambodia, Forte's wet season rice WII and SM index insurance pilots failed to achieve adequate sales and risk spread. Negative underwriting losses were experienced in four of the five years since its implementation with an overall LTALR of 175% (Figure A3.10).

Figure A3.10. Cambodia: Forte WII/SM Index Underwriting Results for Wet Season Rice [1]



Source: Forte Insurance (Cambodia) Plc

Note: [1] Cover from 2015–2017 was a weather index insurance (WII) policy insuring against excess and deficit rainfall and number of dry days. From 2018–2019 cover was a satellite soil moisture (SM) deficit cover insuring against excess and deficit SM

Key Achievements, Issues, and Challenges to Implementing Agricultural Insurance in ASEAN

Key Achievements

The agricultural insurance programmes in Indonesia, the Philippines, and Thailand have scaled up considerably in the past 10 years and are now reaching large numbers of farmers. Scale-up has been

[35] Decision No. 22/2019/QD-TTg on the implementation of agricultural insurance support policy.

enabled by massive government premium subsidy provision in these countries and compulsory linkage between insurance and crop credit. In Thailand, Tier 1 top-up cover was made compulsory for BAAC loanees in 2016. One major benefit of moving from voluntary insurance to compulsory is that anti-section (the tendency for rice farmers located in high flood risk areas to purchase insurance while farmers in low flood risk areas decline to do so) has been greatly reduced. In the Philippines, PCIC cover for MPCI rice and maize farmers is also directly linked to crop-credit provision.

Thailand has developed an interesting PPP Pool model to crowd in private sector insurers. These pools have many potential advantages including the economies of scale from sharing the costs of product design and scheme implementation through to the higher retention levels achievable and the benefits of risk pooling and cheaper reinsurance. Coinsurance pools are also a feature of several agricultural insurance programmes in China and, at an international level, the national PPP agricultural insurance programmes in Spain (Agroseguro Pool) and Turkey (Tarsim Pool).

Although Vietnam, Cambodia, and Myanmar are learning from their pilot experiences, to date, they have not achieved sustainable scale-up. However, Lao PDR and Malaysia are still trying to identify the most appropriate legal and regulatory framework and institutional and operating model(s) to promote and implement agricultural insurance, while debating on the support roles of governments and the types of crop insurance products to start with.

Key Issues and Challenges Identified by Survey Respondents

The survey questionnaire related to issues and challenges faced by different stakeholders such as farmers, insurers, value chain actors, and the government, and their potential impact on the implementation and scale-up of agricultural insurance. The responses were divided into four scales: not an issue at all, low challenge, medium challenge, and high challenge. This part of the survey was completed by public and/or private sector interviewees in six of the eight countries either with existing or planned agricultural insurance programmes. The results are summarised in Table A3.8.

Farmer-Level Challenges: Lack of knowledge and awareness of agricultural insurance was identified by 75% of respondents as a major (high) challenge, followed by the farmer's lack of trust in insurance (high challenge, 50% of respondents) and affordability (high challenge for 50% of respondents). There were notable differences in responses across countries regarding the status of agricultural insurance development. In Lao PDR, Malaysia, Cambodia, and Vietnam where no agricultural insurance provision exists, or it is at the pilot stage, farmers' lack of knowledge and trust were considered to be a major challenge. Conversely, in Indonesia and Thailand, where crop and livestock insurance programmes are well established and most farmers conversant with purchasing crop insurance cover, issues of knowledge and trust pose less of a challenge to implementation and scale-up. While these questions are subjective, they highlight the issues commonly identified in the insurance literature as factors resulting in low demand for agricultural insurance by farmers and the importance of investing in insurance awareness and financial literacy campaigns when new agricultural insurance programmes are introduced.

Insurance Company Challenges: The risky nature of agricultural insurance/lack of profitability was stated by 71% of respondents as being the major challenge to persuading insurers to invest in this class of business. Whereas 57% of respondents identified a lack of knowledge in designing and implementing agricultural insurance as being a major challenge. Similarly, 57% identified the lack of trained field staff to conduct inspections and loss adjustment as major challenges. In this latter context, the main subsidised crop insurance programmes in the Philippines, Thailand, and Indonesia are indemnity-based, relying on in-field damage assessment. It is notable that no respondent identified a lack of access to reinsurance as a major constraint.

Financial and Other Service Institutions: In many Asian countries (including India, China, the Philippines, and Thailand), public sector financial institutions (FIs) lending to farmers play a key role in distributing bundled crop-credit insurance. A third of respondents (37%) identified a lack of interest by FIs in bundled credit and insurance as a major constraint, including Lao PDR and Cambodia where agricultural insurance is very new and FI's have yet to see the potential benefit. However, in Thailand, where the BAAC plays a central role in distributing and administering bundled rice and maize top-up crop insurance to their loanee farmers, this is an unexpected response.

Challenges Facing Governments: The lack of public sector budgets to fund investment (data strengthening, awareness creation, premium subsidies, etc.) was identified by 29% of respondents as being a major constraint to the implementation and scaling up of agricultural insurance in their countries. Similarly, 29% also identified a lack of knowledge and understanding among government departments as a major constraint. Covid-19 has presented a significant challenge to governments in all AMS, with the budget for crop insurance premium subsidies being capped in both Indonesia and Thailand for 2020–2021.

Table A3.8. Key Challenges to Implementing and Scaling up Agricultural Insurance in ASEAN

SECTOR/ ACTOR	CHALLENGE	Lao PDR (Private)	Lao PDR (Public)	Malaysia (Public)	Cambodia (Private)	Vietnam (Private)	Indonesia (Private)	Indonesia (Public)	Thailand (Private)
Farmers	**Lack of knowledge & awareness**, Agricultural insurance	H	M	H	H	H	H	M	H
	Lack of trust in insurance	M	H	H	H	H	M	M	M
	Affordability – premium rates are too high/expensive	H	H	H	H	M	M	L	M
	Lack of access to Insurance companies/ their staff/products	M	M	M	M	NA	H	M	M
	Lack of demand by farmers	H	M	L	M	H	Not an issue	M	M
	Other (specify)								
Insurance Companies	Agricultural insurance is **not a priority** class of business	H	H	L	M	M	H	NA	Not an issue
	Agricultural insurance is **too risky/unprofitable** to invest in	H	H	H	L	M	H	NA	H
	Lack of **knowledge** and **technical capacity** to design and rate agricultural insurance products/programmes	H	M	H	H	M	H	NA	L
	Lack of **quality data** to design and rate indemnity-based and index- based agri-insurance products	H	M	L	M	M	H	NA	H
	High costs of data acquisition (crop production and yields; weather data)	H	M	Not an issue	H	L	H	NA	M

SECTOR/ ACTOR	CHALLENGE	Lao PDR (Private)	Lao PDR (Public)	Malaysia (Public)	Cambodia (Private)	Vietnam (Private)	Indonesia (Private)	Indonesia (Public)	Thailand (Private)
	Lack of **distribution networks** to promote /market agricultural insurance to farmers	M	M	L	M	L	H	NA	M
	Lack of field-based **trained loss inspectors** and loss adjusters	H	M	M	H	NA	H	NA	H
	Lack of support from government	H	L	L	M	M	H	NA	L
	Lack of access to reinsurance at affordable price	N/A	L	M	M	L	Not an Issue	NA	L
	Lack of investment by Insurers into research and development new agri-insurance products						H		
Financial Institutions/ Other Value Chain (VC) actors	**Lack of interest** in bundled crop-credit insurance	H	M	L	H	M	M	M	H
	Agricultural insurance products **do not meet risk transfer needs** of VC actors	H	M	Not an issue	M	M	Not an issue	M	H
	Government focus on public sector FI's and not Cooperatives or other agencies trusted by farmers						H		
Governments	Agricultural Insurance is **not a priority policy area**: leave to private sector	M	L	L	Not an issue	H	M	Not an issue	NA
	Lack of knowledge of the role of agricultural insurance	M	H	L	M	H	M	Not an issue	NA
	Prefer other DRFA (Disaster Risk Financing for Agriculture) Instruments	M	M	M	M	NA	Not an issue	Not an issue	NA
	Lack of budget to allocate to promotion and support of agricultural insurance	H	H	M	M	H	M	Not an issue	NA
	Other (specify)								

CODE (index):

NA	Not answered
Not an Issue	Is not a challenge/is not an issue
L	Low challenge
M	Medium challenge
H	High challenge

Source: ASEAN Survey of Respondents (2021)

Annex 4. AMS – Vietnam: Government Natural Disaster Relief Programmes

1. Decision 719/QD-TTg of Prime Minister about policies on supporting to prevent and solve the problems of livestock diseases
2. Decision 49/2012/QD-TTg Adjusting clause 3 in the Decision 142/2009/QD-TTg about institutions and policies on supporting seeds, livestock, and aquacultural seeds to recall production activities in the regions which incur serious loss from catastrophe or diseases
3. Decree 67/2007/ND-CP about policies on assisting vulnerably households
4. Bilateral Circular 24/2010/TTLT-BLDTBXH-BTC of the Labor Invalid Society Ministry and Finance Ministry on policies for Assisting Vulnerable Households
5. Decree 13/2010/ND-CP adjusting to Decree 67/2007/ND-CP of the Ministry of Labor, Invalid, and Social Assistance – society approved

Source: Dao and Tai (2014)

Annex 5. AMS – Country-Level Agricultural Insurance Questionnaire

Country: ……

Note: In order to complement the virtual meetings, please take time to complete the questions in Tables 1–5 below and email these back to charlesstutley@charlesstutley.com. Your assistance in this survey is greatly appreciated.

Name of Respondent/Position/Organisation: _____

Date Questionnaire Completed: _____

Table 1. Types of Agricultural Insurance Products and Programmes Currently Marketed by Insurers (please complete)

CROP INSURANCE	Available (yes/no)	If Yes, Commercial scale, C, or pilot scale, P	LIVESTOCK INSURANCE (equine sp. bovine sp. pigs, sheep, goats, poultry)	Available (yes/no)	If Yes, Commercial scale, C, or pilot scale, P
INDEMNITY BASED			**INDEMNITY BASED**		
Named Peril Crop Ins. (NPCI)			Named peril accident and mortality		
Multi-peril Crop Ins. (MPCI)			All-Risks Mortality		
Crop Revenue Insurance (loss yield and price)			Epidemic disease/Business Interruption		
Other (specify)			Bloodstock		
INDEX BASED			**INDEX BASED**		
Weather Index Ins. (WII)			Index-based Livestock Insurance (IBLI)		
Satellite Index Insurance (crops)			Satellite Index Insurance (pasture)		
Area Yield Index Insurance (AYII)			Other (specify)		
Other (specify)					
			OTHER		
OTHER			**Aquaculture Insurance (finfish)**		
Greenhouse (crops and buildings)			**Aquaculture (shellfish)**		
Forestry/Plantation Ins. (fire/wind, allied perils)			**Bee Insurance**		

Table 2. Agricultural Insurance Results (Please complete table for applicable classes, crops, livestock, fisheries, and other, for the last five years.) (according to years of operation and data availability)

Crop Insurance (Please add currency and state whether numbers are in thousands or millions.)						
Year	**No. Insured Farmers**	**Insured Area (Ha)**	**Sum Insured (_____)**	**Total Premium (_____)**	**No. Claims**	**Total Claims (_____)**
2016						
2017						
2018						
2019						
2020						
Livestock Insurance (Please add currency and state whether numbers are in thousands or millions.)						
Year	**No. Insured Livestock producers**	**No. Insured Animals**	**Sum Insured (_____)**	**Total Premium (_____)**	**No. Claims**	**Total Claims (_____)**
2016						
2017						
2018						
2019						
2020						
Other Agricultural Insurance (e.g., aquaculture, greenhouse, forestry) (Please add currency)						
Year	**No. Insured Producers**	**Insured Area (Ha)**	**Sum Insured (_____)**	**Total Premium (_____)**	**No. Claims**	**Total Claims (_____)**
2016						
2017						
2018						
2019						
2020						
Total Agricultural Insurance programmes (Please add currency etc.)						
Year	**Total No. Insured Producers/Policies**		**Total Sum Insured (_____)**	**Total Premium (_____)**	**No. Claims**	**Total Claims (_____)**
2016						
2017						
2018						
2019						
2020						

Table 3. Key Challenges to Implementing and Scaling up Agricultural Insurance. (Please tick X in one box only for each of the challenges listed, according to their degree.)

SECTOR/ACTOR	CHALLENGE	NOT AN ISSUE	LOW CHALLENGE	MEDIUM CHALLENGE	HIGH CHALLENGE
Farmers (crop, livestock, aqua)	**Lack of knowledge and awareness** in agricultural insurance				
	Lack of trust in insurance				
	Affordability – premium rates are too high/expensive				
	Lack of access to insurance companies /their staff/products				
	Lack of demand by farmers				
	Other (specify)				
Insurance Companies	Agricultural insurance is **not a priority** business class				
	Agricultural insurance investment is **too risky/unprofitable**				
	Lack of **knowledge** and **technical capacity** to design and rate agricultural insurance products/programmes				
	Lack of **quality data** to design and rate indemnity-based and index-based agricultural insurance products				
	High costs of data acquisition (crop production and yields; weather data)				
	Lack of **distribution networks** to promote/market agricultural insurance to farmers				
	Lack of field-based **trained loss inspectors** and loss adjusters				
	Lack of support from the government				
	Lack of access to reinsurance at an affordable price				
	Other (specify)				
Financial Institutions/Other Value Chain (VC) Actors	**Lack of interest** in bundled crop-credit insurance				
	Agricultural insurance products **do not meet the risk transfer needs** of VC actors				
	Other (specify)				
Governments	Agricultural Insurance is **not a priority policy area**: leave to the private sector				
	Lack of knowledge concerning the role of agricultural insurance				
	Prefer other DRFA (Disaster Risk Financing for Agriculture) instruments				
	Lack of budget for the promotion and support of agricultural insurance (e.g., data strengthening; farmer awareness and financial literacy; premium subsidies; financial support for loss adjusting, etc.)				
	Other (specify)				

Table 4. What are the key requirements for the future development and scale-up of agricultural insurance? (Please state Yes/No and give details.)

KEY NEEDS	Yes / No	Details
1. Policy framework		

2.	Legal and regulatory strengthening		
3.	Farmer awareness and education		
4.	Data strengthening for agricultural insurance		
5.	Capacity building for insurers		
6.	Assistance for product design and rating		
7.	Design of institutional and operational systems and procedures		
8.	Introduction of digital technology for marketing/promotion/policy issuance, premium collection/claims payments, etc.		
9.	Strengthened financial/other support from government		
10.	Access to reinsurance		
11.	Other specify		
12.	Other specify		
13.	Other specify		

Table 5. What roles can ASEAN play in assisting the governments/insurers to scale up agricultural insurance in future? (Please list top five roles in order of priority/need/importance.)

Order of importance	Role of ASEAN in supporting the implementation and scale-up of agricultural insurance in Thailand
1st	
2nd	
3rd	
4th	
5th	