Final Report

Policy Recommendations on Integrating Crop Insurance into Crop Sector-Related Policies of ASEAN, and Enhancing Synergies and Cooperation Among Related ASEAN Bodies to Crop Insurance

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This report is prepared by Roehlano M. Briones, GIZ Consultant. It is based in part on Report entitled: *Desk Review: A Study on Integrating Crop Insurance into Crop Sector Related Policies of ASEAN, and Synergies and Cooperation among Related ASEAN Bodies to Crop Insurance*, prepared by Norman R. Cajucom, GIZ Consultant.

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List of Abbreviations

AADMER	ASEAN Agreement on Disaster Management and Emergency Response
AEC	ASEAN Economic Community
AFCC	ASEAN Multi-sectoral Framework for Climate Change: Agriculture, Fisheries, and Forestry Toward Food Security
AIFS	ASEAN Integrated Food Security
AIIF	ASEAN Integrated Insurance Framework
AMAF	ASEAN Ministerial Meeting on Agriculture and Forestry
AMS	ASEAN Member State
ASCC	ASEAN Socio-Cultural Community
ASEAN	Association of Southeast Asian Nations
ATWGARD	ASEAN Technical Working Group on Agriculture R&D
BAAC	Bank for Agriculture and Agricultural Cooperatives
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung
CLTI	Credit and Life Term Insurance
CRN	Climate Resilience Network
CSA	Climate-Smart Agriculture
FAF	Food, Agriculture, and Forestry
FAO	Food and Agriculture Organisation of the United Nations
GIU	Geographic Insurance Unit
GIZ	Gesellschaft für Internationale Zusammenarbeit
M&E	Monitoring and Evaluation
NCI	Non-crop Insurance
NDVI	Normalised Difference in Vegetative Index
OECD	Organisation for Economic Cooperation and Development
PCIC	Philippine Crop Insurance Corporation
PDR	People's Democratic Republic
PPP	Private-public partnership
R&D	Research and Development
RSBSA	Registry System for Basic Sectors in Agriculture
RTW	Regional Technical Workshop
SAS	Sustainable Agrifood System
SEARCA	Southeast Asian Regional Centre for Graduate Study and Research in Agriculture
SME	Small and Medium Enterprise
SOM	Senior Officials' Meeting
SPA-FS	Strategic Plan of Action – Food Security
USA	United States of America
USD	United States Dollar
VND	Vietnamese Dong
WB	World Bank
WIBI	Weather-Index Based Insurance
WTO	World Trade Organisation
WTP	Willingness-to-Pay

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Executive Summary Report

(Final Draft)

I. Rationale for and scope of crop insurance

1. Weather is a serious concern in Asia, especially in Southeast Asia. Based on the Global Climate Risk Index (2017), three ASEAN Member States (AMS) are listed as among the worst affected countries in terms of extreme weather events over a 20-year period (1998-2017): Myanmar (3rd), Philippines (5th), and Vietnam (9th). Thailand meanwhile ranked 10th worst-affected country worldwide in 2017. With the continued global warming and forecasted increase in extreme weather events due to climate change, agricultural production worldwide will suffer losses and will lead to food shortages, increase in food prices, and adverse impacts on livelihood of agricultural producers and other stakeholders in ASEAN and other countries. Crop insurance as a risk transfer mechanism can help lessen the losses of agricultural producers. Indemnity paid by the insurer to the farmer for agricultural losses can be used to finance and continue the farming activities of the insured. Insurance encourages lenders to provide loans for farming activities thereby ensuring continued food production.

2. Insurance products have historically arisen as a free market offering in many countries, to cover various types of property damage, personal injury, illness, or death. However, a purely free market approach has rarely worked in the case of traditional, indemnity-based crop insurance. Instead, government intervention was usually required in order to expand and sustain crop insurance. Worldwide, since the start of the Uruguay Round of the World Trade Organisation (WTO) in 1986, premium volumes have increased on average by 8 percent annually up to 2004, with the growth rate doubling between 2004 and 2013. The acceleration has been attributed to rising commodity prices; expansion in government subsidies; and growth of agricultural insurance in emerging economies, particularly China. In recent years there has been considerable interest in index-based insurance to lower administrative cost and attenuate the problems of moral hazard and adverse selection.

II. Crop insurance in AMS

3. The **s**tatus of crop insurance in the ten AMS are as follows: i) No programme: Brunei Darussalam, Lao PDR, and Singapore; ii) Preparation phase: Cambodia (implemented a pilot project); Malaysia and Myanmar (in preparation for pilot project); and iii) Implementing an established crop insurance programme: Indonesia, Philippines, Thailand, and Vietnam.

4. **Pilot programmes.** In *Cambodia*, a pilot crop insurance for rice was initiated in 2015 by Forte, a private insurer. Insurance was indexed to the weather. There was no subsidy from government; rather the company itself provided the subsidy. In 2017, Forte conducted a second pilot, charging a premium but still at a low rate. Uptake was quite low, at 60 farmers for the first pilot (Hazell et al, 2017), up to 200 in the second pilot.

5. Meanwhile, in *Malaysia*, fire insurance for plantations has been available for a long time; however, insurance for other types of peril other crops remains unavailable. The government of Malaysia is now planning to introduce a crop insurance programme. Lastly in *Myanmar*, consultations were conducted with the permission of Union Minister of Ministry of Agriculture, Livestock and Irrigation (MOALI) in late 2018 organised by the Department

of Agriculture, MOALI in cooperation with Myanmar Rice Federation (MRF) and Myanmar Agriculture Network (MAN), under the Grow Asia Country Partnership.

6. **Indonesia.** The government insurance programme is indemnity-based, multiple peril (pest, disease, other natural disasters). The cover is up to USD 448 per ha. The premium is USD 13 per ha, of which only one-fifth is paid by the farmer, and the rest by the government. As of April 2017, the state programme covered 600,000 ha. (or 1.3. percent of total area of arable land and permanent crops). Total claims amount to USD 5 million, equivalent to a 64 percent loss ratio. (Nugraha, 2017).

7. **Philippines.** In 2017, the Annual Report of the Corporation (PCIC, 2018) divides crop insurance programmes into Regular and Special. Regular programmes cover paddy rice and corn; high value crops; livestock; fisheries/aquaculture; non-crop insurance (NCI), which covers agricultural assets (machineries, equipments, boats, etc.); and credit and life term insurance (CLTI) for farmers and fisherfolk. Under the regular programmes, only paddy rice and corn are subsidised. Coverage is cost of production inputs, up to a ceiling amount per ha. The premium is a percentage of the cover, adjusted based on the perils covered and risk profile of the farmer; for medium risk farmers under natural disaster cover, the premium is 7.95 percent, of which the government pays 4.2 percent, while the farmer pays 3.73 percent (53 percent subsidy).

8. Meanwhile Special programmes involve 100 percent subsidies, of which the largest by far is the Registry System for Basic Sectors in Agriculture (RSBSA). The RSBSA programme is targeted at subsistence farmers and fisherfolk listed in the registry. In 2017, PCIC made a total of Php 1,936.897 million in pay-outs. It collected Php 3,364.961 million in premiums, for a loss ratio of 58 percent.

9. **Thailand.** The scaled up version of crop insurance in Thailand was the National Rice Insurance Programme, begun in 2011. The programme provides a pay-out of THB 1,111 per rai (THB 6,944 per ha) for natural disasters, or about 25 percent of average production cost. Farmers pay a premium of just THB 625 per ha (matched by an equal amount of public sector subsidy). By end-2016, 1.57 million farmers planting 4.4 million ha participated in the scheme (corresponding to 22 percent of rice farmers and 47 percent of harvested area). In 2015, its premiums reached THB 500 billion, with a loss ratio of just 30.8 percent.

10. **Vietnam.** Government implemented a pilot agricultural insurance programme in 2011-13 in partnership with private companies and other stakeholders. The programme was implemented in 20 provinces with targeted subsidy, i.e. 100 percent for poor households, 80 percent of the near poor, and 60 percent for other households. The product is an area-yield indexed insurance covering crops, as well as livestock and agriculture. The programme eventually reached 304,016 households, of whom 77 percent were poor, 15 percent were near-poor, and the balance were other households. Aggregate coverage was VND 7,744 billion, of which indemnities equalled VND 701.8 billion. Total premiums collected was VND 394 billion, for a loss ratio of 178 percent. This high ratio is due to the non-crop component of the programme; for rice, the loss ratio was only 21 percent (Dang et al, 2017). Following the implementation of the pilot programme, agricultural insurance policy was established by law, i.e. Decree No. 58/2018.

11. At the regional level, various ASEAN framework documents address themes for which crop insurance may make a key contribution. Crop insurance receives explicit treatment in official Working Group or Network documents which are nonetheless endorsed by ASEAN at a Ministerial level, such as the ASEAN Ministerial Meeting on Agriculture and Forestry (AMAF) which supervises the Senior Officials' Meeting (SOM-AMAF).

12. **Assessment**. Based on the 10-Phase Guide, the AMS are in different phases launching a nationwide crop insurance program. The four AMS with established crop insurance programmes have already completed all ten phases; Cambodia is in the first two phases; Malaysia and Myanmar is only in the first phase; while Brunei and Lao PDR have yet to initiate the phases.

13. Efficient implementation of a crop insurance program requires considerable amounts of data and information for proper design. As with any insurance product, estimates of expected loss, differentiated by crop, location, type of peril, season, etc. is essential for proper pricing and to avoid adverse selection.

14. There exists a trade-off between level of subsidy and degree of insurance penetration of crop farmers. Crop insurance is or was significant in Indonesia, Philippines, Thailand, and Vietnam, where government is allocating or had allocated a sizable budget. Aside from increasing the number of farmers benefited, an important advantage of increasing penetration is addressing adverse selection.

15. Lack of clarity of rules, and misallocation of roles between private and public sector actors, can reduce the effectiveness of crop insurance. The experience of Vietnam in its pilot crop insurance program suggests that implementation was constrained by lack of connection and coordination between government and insurance companies.

16. Nationwide launching of crop insurance usually focuses initially on staples and a few major crops, while incrementally expanding crop coverage. On the other hand, if the program focuses on agricultural development, then it should focus on key agricultural products which have the risk level acceptable for both farmers and insurers.

17. Alternative methods of loss estimation have their respective advantages and disadvantages; though new technologies are most promising for increasing program efficiency. Of the established crop insurance programs, one (Vietnam) is area-yield index-based. Indonesia is indemnity-based, and so is Thailand indemnity-based, though in the latter, declaration of state of calamity is required to trigger pay-outs. The Philippines is also largely indemnity-based, though it has piloted area-based yield index and weather index-based schemes. The index-based approaches did tend to reduce administrative cost, and makes it possible to achieve high penetration rates among smallholders (for whom transaction cost may otherwise be prohibitive). In Vietnam however, basis risk made the insurance product somewhat unpopular among farmers, though it may have kept down the loss ratio in the case of paddy rice. Nonetheless studies have shown that basis risk can be minimised, based on geographic information unit (GIU), allowing basis risk to be scaled up throughout developing country agriculture; new technologies (such as remote sensing) can also increase accuracy of loss estimation.

18. Pricing structure and other features can be designed to ensure efficient utilisation of the insurance subsidy. For instance, crop insurance in the Philippines follows differentiated pricing according to risk profile, season, and type of peril. Such a practice can greatly attenuate adverse selection and reduce the loss ratio.

19. An effective crop insurance program is one that invests heavily in socialisation of farmers, ensuring that agents are well-versed in the product being marketed. One difficulty though is that AMS may lack staff; in Indonesia, government staff were too few to undertake adequate socialisation of the program.

20. Protection of the poor is increased by targeting of crop insurance subsidy. Among the established crop insurance programs, government was found to cover an average of 55-80% of the premium, while farmers pay the rest. In the Philippines and Vietnam, farmers from the

poorest group were given a 100% subsidy. Targeted subsidies together with means testing is helpful in extending social protection to the marginalised group, with 77 percent of crop insurance beneficiaries classified as poor.

III. Recommendations

Regional cooperation

With respect to regional cooperation, two recommendations are stated:

1) Articulate agricultural insurance explicitly in key ASEAN documents; and

2) Continue active regional collaboration in cross-country sharing of information and experience in relation to agricultural insurance.

21. The integration of agricultural insurance may commence with the drafting of an ASEAN Regional Framework on agricultural insurance The Framework should draw together related themes of risk transfer, climate resiliency, social protection of smallholders, and food security.

22. Aside from incorporation in formal declarations and documents, concrete regional initiatives may continue to be pursued. Currently the ASEAN SAS offers one such venue, continuing the initiative from the ASEAN CRN; however, there needs to be a permanent platform to pursue collaboration.

Recommendations for countries at initial phases of implementation

3) Conduct need assessment, feasibility study, and pilot programme to assess whether crop insurance is a viable strategy for addressing risk in agriculture.

23. Cambodia, Lao PDR, Malaysia, and Myanmar, are in the process of implementing consultations and need assessment. Based on the Ten Phase Guide, the next set of activities relate to Feasibility Study; these countries may opt to undergo the succeeding Phases, namely National policy creation, Regulatory framework, Product design, and Socialisation. They may also opt to proceed directly with a small-scale pilot insurance programme. A large-scale pilot is also recommended (as was done in Vietnam) given the limited scope for risk transfer in a small-scale pilot.

Recommendations on pricing and product design

4) Establish data collection systems and studies related to weather, loss patterns, and behaviour of farmers in managing agricultural risk.

24. A database and data collection system is a prerequisite for a sustainable crop insurance programme. AMS should explore the application of new information technologies such as remote sensing.

5) Firm up state policy the size of the annual subsidy for crop insurance.

25. The policymaker opting for subsidy should attempt to maximise penetration at the given budget, and ensure that social protection via crop insurance is the best use of taxpayer funds, based on the following:

- Crop insurance may be a viable social protection mechanism that provides alternative means for financial assistance to farmers in the event of disaster;
- Smallholders may obtain greater access to credit and receive an incentive to adopt new technologies by acquiring crop insurance.

6) Introduce pricing structure that aligns premiums with expected costs.

While a single pricing scheme is administratively simpler, such a scheme is prone to an adverse selection problem. Pricing structure should avoid under-pricing or overcharging the premium across different locations, seasons, and crops.

7) Adopt targeted subsidy favouring poorest and most vulnerable smallholders.

Targeting is a highly recommended strategy that allows the same amount of subsidy to expand penetration of over a wider range of smallholders.

8) Consider incorporating incentives towards climate-smart agriculture practices for farmers participating in crop insurance.

Crop insurance creates an opportunity to leverage risk transfer to incentivise behaviours conducive to climate resiliency. For instance, in areas prone to drought, premium discounts (for premium-paying farmers) or higher pay-outs (for highly subsidised farmers) can be extended for adoption of drought-tolerant crop varieties, or adoption of water-saving practices such as alternate wet-and-dry irrigation.

9) Explore index-based insurance to cover smallholder farmers.

Index-based insurance may be more suitable than traditional indemnity-based when reaching a wider group of smallholders. Such a product should of course be properly designed, as discussed previously: i.e. the index should track as closely as possible actual, farm-level shocks, to minimise basis risk. The development of GIUs based on clustering of farms under similar production conditions is one way to address basis risk.

10) Adopt an incremental introduction of insurance products, beginning from those easily designed, to those with more complex design requirements.

A nationwide crop insurance program may be initiated with an indemnity-based program, as this is easier to implement and explain to farmers. After this form of program has been tested and rolled out, pilot implementation of an index-based program may commence.

Recommendations on programme implementation

11) **Deliver crop insurance service via modality of private-public partnership under a framework of transparent regulations and well-defined roles for the partners**

For private partners and farmers to participate fully in the program, a clear framework of rules and regulations for crop insurance must be provided by government. Allocation of roles should be made clear from the outset to avoid operational ambiguity.

12) In implementing a scaled up programme, deploy well-trained agents to conduct socialisation of intended beneficiaries.

Proper socialisation of farmers requires that government extension agents, or private insurers' agents, or staff of lending agencies, be properly trained for explaining risk transfer and the benefits – and costs - of agricultural insurance.

13) Invest in a strong monitoring and evaluation (M&E) system for feedback and continuing revision of the program.

With a well-developed M&E system, systematic information can be collected towards real-time tracking of progress towards programme objectives, in terms of programmatic inputs, outputs, outcomes, and impact. This in turn will serve as basis for period program review and recalibration as needed.

Policy Recommendations on Integrating Crop Insurance into Crop Sector-Related Policies of ASEAN, and Enhancing Synergies and Cooperation Among Related ASEAN Bodies to Crop Insurance

1. INTRODUCTION

1.1 Background

Risk management against natural disasters and climate hazards through crop insurance can reduce the vulnerability of smallholder farmers from weather-related production risks and promote their economic development thus contributing to national and regional food security. The Association of Southeast Asian Nations Sustainable Agrifood Systems (ASEAN SAS) Project is being implemented by ASEAN Member States (AMS) and the ASEAN Secretariat, in cooperation with German Development Cooperation (GIZ), and funded by the German Federal Ministry for Economic Cooperation and Development (BMZ). The Project aims at developing regionally coordinated policies and strategies for sustainable agriculture and the food sector contributing to food security and competitiveness of the region. In 2017, the project was extended to include crop insurance, until December 2019.

1.2 Objectives

The overall objective of the assignment is to formulate policy recommendations to integrate crop insurance into crop sector related policies of ASEAN, and recommendations on enhancing synergies and cooperation among related ASEAN Bodies to crop insurance. The development of policy recommendations to integrate crop insurance into the crop sector related policies of ASEAN and recommendations on enhancing synergies and cooperation among related ASEAN Bodies to crop insurance involves a review of previous documents, as follows:

- First and Second Regional Technical Workshop (RTW) on Crop Insurance in ASEAN in 2017 and 2018, respectively;
- The Tenth and Eleventh Steering Committee Meeting of the ASEAN SAS in 2017 and 2018, respectively;
- Documents of ASEAN sectoral bodies and subsidiaries bodies relevant to crop insurance, including: ASEAN Cooperation in Food, Agriculture, and Forestry (FAF); ASEAN Committee on Disaster Management (ACDM); and ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA)
- Desk Review: A Study on Integrating Crop Insurance into Crop Sector Related Policies of ASEAN, and Synergies and Cooperation among Related ASEAN Bodies to Crop Insurance, by Norman Cajucom, Consultant, GIZ

1.3 Organisation

To address the objective, the rest of the Report will tackle the following topics: scope and rationale for crop insurance, with focus on ASEAN (Section 2); past and existing initiatives on crop insurance of AMS, as well as existing ASEAN frameworks that relate broadly to crop insurance (Section 3); analysis of policy gaps both at the national and regional level (Section 4); and lastly, recommendations to integrate crop insurance into the crop sector related policies of ASEAN, as well as to enhance synergies and cooperation among ASEAN bodies to crop insurance (Section 5).

2. CONCEPTUAL FRAMEWORK AND GLOBAL EXPERIENCE

2.1 Need for crop insurance

Insurance is contingent claim involving a pay-out in case of an undesirable outcome or *loss*; to receive this promise of a pay-out over a given period, the insured must make a certain payment, called a *premium*. Demand for insurance arises in the presence of risk, i.e. the buyer of insurance is one who faces some likelihood of loss, and is willing to pay a premium to receive an offsetting pay-out.

Crop insurance is a special case of agricultural insurance, which can cover damage to products other than crops, i.e. tree plantation, agricultural assets/equipment, livestock, poultry, fish stocks, breeding stocks, etc. Worldwide, agriculture is highly vulnerable to risk, hence the need for risk management instruments, such as crop insurance. The Asia and Pacific region in particular, including its agriculture sector, is highly exposed to various natural disasters, i.e. typhoons, floods, landslides, droughts, earthquakes, volcanic eruptions, and tsunamis compared to other world regions (FAO, 2011). The agriculture sector in general, and crops in particular, may benefit greatly from risk transfer provided by insurance.

Weather is a serious concern in Asia, especially in Southeast Asia. Based on the Global Climate Risk Index (2017), three AMS are listed as among the worst affected countries worldwide in terms of extreme weather events over a 20-year period (1998-2017): Myanmar (3rd), Philippines (5th), and Vietnam (9th). Thailand meanwhile ranked 10th worst-affected country worldwide in 2017 (Eckstein, Hutfils, and Winges, 2019). Over the past 20 years, Philippines, Thailand, and Vietnam, had been struck by at least one catastrophic flood. Such disasters have had severe impacts on domestic agriculture, threatening regional food security and development objectives (OECD, 2018).

With the continued global warming and forecasted increase in extreme weather events due to climate change, agricultural production worldwide will suffer losses and will lead to food shortages, increase in food prices, and adverse impacts on the livelihood of agricultural producers and other stakeholders in ASEAN and other countries. Crop insurance as a risk transfer mechanism can help lessen the losses of agricultural producers. Indemnity paid by the insurer to the farmer for agricultural losses can be used to finance and continue the farming activities of the insured. Insurance encourages lenders to provide loans for farming activities, thereby ensuring continued food production.

2.2 Types of crop insurance

Traditionally, crop insurance has only been defined in terms of quantity of crop suffering physical damage, that is insurance is **indemnity-based**. Insurance may cover only one source of damage (e.g. flood), in which case it is single peril; more generally, crop may insurance may cover multiple perils (e.g. droughts or floods).

Beyond traditional insurance, there is a variety of insurance products that are not indemnity-based. Insurance may be **index-based**, i.e. payments are based on the value an index. Index-based insurance takes a variety of forms, such as:

- *Area-yield index*: realized yield of an area
- *Crop weather index*: based on a meteorological observation, such as cm of rainfall
- *Normalised Difference in Vegetation Index (NDVI)*: based on vegetation data collected by remote sensing

A survey conducted by World Bank in 2008 show that indemnity-based insurance, whether named peril or multiple peril, is the most widespread type of insurance (Table 1). Index-based insurance was found only in a few countries (Canada, Brazil, India, Malawi, Mexico, USA). The row of the Table pertains to crop revenue insurance, which incorporates a pay-out not only for a crop loss, but also the broader financial loss from a deviation between market price and an expected price.

Table 1: Classification of Agricultural Insurance Products

Type of insurance	Pay-out	Availability
Indemnity-based		
Named peril	Percentage of damage	Widespread
Multiple peril	Yield loss	Widespread
Index-based		
Area-yield	Area-yield loss	USA, India, Brazil
Crop weather index	Weather index pay-out scale	India, Mexico, Malawi, Canada, USA
NDVI index	NDVI Index pay-out scale	Mexico, Spain, Canada
Crop revenue	Yield and crop price measure	USA

Source: Iturrioz (2009).

An insurance contract can be regarded as a contingent financial asset that itself can be the subject of insurance. That is, a loss claim itself inflicts a loss on the insurance provider. This loss in turn can also be insured; a second-order insurance on the pay-out for insurance buyers is called **reinsurance**. A company that provides reinsurance agrees to share in the pay-out for the original claimant, in exchange for a premium (say, a share in the claimant's premium) from the original insurer.

2.3 Provision of crop insurance

Supply for insurance arises when there exists a payer willing to promise an acceptable compensation for the loss, in exchange for a relatively small and non-refundable premium upfront. The field of study that evaluates risk is called *actuarial science*; the risk evaluation forms the basis of valuation or pricing of insurance products.

Insurance products have historically arisen as a free market offering in many countries, to cover various types of property damage, personal injury, illness, or death. Crop and livestock insurance has a long history: insurance schemes were offered in Germany as early as the late 1700s. By the late 19th century many European countries as well as the United States had crop insurance schemes, mainly against hail (Reyes et al, 2017). However, a purely free market approach has rarely worked in the case of traditional, indemnity-based crop insurance. Instead, government intervention was usually required in order to expand and sustain crop insurance.

In economic theory, market failure is deemed a standard feature in insurance. The two main reasons for market failure in insurance are the following:

- *Moral hazard:* the presence of insurance itself offsets the incentive to avoid risk, raising the probability of loss.

- *Adverse selection:* when buyers are differentiated by risk profile (e.g. high risk versus low risk), but insurers set a common premium, low risk.

If the failures are sufficient severe, an insurance product may end up not being offered at all, i.e. there is no positive premium at which the market achieves a balance between supply and demand. In the United States for example, crop insurance was first offered by private companies in 1899; this initial effort failed, as did subsequent initiatives. These failures have been attributed to the following: i) price risk was covered, in addition to harvest risk; ii) there was inadequate dispersion of risks across space; iii) there was insufficient data for sound actuarial pricing; iv) adverse selection owing to improper timing of sales and wide zoning of rates.

It was only when the public sector entered the crop insurance market, offering government-funded subsidies, was there a sustained provision of the service (Gardner and Kramer, 1986). In other wealthy countries, agricultural insurance has typically been established conditional on government support together with premium subsidies. By 2007, more than 100 countries were implementing crop insurance programmes (Mahul and Stutley, 2010).

Insurance has also been of great interest for policymakers in developing countries, as an instrument to address risk facing smallholder agriculture. Similar to other settings, programme cost has usually been high; although the financial capacity of developing country governments is obviously less than their developed counterparts (Hazell, Pomareda, and Valdes 1986).

Worldwide, since the start of the Uruguay Round of the World Trade Organisation (WTO) in 1986, premium volumes have increased on average by 8 percent annually up to 2004, with the growth rate doubling between 2004 and 2013. The acceleration has been attributed to rising commodity prices; expansion in government subsidies; and growth of agricultural insurance in emerging economies, particularly China.

In recent years there has been considerable interest in index-based insurance to lower administrative cost and attenuate the problems of moral hazard and adverse selection (Glauber, 2017). There are nonetheless some limitations of index-based insurance. A key barrier is *basis risk*, i.e. the risk of a difference between pay-out and actual loss experienced by the farmer. That is, farmers may receive a lower or even no pay-out even when their crop is damaged; on the other hand, farmers with little or no damage may receive a relatively generous pay-out (Greatrex et al, 2015).

2.4 Theory of change

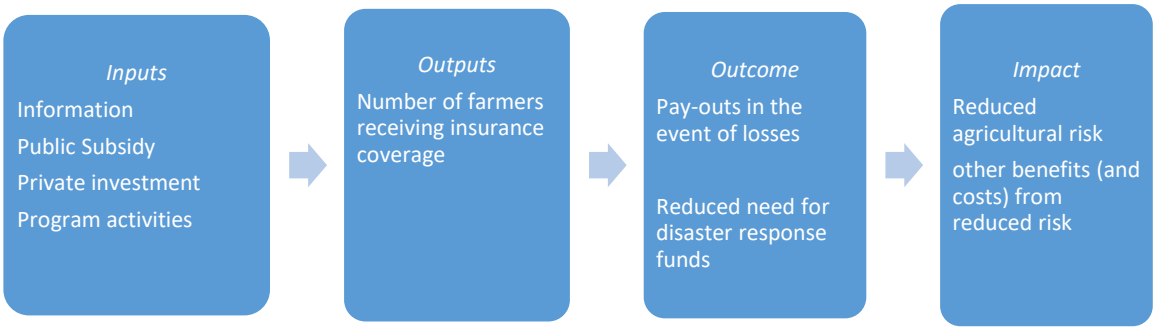
The foregoing concerns may be organized around a *theory of change* (Figure 1), which relates inputs (both public and private) to generate output, measured by number of farmers reached or insurance penetration (often expressed as a ratio to total farmer population). The outcome is to provide pay-outs in the event of unanticipated crop losses; on the side of government, this may permit them to cut back on funding for disaster response to farmers, so that taxpayer money can be utilised for other public goods.

The rightmost box of Figure 1 pertains to the impact of crop insurance, which is to reduce risk in agriculture. Note that the outcome is measured retrospectively (in the event of a loss), but reduced risk is determined prospectively. One method to measure the value of reduced risk going forward is willingness-to-pay (WTP) of farmers for coverage.

Lastly, if farmers do perceive a reduced risk, they may change their behaviour, i.e. be incentivized to adopt productivity-enhancing technologies. Other service providers, e.g.

financial institutions, may also expand its lending to smallholders who are insured (compared to the uninsured), leading to increased production and profitability of the former. Adjusting for moral hazard, then the net benefits from these second-order effects are part of the project impact.

Figure 1: A Theory of Change for Crop Insurance



3. CROP INSURANCE IN ASEAN

3.1 Overview of crop insurance in AMS

Status of crop insurance in the ten AMS are as follows:

- No programme: Brunei Darussalam, Lao PDR, Singapore
- Preparation phase: Cambodia (implemented a pilot project); Malaysia and Myanmar (in preparation for a pilot project)
- Implementing or had recently implemented an nationwide crop insurance programme: Indonesia, Philippines, Thailand, and Vietnam

A legal framework for crop insurance (distinct from insurance in general) has been developed in Indonesia, Philippines, Thailand, and Vietnam – the same countries that have implemented a nationwide programme. The programs of Thailand and Vietnam cover paddy; that of Indonesia covers paddy, corn, and oil palm. Philippines offers the most number of insurance products, covering paddy, corn, and 84 high value crops, not to mention livestock, fisheries/ aquaculture, non-crop agricultural assets, and even credit and life term insurance for farmers and fisherfolk. Nonetheless, the insurance penetration in AMS tended to be very low, all below 0.01 percent as of 2009 (FAO, 2011), though recently Thailand and the Philippines have made impressive gains.

At the regional level, various ASEAN framework documents address themes for which crop insurance may make a key contribution. Crop insurance receives explicit treatment in official Working Group or Network documents which are nonetheless endorsed by ASEAN at a Ministerial level, such as the ASEAN Ministerial Meeting on Agriculture and Forestry (AMAF) which supervises the Senior Officials' Meeting (SOM-AMAF). Regional policies related to crop insurance are discussed in the last part of this Section.

3.2 AMS in preparation phase for crop insurance programme

In *Cambodia*, a pilot crop insurance for rice was initiated in 2015 by Forte, a private insurer. Insurance was indexed to the weather. There was no subsidy from government; rather the company itself provided the subsidy. In 2017, Forte conducted a second pilot, charging a premium but still at a low rate. Uptake was quite low, at 60 farmers for the first pilot (Hazell et al, 2017), up to 200 in the second pilot.

Meanwhile, in *Malaysia*, fire insurance for plantations has been available for a long time; however, insurance for other types of peril and for other crops remains unavailable. The government of Malaysia is currently planning to introduce a crop insurance programme. Preparations are underway, including consultations with farmer and other stakeholders (state governments and private insurers); studies on structuring of the insurance product; and feasibility study. The programme initially targets 200,000 clients. [1]

- Lastly in *Myanmar*, consultations were conducted with the permission of Union Minister of Ministry of Agriculture, Livestock and Irrigation (MOALI) in late 2018 by the Department of Agriculture, MOALI in cooperation with Myanmar Rice Federation (MRF) and Myanmar Agriculture Network, under the Grow Asia Country Partnership. Concrete plans were made as follows: Yield index-based project in collaboration with Global World Insurance, to commence in coming paddy season;
- Weather index-based project, in collaboration Myanmar Agricultural Development Bank, Myanmar Insurance and Sompo Japan Insurance, to be implemented in February-April 2019;
- Feasibility survey for a weather index-based project, in collaboration with Mitsui-Sumitomo Insurance Company and JICA.

3.3 AMS with established crop insurance programmes

3.3.1 Indonesia

The large-scale crop insurance programme is operated by the state-owned insurance company, as authorised by Law No. 19/2013 on Protection and Empowerment of Farmers. The programme is aimed at paddy rice farmers. Article 37 requires the programme to start with a pilot scheme covering 1,500 ha., and to scale up from there. The government insurance programme is indemnity-based, multiple peril (pest, disease, other natural disasters). The cover is up to USD 448 per ha. The premium is USD 13 per ha, of which only one-fifth is paid by the farmer, and the rest by the government. As of April 2017, the state programme covered 600,000 ha. (or 1.3. percent of total area of arable land and permanent crops). Total claims amount to USD 5 million, equivalent to a 64 percent loss ratio. (Nugraha, 2017).

The private sector in Indonesia has been active in implementing value chain programmes which incorporates an insurance component. One is a project of Agrifin Mobile (Financing of Smallholder Corn Farmers Based on Value Chain). The pilot insurance component is area-yield index-based, multiple peril (drought and windstorm), covering 1,200 ha in Dompu District, West Nusa Tenggara Province, Indonesia. The coverage is up to USD 600 per ha, while the premium rate is 5 percent of cover. Another, much smaller value chain project, targets non-bankable farmers. The pilot insurance scheme covers 80 ha paddy fields in West

[1] https://agroinsurance.com/en/malaysia-crop-insurance-scheme-in-final-stage-ministry-hopes-to-make-it-for-2018-budget/; https://www.nst.com.my/news/nation/2018/07/389753/salahuddin-crop-insurance-scheme-out-end-month.

Java Province. The project is a collaboration between Rural Bank Bank Perkeditan Rakyat Kroya, Syngenta Indonesia, Syngenta Foundation, farmers' groups, ACA, and the local weather station; no government financial support is provided.

3.3.2 Philippines

The law on crop insurance was enacted in 1978 with the establishment of the Philippines Crop Insurance Corporation (PCIC) under Presidential Decree 1467. The crop insurance programme began in 1981, and initially focused on rice and corn. The legal mandate was strengthened by RA 7607 (Magna Carta of Small Farmers) of 1991, which requires crop insurance to expand beyond rice and corn to other crops, livestock, poultry, fishery, and agro-forestry.

In 2017, according to the Annual Report of the Corporation (PCIC, 2018), crop insurance programmes are divided into Regular and Special. Regular programmes cover the following:

- Paddy rice and corn;
- High value crops;
- Livestock;
- Fisheries/aquaculture;
- Non-crop insurance (NCI), which covers agricultural assets (machineries, equipments, boats, etc.)
- Credit and life term insurance (CLTI) for farmers and fisherfolk (protection plan, loan repayment, accident and dismemberment security)

Under the Regular programmes, only paddy rice and corn are subsidised. Coverage is cost of production inputs, up to a ceiling amount per ha. The premium is a percentage of the cover, adjusted based on the perils covered and risk profile of the farmer; for medium risk farmers under natural disaster cover, the premium is 7.95 percent, of which the government pays 4.2 percent, while the farmer pays 3.73 percent (53 percent subsidy). For borrowing farmers whose creditors require insurance (most commonly, Land Bank of the Philippines), PCIC charges 1.5 percent to the lending institution, bringing the farmer share down to 2.23 percent. Meanwhile, Special programmes involve 100 percent subsidies, of which the largest by far is the Registry System for Basic Sectors in Agriculture (RSBSA). The RSBSA programme is targeted at subsistence farmers and fisherfolk listed in the registry; for crop farmers, no beneficiary can have more than 3 ha landholding, and priority is given to farmers cultivating 1.5 ha and lower. In 2017, PCIC made a total of Php 1,936.897 million in pay-outs. It collected 3,364.961 million in premiums, for a loss ratio of 58 percent.

3.3.3 Thailand

In Thailand, a crop insurance programme was implemented between 1978 and 1990, covering cotton, maize, and soybeans. The programme was a multiple peril indemnity-based scheme. It was terminated owing to high administrative cost and losses. Another crop insurance was started in 2006 as a weather index pilot (with World Bank assistance). Since 2009, another weather-based index programme was supported by Japanese Bank for International Cooperation, with Bank of Agriculture and Cooperatives (BAAC) serving as the distributer and main implementing agency (FAO, 2011).

The scaled up version of crop insurance was the National Rice Insurance Programme, begun in 2011. The programme was a collaboration between Ministry of Finance for policy design; BAAC for insurance sale; Ministry of Agriculture and Cooperatives for farmer registration and loss verification, also known as "adjustment"; the Insurance Commission for approval; and the Thai General Insurance Association, an association of private insurers, to administer the programme. The programme provides a pay-out of THB 1,111 per rai (THB 6,944 per ha) for natural disasters, or about 25 percent of average production cost. Farmers pay a premium of just THB 625 per ha (matched by an equal amount of public sector subsidy). By end-2016, 1.57 million farmers planting 4.4 million ha participated in the scheme (corresponding to 22 percent of rice farmers and 47 percent of harvested area). In 2015, its premiums reached THB 500 billion, for a loss ratio of just 30.8 percent.

3.3.4 Vietnam

Prior to 2011, crop insurance was a small and market-driven affair. Government implemented a pilot agricultural insurance programme in 2011-13 in partnership with private companies and other stakeholders. The programme was implemented in 20 provinces with targeted subsidy, i.e. 100 percent for poor households, 80 percent of the near poor, and 60 percent for other households. The product is an area-yield indexed insurance covering crops, as well as livestock and aquaculture. The programme was administered by 2 insurance companies, Bao Viet (state-owned insurer) and Bao Minh (a private insurer), with 1 private reinsurer. The programme eventually reached 304,016 households, of whom 77 percent were poor, 15 percent were near-poor, and the balance were other households. Aggregate coverage was VND 7,744 billion, of which indemnities equalled VND 701.8 billion. Total premiums collected was VND 394 billion, for a loss ratio of 178 percent. This high ratio is due to the non-crop component of the programme; for rice, the loss ratio was only 21 percent (Dang et al, 2017).

Following the implementation of the pilot programme, agricultural insurance policy was established by law by Decree No. 58/2018. The Decree established a transparent framework to regulate private sector engagement in agricultural insurance, as well as the policy on government-sponsored agriculture insurance. The government planned to introduce agricultural insurance schemes in 2019 that will provide subsidised agricultural insurance at possibly 90 percent subsidy of poor and near-poor households, and 20 percent subsidy for other farmers and agricultural business.

3.4 Crop insurance in relation to ASEAN Frameworks

3.4.1 ASEAN Framework documents

ASEAN official documents, adopted at the Ministerial or Summit level, have yet to make explicit mention of crop insurance as such. Nonetheless these documents do address issues for which crop insurance may make a key contribution:

ASEAN Economic Community (AEC) Blueprint. The Characteristics and Elements of the AEC Blueprint include:

- *Promote deeper insurance markets through the ASEAN Insurance Integration Framework* (under A. Highly Integrated and Cohesive Economy - A4. Financial Integration, Financial Inclusion, and Financial Stability.)

- *Increase resilience to climate change, natural disasters, and other shocks* (under C. Enhanced Connectivity and Sectoral Cooperation – C.5. Food, Agriculture, and Forestry).

ASEAN Socio-Cultural Community (ASCC) Blueprint. The Characteristics and Elements of the ASCC Blueprint include:

- *Promote local communities' resilience, climate change adaptation, and institutionalise resilience* (under D. Resilience – D4. A Disaster Resilient ASEAN that is able to Anticipate, Respond, Cope, Adapt, and Build Back Better, Smarter, and Faster)
- *Explore the possibility of establishing financial and insurance mechanisms and strategies for disaster risk reduction and climate change adaptation* (under D. Resilience – D5. Enhanced and Optimised Financing Systems, Food, Water, Energy Availability, and other Social Safety Nets in Times of Crises by making Resources more Available, Accessible, Affordable and Sustainable)

ASEAN Insurance Integration Framework (AIIF). According to the BMZ/SAS Extension: Integrating Crop Insurance Policy and Technical Justification, AMS agreed on the ASEAN Insurance Integration Framework which guides them on how to proceed with liberalising and integrating their insurance sectors. A two prong approach is envisaged in implementing the AIIF. These are i) strengthening the insurance sector' policy and initiatives to promote wider coverage of insurance, including crop insurance; and ii) promoting integrating of crop insurance as part of the agriculture sector's policy and initiatives.

ASEAN Agreement on Disaster Management and Emergency Response (AADMER). The AADMER aims to provide effective mechanisms to achieve substantial reduction of disaster losses, and to jointly respond to disaster emergencies through concerted national efforts and intensified regional and international co-operation. The Agreement also establishes an ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre), whose Work Plan includes a programme output of: *Established the Regional Risk Financing and Insurance Framework*.

ASEAN Vision and Strategic Plan for Food, Agriculture, and Forestry (FAF) 2016-2025 and **ASEAN Integrated Food Security (AIFS) Framework and Strategic Plan of Action – Food Security (SPA-FS) 2015-2020**. The current Vision and Strategic Plan for FAF includes *increasing resilience to climate change, natural disasters, and other shocks* under Strategic Thrust 4. The Strategic Thrust on *Assist resource constrained small producers and SMEs to improve productivity, technology and product quality* (No. 5) may also be facilitated by integrating financial protection mechanisms within agricultural value chains, such as crop insurance for smallholders. Moreover. insurance is mentioned under Action Programme 5.3: *Provide credit, insurance, market information, quality control and certification facilities to enable small scale producers and SMEs to comply with food safety and quality standards in both domestic and foreign markets*. Similarly, Strategic Thrust 5 of AIFS SPA-FS relates to FAF Strategic Thrust 5, namely *Encourage greater investment in food and agro-based industry to enhance food security* (though the document makes no explicit mention of insurance).

AMAF's Approach to Gender Mainstreaming in the Food, Agriculture, and Forestry Sectors. The overall approach of AMAF for gender mainstreaming entails providing *opportunity for women to access different financial services such as credit, savings, remittances and insurance schemes* (p. 8). Insurance is also mentioned as an example of a

climate change adaptation measure, which needs to be made more gender neutral and address constraints to womens' participation (p. 14).

3.4.2 ASEAN Working Group documents

The Technical Working Group (TWG) on Crops under the SOM-AMAF developed the **ASEAN Strategic Plan of Action on Crops 2016-2020**. The SPA Strategic Thrusts mirror that of the Vision and Strategic Plan for FAF, hence the foregoing points apply, with specific application to crops. The SPA highlights as well under Thrust 4 the sub-activity of *Implement the ASEAN Regional Guidelines on the Promotion of Climate Smart Agriculture Practices*.

SOM-AMAF has also convened the ASEAN Multi-Sectoral Framework on Climate Change: Agriculture, Fisheries and Forestry towards Food Security (AFCC) as a mechanism for coordinated action and collaboration to address the issues and challenges threatening food security due to climate change.

The ASEAN Technical Working Group on Agriculture Research and Development (ATWGARD) is implementing a Strategic Plan of Action for ASEAN Cooperation in ARD 2016 – 2020. As with SPA on Crops, that on ARD mirrors Strategic Thrusts for FAF Cooperation. Under its Strategic Thrust 4 is the Action Programme: *Provide access to climate-related financial resources to support climate-friendly agriculture.* Under its direct auspices, and in coordination with the Ad Hoc Committee on AFCC is the ASEAN Climate Resilience Network (CRN); this is the same Network that has drafted the abovementioned *Regional Guidelines on the Promotion of Climate Smart Agriculture Practices* (see below).

Working Groups under SOM-AMAF whose action plans make explicit mention of insurance are the ATWGARD, the Working Group on Agricultural Training and Extension, as well as Working Group on Agricultural Cooperatives.

The ATWGARD also developed the **ASEAN Guidelines in Promoting Responsible Investment in Food, Agriculture, and Forestry**, which was adopted in the 40th AMAF Meeting. Under Guideline 7, *[i]ncrease resilience to, and contribute to the mitigation of and adaptation to climate change, natural disasters, and other shocks*, the document suggests that AMS consider [*d]eveloping legal and policy frameworks to harness the private sector to find diverse and innovative insurance products and services that consider the risks arising from the increased frequency of droughts, floods and other extreme weather-related events*.

The Plan of Action on ASEAN Cooperation in Agricultural Training and Extension (2016-2020) mentions insurance under the FAF Cooperation Strategic Thrust 1: Enhance quantity and quality of production with sustainable, 'green' technologies, resource management systems, and minimise pre- and post-harvest losses and waste. The relevant Activity under this Plan of Action is to *Introducing on funding assessment, cooperative funding, agriculture insurance, strengthening of farmer group organization, etc* under the Action Programme: Identify infrastructure investment and technology requirements to increase production and, promote technology adoption and capacity building programme to reduce post-production losses, and address investment needs.

The relationship between ASEAN Roadmap for Enhancing the Role of Agricultural Cooperatives in Agricultural Global Value Chains 2018-2025 and the Vision and Strategic Plan for FAF Cooperation is more complex. The Roadmap identifies four pillars: 1) Institutional and capacity development; 2) Competitiveness; 3) Access to finance; and 4) Access to markets. Rather than under Pillar 3, insurance is mentioned under Pillar 2: Competitiveness. Under each Pillar is a set of Measures, which leads to some Actions. Insurance is mentioned under the relevant Action (Bullet No. 1): *Promote a systemic and*

comprehensive approach to risk management for agricultural cooperatives, including diversification, insurance schemes and internal control mechanism under Measure 1: Creating Resilient Cooperatives.

3.4.3 ASEAN CRN

The ASEAN CRN was initiated through a proposal of the Thai government for a Production System Approach for Sustainable Productivity and Enhanced Resilience to Climate Change, under the AFCC and ATWGARD, with initial funding and technical support from the ASEAN German Programme on Climate Change (GAP-CC), GIZ GmbH, and facilitated by the South East Asian Centre for Graduate Studies and Research in Agriculture (SEARCA). The Network developed several Guides/Guidelines that were endorsed by AMAF:

- ASEAN Regional Guidelines for Promoting Climate Smart Agriculture (CSA) Practices Volume 1 (endorsed, 37th Meeting);
- ASEAN Regional Guidelines for Promoting Climate Smart Agriculture (CSA) Practices Volume 2 (endorsed, 39th Meeting)
- Ten Phases in Developing a National Crop Insurance Program: Guide Overview (endorsed, 39th Meeting).

ASEAN Regional Guidelines Vols. 1: The Guidelines cover Agro-Insurance using Weather Indices. The Guidelines point to an advantage of index-based on traditional insurance, which is to reduce administrative cost and asymmetric information problems from loss-assessment thus avoids the cost of loss-assessment on field and asymmetric information problems. It also acknowledges the disadvantage of basis risk.

ASEAN Regional Guidelines Vol. 2: The second volume goes into further detail into guidelines for agricultural insurance. When developing a crop insurance program or commercial business, one must address product design, distribution channels, farmer socialization and awareness creation, registration, loss assessment and stakeholder coordination strategies.

Ten Phases in Developing a National Crop Insurance Program: The 10 phases serve as an overview guide for prospective governments to consider before launching a national crop insurance program or to review for improving a current program. The 10 phases are:

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

While ASEAN CRN is currently on hiatus, it should be noted that ASEAN SAS has served as venue for regional cooperation on crop insurance beginning in 2017, as previously stated (Section 1).

4. ASSESSMENT

The AMS are in different phases of launching a nationwide crop insurance program.

The four AMS with established crop insurance programmes have already completed all ten phases; Cambodia is in the first two phases; Malaysia and Myanmar is only in the first phase; while Brunei and Lao PDR have yet to initiate the phases.

The following assessment examines past experience and existing policies, both national and regional, concerning crop insurance. Issues raised are based on the inputs (see Figure 1 on the theory of change) that supposedly will trigger outputs (insurance penetration), outcomes (loss pay-out), and finally impacts. These issues cover: information; public subsidy; modality (public versus private sector roles); product design; product roll-out; and targeting.

4.1 Information

Efficient implementation of a crop insurance program requires considerable amounts of data and information for proper design.

As with any insurance product, estimates of expected loss, differentiated by crop, location, type of peril, season, etc. is essential for proper pricing and to avoid adverse selection. Index-based insurance in particular requires specific information about the selected index, and its correlation to farmers' yield. Also helpful is variability of crop damage, as well as how farmer behaviour affects loss, to mitigate the problem of moral hazard. Data and knowledge products are typically public goods that mostly depend on public investment.

4.2 Subsidy

There exists a trade-off between level of subsidy and degree of insurance penetration of crop farmers.

A voluntary, fee-based insurance service for crops has usually been small or non-existent. This clearly holds for AMS: crop insurance is not offered in Brunei Darusallam, Lao PDR, and Myanmar; and is minimal in Cambodia. On the other hand, crop insurance is or was significant in Indonesia, Philippines, Thailand, and Vietnam, where government is allocating or had allocated a sizable budget. Aside from increasing the number of farmers benefited, an important advantage of increasing penetration is addressing adverse selection.

4.3 Modality

Lack of clarity of rules, and misallocation of roles between private and public sector actors, can reduce the effectiveness of crop insurance.

The experience of Vietnam in its pilot crop insurance program suggests that implementation was constrained by lack of connection and coordination between government and insurance companies. To address this, roles of public and private sector partners in insurance provision should be clarified, and each stakeholder properly oriented from the outset. National government (invoking both executive and legislative functions) provides the database for product design, as well as the overall policy and regulatory framework for crop insurance, including the subsidy level. Depending on the country, local governments may also play a

role in socialisation of farmers in the program, including eliciting their inputs in product design. In the Philippines, the crop insurer is a state-owned enterprise; state insurance is also a key player in Vietnam. In other countries though, private insurers can actively participate in crop insurance.

4.4 Product design

Nationwide launching of crop insurance usually focuses on staples and a few major crops, while incrementally expanding crop coverage.

Dang et al (2017) argue that a pilot crop insurance program should be designed towards cereal crops to ensure food security. On the other hand, if the program focuses on agricultural development, then it should focus on key agricultural products which have the risk level acceptable for both farmers and insurers.

Alternative methods of loss estimation have their respective advantages and disadvantages; though new technologies are most promising for increasing program efficiency.

Of the established crop insurance programs, one (Vietnam) is area-yield index-based. Indonesia is indemnity-based, and so is Thailand indemnity-based, though in the latter, declaration of state of calamity is required to trigger pay-outs. The Philippines is also largely indemnity-based, though it has piloted area-based yield index and weather index-based schemes for high-value crops, such as: coconut, coffee, cacao and other high-value crops.

The index-based approaches did tend to reduce administrative cost, and makes it possible to achieve high penetration rates among smallholders (for whom transaction cost may otherwise be prohibitive). In Vietnam however, basis risk made the insurance product somewhat unpopular among farmers, though it may have kept down the loss ratio in the case of paddy rice. In Thailand though indemnity-based, the need for a calamity declaration was also a problem as a farmer can sustain a loss even if his or her locality has not been declared a calamity area.

The literature has yet to reach a consensus on which is a better form of insurance, index-based or indemnity-based crop insurance. Provided basis risk and loading cost are sufficiently low, efficiency gains from index-based crop insurance are large (Marr et al, 2016). A number of case studies reviewed in Greatrex et al (2015) suggest that farmer input is essential for product design towards reducing basis risk. Hazell et al (2017) are optimistic that in many instances basis risk can be minimised allowing basis risk to be scaled up throughout developing country agriculture.

Greater accuracy in index-based insurance can be achieved by remote sensing. For example, the RIICE project of India uses remote sensing technology to determine the extent of rice cropping, monitor the rice growth, estimate (to some extent) biomass and identify crop damages and losses caused by droughts and floods. It also replaces traditional loss adjustment which is slow, costly, and prone to opportunistic behavior. Note though that remote sensing technology will still require field data on yields and other ground information for proper design and testing of the insurance product (IFAD, 2017).

Pricing structure and other features can be designed to ensure efficient utilisation of the insurance subsidy.

Crop insurance in the Philippines follows differentiated pricing according to risk profile, season, and type of peril. Such a practice can greatly attenuate adverse selection and reduce the loss ratio, which can reach as high as 64 percent or even higher as in Indonesia.

4.5 Product roll-out and targeting

An effective crop insurance program is one that invests heavily in socialisation of farmers, ensuring that agents are well-versed in the product being marketed.

Observations for the crop insurance program in Thailand claimed that farmers lacked knowledge of the insurance product. In general, smallholders in Southeast Asia lack basic elements of insurance literacy. However, government extension bureaus are typically too understaffed to adequate socialise farmers, as mentioned in the case of Indonesia. There is some evidence from a developing country (Nigeria) that extension agents were found to participate less frequently in the dissemination of insurance, probably owing to their lack of knowledge of the service (Olurunfemi et al, 2019).

Protection of the poor is increased by targeting of crop insurance subsidy.

Among the established crop insurance programs, government was found to cover an average of 55-80% of the premium, while farmers pay the rest. In the Philippines and Vietnam, farmers from the poorest group were given a 100% subsidy. Targeted subsidies together with means testing is helpful in extending social protection to the marginalised group, with 77 percent of crop insurance beneficiaries classified as poor.

5. RECOMMENDATIONS

5.1 Regional cooperation

1) *Articulate agricultural insurance explicitly in key ASEAN documents.*

Agricultural insurance is worthy of more detailed treatment in the documents adopted by AMAF, as well as those adopted by selected Working Groups, in particular: the sector TWGs (on Crops, Livestock, and Fisheries). The integration of agricultural insurance may commence with the drafting of an ASEAN Regional Framework on agricultural insurance, relating insurance to risk transfer, climate resiliency, social protection of smallholders, and food security. Based on this Regional Framework, future updates of the key ASEAN FAF and related documents can integrate agricultural insurance.

2) *Continue active regional collaboration in cross-country sharing of information and experience in relation to agricultural insurance.*

Aside from incorporation in formal declarations and documents, concrete regional initiatives may continue to be pursued. Currently the ASEAN SAS offers one such venue, continuing the initiative from the ASEAN CRN; however, there needs to be a permanent platform to pursue collaboration. The four AMS with existing crop insurance programmes have the opportunity to share their knowledge and experience to other AMS who plan to start and implement a national crop insurance programme in their country. Learnings from experiences beyond Southeast Asia should be encouraged, such as from India.

Philippines and India have had lengthier experience in managing a national crop insurance programme, including the development of agricultural insurance products (indemnity-based and index-based), development of policies, systems and procedures on marketing, underwriting, claims adjustment and digital/mobile applications on insurance operations, among others. They have the potential to share and/or exchange knowledge/technologies with AMS.

Another venue to pursue collaboration in crop insurance is through the ASEAN Insurance Council, investigate how as a regional block the community to establish catastrophic

insurance against severe climate risks impacting multiple countries. Risk pooling and regional reinsurance may be possible given commitment from the member countries.

5.2 Recommendations for countries at initial phases of implementation

3) *Conduct need assessment, feasibility study, and pilot programme to assess whether crop insurance is a viable strategy for addressing risk in agriculture.*

Cambodia, Lao PDR, Malaysia, and Myanmar, are in the process of implementing consultations and need assessment. Based on the Ten Phase Guide, the next set of activities relate to Feasibility Study; these countries may opt to undergo the succeeding Phases (see Section 3.4.3); they may also opt to proceed directly with a small-scale pilot insurance programme, drawing from the experience of four AMS with nationwide crop insurance programmes, as in preceding Recommendation 1). The pilot programme will then form the basis of National policy creation, Regulatory framework, Product design, and Socialisation. A large-scale pilot is also recommended (as was done in Vietnam) given the limited scope for risk transfer in a small-scale pilot.

5.3 Recommendations on pricing and product design

4) *Establish data collection systems and studies related to weather, loss patterns, and behaviour of farmers in managing agricultural risk.*

A database and data collection system is a prerequisite for a sustainable crop insurance programme. Data is a useful way to delimit the scope of an insurance product, i.e. crops for which no reliable information is available for actuarial assessment should probably not be included in the coverage of a crop insurance program. Countries at a Feasibility study phase will still need to conduct risk assessment; meanwhile countries with a nationwide programme must continue to refine and collect more data towards improving design of their insurance products. The latter countries should explore the application of new information technologies such as remote sensing to collect up-to-date information on production and real-time assessment of crop losses.

5) *Firm up state policy the size of the annual subsidy for crop insurance*.

A government that opts for low subsidy for crop insurance should continue to seek other, effective instruments for attenuating risk in agriculture. On the other hand, a government that commits to protecting smallholders against agricultural risk through crop insurance should follow through by allocating a commensurate budget for premium subsidy.

The policymaker opting for high subsidy should attempt to maximise penetration at the given budget, and ensure that social protection via crop insurance is the best use of taxpayer funds, say by cost effectiveness analysis. Considerations for the cost effectiveness analysis are as follows:

- Crop insurance may be a viable social protection mechanism that provides alternative means for financial assistance to farmers in the event of disaster;
- Smallholders may obtain greater access to credit and receive an incentive to adopt new technologies by acquiring crop insurance.

6) Introduce pricing structure that aligns premiums with expected costs.

Though it appears administratively simple to adopt a single pricing scheme, such a scheme is prone to an adverse selection problem. The structure of pricing should of course be carefully designed – by following Recommendation 3) above, and drawing lessons for the established

crop insurance programmes such as that of Philippines – so as not to under-price or overcharge the premium across different locations, seasons, and crops.

7) *Adopt targeted subsidy favouring poorest and most vulnerable smallholders.*

Adopting a subsidy-dependent modality of crop insurance need not involve 100 percent subsidy for all farmers. Rather, targeting is a highly recommended strategy that allows the same amount of subsidy to expand penetration of over a wider range of smallholders. Dang et al (2017) advise that even the poorest group should be charged even a token amount (about 10 percent of premium) to screen out farmers without a serious need for insurance.

8) *Consider incorporating incentives towards climate-smart agriculture practices for farmers participating in crop insurance.*

Crop insurance creates an opportunity to leverage risk transfer to incentivise behaviours conducive to climate resiliency. For instance, in areas prone to drought, premium discounts (for premium-paying farmers) or higher pay-outs (for highly subsidised farmers) can be extended for adoption of drought-tolerant crop varieties, or adoption of water-saving practices such as alternate wet-and-dry irrigation.

9) *Explore index-based insurance to cover smallholder farmers.*

As argued in Dang et al (2017), index-based insurance may be more suitable than traditional indemnity-based when reaching a wider group of smallholders. Such a product should of course be properly designed, as discussed previously: i.e. the index should track as closely as possible actual, farm-level shocks, to minimise basis risk.

The PCIC, during its pilot projects implementation of weather index-based insurance (WIBI) – rainfall index for rice and corn crops in 2011-2016 (in collaboration with ILO, WB and other institutions), has developed a protocol to minimize "basis risk" in the operation of index-based insurance scheme. This is the development of geographic insurance units (GIUs), which are groupings of farms where farmers involved are applying the same cultural practices in growing the same crop variety. This GIU protocol will also facilitate the formulation of applicable indices for the particular GIU and also helpful in assessing the vulnerability of the farm which is a factor in pricing and development of the insurance package. The Philippines, together with Thailand, Vietnam and other AMS, GIZ and other international technical cooperating agencies/donor institutions willing to collaborate on this objective, currently piloting an index-based product/s can work together to further develop this GIU development system for various crops, livestock and aquaculture insurance products (Cajucom, 2019).

The strategy of index-based insurance need not rule out traditional, indemnity-based products entirely, as explained in the next Recommendation:

10) *Adopt an incremental introduction of insurance products, beginning from those easily designed, to those with more complex design requirements.*

A nationwide crop insurance program may be initiated with an indemnity-based program, as this is easier to implement and explain to farmers. After this form of program has been tested and rolled out, pilot implementation of an index-based program may commence. Depending on program experience over time, the mature phase of a program may involve full roll-out of an index-based product, which can be offered in parallel with or in lieu of the indemnity-based product.

5.4 Recommendations on programme implementation

11) *Deliver crop insurance service via modality of private-public partnership under a framework of transparent regulations and well-defined roles for the partners.*

The PPP approach is the appropriate modality in implementing crop insurance in Southeast Asia. For PPP to work, a clear framework of rules and regulations, as well as role assignment must be provided by government to ensure full participation by farmers and private partners. Based on the ASEAN Regional Guidelines, the various partners may be assigned the following roles:

- Distribution Channel Partners – facilitates access to farmers through established networks. These include banks and microfinance institutions bundling insurance with credit.
- Local Insurance Companies – designs and underwrites the program's insurance products; engages in farmer sales, sign up and registration processes; collects premiums; conducts loss assessment and makes claims payouts.
- Local and International Reinsurers – reinsures risk from local insurance companies, ensuring that claims can be paid.

The Philippines has established a state-owned crop insurance organisation, an institution unique within ASEAN, though within Asia similar set-ups are found for India (Agriculture Insurance Company of India, Inc.) and China (People's Insurance Company of China). In this case, the state-owned company may very well take the lead in implementing the crop insurance programme, while the private sector may specialise in providing a distribution channel, as well as reinsurance,

12) In implementing a scaled up programme, deploy well-trained agents to conduct socialisation of intended beneficiaries.

Implementers of crop insurance should either train local government extension agents properly to understand the benefits and responsibilities of being an insurance holder; allow the private insurers' agents to do the dissemination (as applicable); or deputise staff of lending agencies (public or private) for product dissemination. Aside from information and dissemination, at this stage, farmers' inputs in product advantages and disadvantages can be elicited for product design and refinement.

13) Invest in a strong monitoring and evaluation (M&E) system for feedback and continuing revision of the program.

It is unrealistic to expect that upon nationwide launch of a crop insurance programme, even with proper study, a comprehensive database, and detailed and extensive farmer input. With a well-developed M&E system, systematic information can be collected towards real-time tracking of progress towards programme objectives, in terms of programmatic inputs, outputs, outcomes, and impact. This in turn will serve as basis for period program review and recalibration as needed.

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