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Agricultural Insurance in the Philippines: Innovative Product Development and Scale-Up Amid Climate Risks and Other Hazards

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ABSTRACT

The Philippines, an archipelago situated in the Pacific Ring of Fire and the typhoon belt, is highly vulnerable to natural disasters. The continued global warming experienced in the country in the past years shows a trend of climate changes that have caused casualties and losses in agriculture and properties. One of the solutions to address the negative effects of climate change is agricultural insurance. The Philippine Crop Insurance Corporation (PCIC) is a government institution that has served as the country's sole provider of traditional crop insurance since 1981. However, because of PCIC's limited resources, the private sector's participation in the agricultural insurance business is necessary to increase the number of farmers, fisherfolk, and other stakeholders protected with insurance. The issuance of rules and regulations for private agricultural insurance operations and the formation of a Public-Private Partnership composed of the PCIC and private insurance companies are vital strategies to scale-up agricultural insurance business in the country. Further, to improve the agricultural insurance program, innovative/index-based agricultural insurance products, such as Weather Index-Based Insurance (WIBI) and Area-Based Yield Index Insurance (ARBY), have been developed and piloted with funding from donor agencies. New products such as the Yield Insurance Products for High-Value Crops (a hybrid of traditional, ARBY, and WIBI schemes), initially for coconut, coffee, and cacao crops could enable the PCIC and private insurers to provide insurance services at lesser loss adjustment cost and with a faster settlement of claims. Challenges to a successful and sustainable implementation of the new products need to be met, namely the (1) development of the required data infrastructure; (2) acquisition of advanced weather equipment and technologies for crop modeling and experimentation; and (3) collaboration with government research institutions and state colleges and universities to undertake science-based modeling and experimentation for the development of various weather indices/parametric for crops, fisheries/aquaculture, and livestock. Further measures to strengthen the existing agricultural insurance program include (1) integrating plans for agricultural insurance in the development and implementation plans of all concerned government institutions involved in agriculture, fisheries, and forestry sectors and (2) organizing small farmers and fisherfolk to undertake collective farming and business activities as they cannot cope with rapid changes in climate on their own that affect their livelihood.

Keywords:
agricultural insurance program,
climate change,
Philippines

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INTRODUCTION

In the Philippines, about 70% of the population lives in rural areas and majority are small farmers whose livelihood depends on agriculture. The agriculture sector provides food for the Filipinos and contributes a major portion to export earnings. However, due to the country's geographic location, the sector faces various hazards. The Philippines, an archipelago with 7,641 islands, is situated in the Pacific Ring of Fire and along the typhoon belt of the Western North Pacific Basin, where more than 60% of tropical cyclones enter or originate. It experiences an average of 20 typhoons annually. About five of these typhoons and related floods severely damage crops, livestock, and other properties. The country also experiences droughts in varying degrees and with different effects. Aside from extreme weather events and adverse climatic conditions, the Philippines is exposed to other risks such as pest and disease infestations, earthquakes, and volcanic eruptions (Sia-Catedral 2016; Cajucom 2017). These conditions, heightened by climate change, make agricultural insurance imperative in the country.

The Philippine Crop Insurance Corporation (PCIC) is the government institution that serves as the country's sole provider of traditional crop insurance since 1981. It has developed and is implementing seven agricultural insurance lines: rice crop, corn crop, high-value crops (84 crops), livestock, fisheries/aquaculture, non-crop agricultural asset, and credit and life-term insurance for farmers and fisherfolk. Over its 37 years of operation, PCIC has demonstrated that agricultural insurance is a viable business in the Philippines, provided that a proportionate volume of insurance production needed to defray operational costs is attained and more importantly, that proper risks management practices to prevent or minimize losses in insurance operations are consistently applied. However, the PCIC has limited resources to provide insurance protection to the more than 50% of the Philippine population involved in agriculture, fisheries, and forestry activities. The private sector's participation in the agricultural insurance business is necessary to be able to increase the number of farmers, fisherfolk, and other stakeholders protected with insurance.

With climate changes effects on agricultural productivity and farmers' income, the need for the country's agricultural insurance program to continue enhancing its existing insurance products and developing new and innovative insurance products responsive to the needs of farmers, fisherfolk, and other stakeholders is vital to make our country more resilient to the destructive effects of climate change.

In general, insurance is a form of risk management used to hedge against a contingent loss. The conventional definition of insurance is the equitable transfer of risk of loss from one entity to another in exchange for a premium or guaranteed and quantifiable small loss to prevent a large and possibly devastating loss. Agricultural insurance is a special line of property insurance applied to agricultural firms. Agricultural insurance is not limited to crop insurance. It also applies to livestock, bloodstock, forestry, aquaculture, and greenhouses (Iturrioz 2009). Agricultural insurance provides the following benefits: transfers the agricultural producers and other stakeholders' risks of natural calamities and other perils in agricultural production and related activities to the insurer; promotes investments in agriculture, fisheries, forestry, food production, non-crop agricultural assets, livelihood, and employment; contributes to the continuation of agricultural production and related activities by providing indemnity/payment for damaged farm investments (i.e., the payment will be used to finance replanting and/or other agricultural activities); and

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stabilizes the finances of lenders and encourages them to provide credit programs for farmers and other stakeholders (Abada 1992; Faustino 1992; Cajucom 2017); among others.

This paper discusses (a) PCIC's role as the country's agricultural insurance provider; (b) measures to improve the agricultural insurance program, including the development of innovative/index-based products; (c) strengthening and scaling up of the agricultural insurance program; and (d) challenges especially with climate changes deleterious effects on agriculture and fisheries.

PCIC HISTORY AND EXPERIENCE

The history of agricultural insurance in the Philippines coincides with the history of PCIC. A government-owned and controlled corporation (GOCC), PCIC is the sole provider of traditional crop insurance to the agriculture, fisheries, and forestry sectors of the country. Another GOCC, the Government Service Insurance System (GSIS), insures government properties, including livestock (Cajucom 2017). PCIC is the pioneer government agency in Southeast Asia that provides agricultural insurance (Yorobe et al. 2015).

In 1976, the Land Bank of the Philippines (LBP) formed the Interagency Committee for the Development of the Philippine Crop Insurance System (IAC-PCIS) to explore the use of crop insurance to protect agricultural producers from risks of losses due to adverse weather conditions and other natural causes. The IAC-PCIS was composed of representatives from the LBP, the Ministries (now Departments) of Agriculture, Agrarian Reform, Local Governments and Community Development, Budget, Finance (including the Insurance Commission), Cooperative Insurance System of the Philippines, Actuarial Society of the Philippines, academe, private insurance industry, and other institutions involved in agriculture.

The report of the IAC-PCIS led to the promulgation of Presidential Decree No. 1467 (PD 1467) on 11 June 1978, creating the PCIC. The PCIC began operating in 1981, initially covering insurance for rice crops. Its principal mandate is to provide insurance protection to the country's agricultural producers, particularly subsistence farmers, against crop losses arising from natural calamities, such as typhoons, floods, droughts, tornadoes, earthquakes, and volcanic eruptions, as well as from plant diseases and pest infestations (PCIC 1980). Over the years, more laws were passed to strengthen and enhance PCIC's operations so that it may respond to its beneficiaries' needs.

Various laws were enacted to further strengthen the PCIC and expand its coverage of beneficiaries. These are summarized in Box 1.

Box 1. Laws creating the PCIC.

PD 1467 s.1978	Establishing PCIC. Creating the "Philippine Crop Insurance Corporation" prescribing its powers and activities, providing for its capitalization and the required government premium subsidy, and other purposes.
PD 1733 s.1980	Amending Presidential Decree no. 1467 creating the "Philippine Crop Insurance Corporation" by adding penal sanctions therein. To ensure the attainment of the objective of the creation of PCIC, defining the duties and obligations of all lending institutions granting production loans for *palay* (rice) under the supervised credit program of the government, and providing penal sanctions for violation of the provisions of said decree.

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Continuation (Box 1. Laws creating the PCIC.)

Republic Act No. 8175	An Act further amending Presidential Decree no. 1467, as amended, otherwise known as the Charter of the Philippine Crop Insurance Corporation (PCIC), in order to make the crop insurance system more stable and more beneficial to the farmers covered thereby and for the national economy. (Revised Charter of the Philippine Crop Insurance Corporation Act of 1995 amended PD 1467 to include provisions to make the crop insurance system more stable and beneficial to farmers.)
Republic Act No. 8550 (RA 8550) or the Philippine Fisheries Code of 1998; Section 54	RA 8550: An Act providing for the development, management, and conservation of the fisheries and aquatic resources, integrating all laws pertinent thereto, and for other purposes. Section 54: Insurance for Fishponds, Fish Cages, and Fish Pens. Inland fishponds, fish cages, and fish pens shall be covered under the insurance program of the Philippine Crop Insurance Corporation for losses caused by force majeure and fortuitous events. (Provided fisheries/aquaculture insurance coverage for unharvested crops or stock in fish ponds, fish cages, and fish pens, as well as seaweed and other aquaculture farms. Fish farmers' fish cages, processing and storage facilities, equipment, boats, and other properties are under the PCIC non-crop agricultural asset insurance program.)

The PCIC Experience from 1981 to 2017: Results of Operations

Since it started operations in 1981, PCIC has developed seven types of traditional agricultural insurance products which are described below. PCIC's cumulative insurance production from 1981 to 2017 generated a total amount of cover worth PHP 279.493 billion and paid a total indemnity of PHP 9.953 billion. The favorable average loss ratio was 1:0.54 (i.e., PCIC paid PHP 0.54 only for indemnity for every PHP 1 of premium earned) (Table 1).

PCIC Agricultural Insurance Products

The following are the agricultural insurance products of PCIC:

Rice Crop Insurance

Rice crop insurance aims to protect farmers against rice crop losses due to natural calamities as well as plant pests and diseases. It covers the cost of production inputs. The premium rate varies per region, season, and risk classification. Subsistence rice farmers who are not participating in special agricultural insurance programs with a premium subsidy (100%) from National Government are given a premium subsidy of 55 percent. The subsidy funds are sourced by PCIC from the Bangko Sentral ng Pilipinas (BSP) remittances to the Corporation representing PCIC's share in the penalties collected by the BSP from certain lending institutions for noncompliance or under-compliance with the provisions of Agri-Agra Law (RA 10000).

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Table 1. Summary of PCIC Cumulative Insurance Production and Claims Paid (1981-2017).

Insurance Lines (Year Started)	PRODUCTION			CLAIMS			Damage Rate	Loss Ratio	Loss Incidence
	No. of Farmers	Area (hectares)/ Heads/ Policies	Amount of Cover (PhP M)	No. of Farmers	Area (Ha)/ Heads/ Policies	Claims Paid (PhP M)			
Palay (1981)	5,760,599	8,800,833	107,757.399	1,544,701	2,423,835	7,525.104	6.98	0.65	**26.81**
Corn (1982)	1,081,110	1,676,730	22,364.135	345,155	565,811	1,842.562	8.24	0.48	31.93
Combined Palay & Corn	6,841,709	10,477,563	130,121.534	1,889,856	2,989,646	9,367.666	7.20	0.61	27.62
HVCC (1991)	491,854	655,666	29,804.363	17,308	24,441	276.530	0.93	0.18	3.52
Livestock (1988)	930,865	8,454,614	17,547.263	16,823	128,014	151.933	0.87	0.13	1.81
NCAAI (1996)	101,203	71,961	13,798.395	620	63	69.331	0.50	0.60	0.61
CLTI (2005)	2,045,232	330,234	87,576.752	3,326	3,138	81.023	0.09	0.35	0.16
Fisheries (2011)*	22,023	2,980	644.670	743	740	6.667	1.03	0.27	3.37
Total	10,432,886		279,492.977	1,928,676		9,953.150	3.56	0.54	18.49

* Included the following insurance for fisherfolk: aquaculture-unharvested stocks in fish ponds/cages, seaweeds and non-crop agricultural asset: boats, fish cages, and other farm investments of fisherfolk.
HVCC, High-Value Commercial Crop; NCAAI, Non-Crop Agricultural Asset Insurance; CLTI, Credit and Life Term Insurance.

Corn Crop Insurance

The goal of corn crop insurance is to protect farmers against corn crop losses brought about by natural calamities, including plant pests and diseases. Similar to rice crop insurance, corn crop insurance covers the cost of production inputs. The premium rate also varies per region, season, and risk classification. Subsistence corn farmers who are not participating in special agricultural insurance programs with a premium subsidy of 100 percent from the national government are given a premium subsidy of 55 percent.

The subsidy funds are sourced by PCIC from BSP remittances to the Corporation representing PCIC's share in the penalties collected by the BSP from certain lending institutions.

High-Value Crop Insurance

High-value crop insurance aims to protect farmers against high-value crop losses due to natural calamities and other perils such as pests and diseases. High-value crops include abaca, ampalaya, asparagus, banana, cabbage, cacao, carrot, cassava, coconut, coffee, commercial trees, cotton, garlic, ginger, mango, mongo, onion, oil palm, papaya, peanut, pineapple, sugarcane, sweet potato, tobacco, tomato, watermelon, and white potato. PCIC provides crop insurance for 84 high-value crops.

Livestock Insurance

Livestock insurance aims to protect livestock raisers against livestock losses due to accidental death or disease. Livestock include carabao, cattle,

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horses, swine, goats, sheep, poultry and game fowls, and animals.

Fisheries/Aquaculture Insurance

The goal of fisheries/aquaculture insurance is to protect fish farmers, fisherfolk, and fish growers against losses in unharvested crop or stock in fisheries farms due to natural calamities and fortuitous events.

Non-Crop Agricultural Asset Insurance

Non-crop agricultural asset insurance aims to protect farmers against the loss of non-crop agricultural assets due to perils such as fire, lightning, typhoon, tornado, flood, earthquakes, and theft. Agricultural assets pertain to machinery, equipment, transportation facilities, and other related infrastructures directly or indirectly used in the pursuit of agricultural activities including production and processing and storage and distribution of goods and services. Non-crop agricultural assets include warehouses, rice mills, poultry pens, pig pens, stables, irrigation facilities, fishing vessels or boats, and tractors and threshers.

Credit and Life Term Insurance

Credit and life term insurance plans include the Agricultural Producers Protection Plan, an insurance protection that covers the dismemberment or death of the insured due to accident, natural causes, and murder or assault; Loan Repayment Protection Plan, an insurance protection that guarantees the payment of the face value or the amount of the released agricultural loan upon the death or total permanent disability of the insured borrower; and Accident and Dismemberment Security Scheme, an insurance protection that covers the death, dismemberment, or disablement of the insured due to accident.

PHILIPPINE CLIMATE AND CLIMATE CHANGE

The climate of the Philippines is tropical and maritime, characterized by relatively high temperature, high humidity, and abundant rainfall. There are two major seasons: rainy season from June to November and dry season from December to May. The dry season may be subdivided further into a cool dry season from December to February and a hot dry season from March to May (PAGASA 2018).

The PAGASA, in its 2011 report, stated that:

> Climate change is happening now. Evidences support the fact that the change cannot simply be explained by natural variation. The most recent scientific assessments have confirmed that this warming of the climate system since the mid-20th century is most likely to be due to human activities; and thus, is due to the observed increase in greenhouse gas concentrations from human activities, such as the burning of fossil fuels and land use change. Current warming has increasingly posed quite considerable challenges to man and the environment, and will continue to do so in the future. (PAGASA 2011)

Trends and Projections

Vulnerability of the Philippines to Natural Hazards

The Philippines is highly vulnerable to natural hazards. The World Risk Index 2016 ranked the Philippines as the third (with an Index value of 26.70%) among 171 countries vulnerable to natural hazards, such as earthquakes, cyclones, floods, droughts, and sea-level rise. The highest is Vanuatu (with an Index value of 36.28%) and Tonga is second (with an Index value of 29.33%). Among the countries located near the Philippines and included in the first 15 countries, Brunei Darussalam was ranked seventh (with an Index Value of 17%) while Cambodia was ranked ninth (with an Index value of 16.58%). Their specific Risk Index Value is much lower than the 26.70% Risk Index Value of the Philippines (World Risk Report 2016).

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Experience with Typhoons and Drought

As stated earlier, about twenty (20) typhoons enter the Philippine Area of Responsibility (PAR) every year and about five of these are destructive, having maximum sustained winds not lower than 150 kph. It is periodically affected by the El Niño-Southern Oscillation (ENSO) phenomenon, which creates enormous strains on water resources due to low rainfall (drought).

Key Findings on Climate Change

The PAGASA (2018) reported observed climate trends and projected climate changes in the country. These are summarized as follows:

- the country-averaged mean temperature could increase by 0.9 °C-1.9 °C and 1.2 °C-2.3 °C, considering moderate and high emissions, respectively, in the mid-21st century (2036-2065);
- increasing trends in seasonal and annual rainfall;
- minimal increase in the frequency of strong typhoons; and
- rise in sea level by nearly double the global average rate of sea-level rise.

Projected Climate Change in the World

On the world situation, the Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC) (2007) projected that the world is on a path toward inevitable overall warming (PAGASA 2018; AMIA 2018) — increased annual mean temperature of 0.9-1.1 °C in 2020, 1.8-2.2 °C in 2050; extreme events such as more frequent hot days (>35 °C), more dry days (<2.5 mm rain), and increase in heavy rainfall events (>300mm rain); the seasonal rainfall: dry will be drier, wet will be wetter; and in terms of cyclones and typhoons, 10-20% increase in intensities due to increase of 2% in sea surface temperature.

In 2021, the IPCC reported that:

> Global surface temperature will continue to increase until at least the mid-century under all emissions scenarios considered. Global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO2 and other greenhouse gas emissions occur in the coming decades (IPCC 2021).

Potential Reduction in Agricultural Productivity

The changes in climate will reduce agricultural productivity in the country. In 2017, the DA-Systems Wide Climate Change Office (SWCCO) provided the following estimates of reduced production (DA-SWCCO 2017):

> (a) Estimated reduction in agricultural productivity due to increase in temperatures (e.g., reduced rice yields: 10% for every 1°C increase in temperature);
>
> (b) Estimated losses in production after harvesting during transport; storage is 25 % due to faster ripening, microbial spoilage, and new pests and diseases; and
>
> (c) Projected decrease in export for fisheries is 30-50%.

Major Typhoons for the Last 10 years (2008-2017): Cost of Damage and Casualties

A number of very destructive typhoons have hit the Philippines in the past ten years but the most destructive of these is Typhoon Yolanda (Haiyan). Typhoon Yolanda (classified as category 5, a super typhoon), attained ten-minute sustained winds of 230 km/h (145 mph) and six hours later, attained a minute sustained winds of 315 km/h (195 mph) and gusts up to 380 km/h (235 mph) on 7 November 2013 (Typhoon Haiyan-Wikipedia 2018). When Typhoon Yolanda made landfall in the central Philippine islands region on 8 November 2013, its 600 km typhoon diameter crossed the Philippine

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archipelago and brought widespread devastation in its path. Strong winds, heavy rainfalls, and storm surges (height: 4.5 m [14.7 feet]) caused extreme loss of lives and widespread damage to properties (NOAH 2014). The total damage reached PHP 96,621 million and about 6,300 deaths.

Other major typhoons have hit the Philippines and wrought catastrophic damages on the country. Table 2 below provides a summary of the cost of damage and casualties due to major typhoons for the last ten years (2008-2017). The figures show that the agriculture sector was the hardest hit. The average total annual is PHP 36,833 million (equivalent to about 0.32% of the country's average GDP for the past ten years) and is comprised of agriculture (PHP 24,073 million), infrastructure (PHP 6,463), and others (PHP 6,297 million).

Table 2. Cost of damage and casualties due to major typhoons for the last 10 years (2008-2017).

Year	Name of Typhoon: Local Name (International Name)	Cost of Damage (PhP M)				Casualties[b]		
		Agriculture[a]	Infrastructure[b]	Others[b]	Total	Dead	Injured	Missing
2017	Auring (01W), Gorio (Nesat), Huaning (Haita), Lani (Talim), Maring (Doksuri), Odette (Khanun), Urduja (Kai-Tak) & Vinta (Tembin)	6,768	2,153	-	8,921	243	96	217
2016	Butchoy (Nepartak), Carina (Nida),Karen (Sarika), Lawin (Haima), Marce (Tokage) & Nina (Nock-ten)	19,093	4,002	-	23,095	28	6	22
2015	Amang (Mekkhala), Ineng (Goni), Nona (Melor), Egay (Linfa) & Lando (Koppu)	21,505	8,326	143	29,975	144	139	15
2014	Agaton (Lingling), Glenda (Rammasun), Luis (Kalmaegi), Mario (Fung-wong) & Seniang (Jangmi)	39,581	8,218	553	48,352	265	1,397	24
2013	Crising (Shanshan), Emong (Leepi), Gorio (Rumbia), Labuyo (Utor), Maring (Trami), Odette (Usagi), Ramil (Danas), Santi (Nari) & Vinta (Krosa)	9,572	1,748	-	11,319	84	78	16
	Yolanda (Haiyan)	**28,857**	**9,585**	**58,180**	**96,621**	**6,300**	**28,689**	**1,061**
	Sub-total	38,429	11,333	58,180	107,940	6,384	28,767	1,077
2012	Dindo (Doksuri), Ferdie (Vicente),Gener (Saola), Helen (Kai-tak), Ofel (Son-tinh), Pablo (Bopha) & Quinta (Wukong)	33,155	7,849	2,858	43,862	1,177	2,727	862
2011	Bebeng (Aere), Egay (Haima), Falcon	24,142	6,611	580	31,334	1,520	6,278	241
2010	Basyang (Conson), Caloy (Chanthu) & Juan (Megi)	11,743[b]	620	-	12,363	135	113	96

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(Continuation) Table 2. Cost of damage and casualties due to major typhoons for the last 10 years (2008-2017).

2009	Crising, Dante (Kujira), Emong (Chanhom), Feria (Nangka), Gorio (Soudelor), Isang (Molave), Kiko (Morakot), Ondoy (Ketsana), Pepeng (Parma), Santi (Mirinae) & Urduja (27W)	32,284	12,357	10	44,651	1,058	818	108
2008	Cosme (Halong), Frank (Fengshen), Helen (Kalmaegi), Igme (Fungwong),Julian (Kammuri), Karen (Nuri) & Nina (Hagupit)	14,026	3,164	648	17,838	604	878	133
Total		**240,726**	**64,633**	**62,972**	**368,331**	**11,558**	**41,219**	**2,795**
Average		**24,073**	**6,463**	**6,297**	**36,833**	**1,156**	**4,122**	**280**

Sources: [a]DA FPOPD-DRReaMS; [b]NDRRMC 2018; UNOCHA-ReliefWeb 2018.

Compared to the 1990 to 2006 period, the recent damage rate has significantly increased. The National Disaster Risk Reduction and Management Council (NDRRMC) reported that the average annual direct damages for the period 1990-2006 caused by disasters was PHP 20 billion (Cathedral 2016). The direct damages included not only typhoons but all disasters for this period. For the last ten-year (2008-2017) period, the average annual damage rate due to major typhoons only was about PHP 36.833 billion (Table 2).

Special Agricultural Insurance Programs

Climate change has posed an ever-growing challenge to the Philippine government to help poor farmers and fisherfolk cope with damages to their farm investments and improve their livelihood. Consequently, the government is continuously expanding its agricultural development programs and implementing climate change adaptation and mitigation measures. One of these programs is the provision of fully (100%) subsidized or free agricultural insurance programs for subsistence/ small farmers and fisherfolk, which are listed in Box 2.

Box 2. List of subsidized or free agricultural insurance programs for subsistence/small farmers and fisherfolk.

1. Registry System for Basic Sectors in Agriculture-Agricultural Insurance Program (RSBSA- AIP)

The RSBSA-AIP is a full (100%) premium subsidy insurance program for all subsistence farmers and fisherfolk listed in the RSBSA. The government allocated a PHP 3.5 billion premium subsidy fund to PCIC, pursuant to Republic Act No. 10964 or the FY 2018 General Appropriations Act, to be used exclusively for the full cost of insurance premiums. Those eligible for insurance coverage are (1) farmers and fisherfolk registered under the RSBSA; (2) farmers and fisherfolk not receiving any other subsidy for similar types of insurance programs from the local government; and (3) farmers and fisherfolk listed in the RSBSA with insurable interest on the farm, fish farm, livestock, and agricultural assets submitted for coverage. Farmers and fisherfolk may avail of insurance for rice, corn, high-value crops, livestock, fisheries/aquaculture, and non-crop agricultural assets.

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(Continuation) Box 2. List of subsidized or free agricultural insurance programs for subsistence/small farmers and fisherfolk.

2. Agricultural Insurance Program for Subsistence Farmers and Fisherfolk and Agrarian Reform Beneficiaries (ARBs) Not Listed under RSBSA

This program provides a full (100%) premium subsidy for the insurance coverage of farms and other farm investments of subsistence farmers and fisherfolk and ARBs who are not listed under RSBSA and also not a recipient of any DA or DAR subsidized agricultural insurance programs. The List of ARBs Not Listed in RSBSA shall be submitted by the DAR Provincial Agrarian Reform Officer (PARO) or the Municipal Agrarian Reform Officer (MARO) to the concerned PCIC Regional Office(RO)/PCIC Extension Office (PEO), while the List of Subsistence Farmers and Fisherfolk Not Listed under RSBSA shall be submitted by the DA-RFO Regional Executive Director or Provincial or Municipal Head of agencies/bureaus/corporations attached to DA, or Provincial/Municipal Head of the Philippine Coconut Authority (PCA) and National Irrigation Administration (NIA), or Municipal Agricultural Officer (MAO) of Local Government Units (LGUs), to the concerned PCIC RO/PEO.

3. Agricultural Insurance Program for Agrarian Reform Beneficiaries (ARBs)

This program provides a full (100%) premium subsidy for the cost of insurance coverage of farm investments of ARBs participating in the Agrarian Production Credit Program (APCP) and Credit Assistance Program for Program Beneficiaries Development (CAP-PBD). The APCP and CAP-PBD are financing programs implemented by the DA, DAR, and LBP to provide affordable credit, development assistance, and marketing support. The eligible borrowers are ARBs and ARB household members certified and endorsed by DAR.

Farmers and fisherfolk may avail of insurance for rice, corn, high-value crops, livestock, fisheries/aquaculture, non-crop agricultural assets (for fixed asset acquisition loan), and loan repayment (for working capital loan).

4. Agricultural Insurance Program for DA-Program for Unified Lending in Agriculture (PLEA)

This program provides a full (100%) premium subsidy for the insurance coverage of farm investments (rice crop, corn crop, high-value crops, livestock, fisheries/aquaculture, and non-crop agricultural assets), including a loan repayment protection plan which guarantees payment of the loan in case of death/disability of subsistence farmers and fisherfolk participating in DAPLEA non-collateralized agricultural loans. The farmer/fisherfolk-participant of DA-PLEA must be a borrower of any eligible Lending Conduits (LCs) accredited by the Agricultural Credit and Policy Council (ACPC). The ACPC accredited LC/identified organization shall submit to the concerned PCIC Regional Office the list of eligible farmer/fisherfolk participants in the DA-PLEA Program.

5. Agricultural Insurance Program for DA-Survival and Recovery (SURE) Assistance Program

This program provides a full (100%) premium subsidy for the insurance coverage of farm investments (rice crop, corn crop, high-value crops, livestock, fisheries/aquaculture, and non-crop agricultural assets), including loan repayment protection plan for subsistence farmers and fisherfolk in areas declared under a state of calamity by the concerned Local Government Unit (LGU). The farmer/fisherfolk-participant of DA-SURE must be a borrower of any eligible lending conduits (LCs) accredited by the ACPC. The ACPC

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(Continuation) Box 2. List of subsidized or free agricultural insurance programs for subsistence/small farmers and fisherfolk.

accredited LC/identified organization shall submit to the concerned PCIC Regional Office the list of eligible farmer/fisherfolk participants in the DA-SURE Program.

6. DA-LBP Sikat Saka Program (SSP) – Rice (Palay) Crop Insurance

This program provides a full (100%) premium subsidy for the rice crop insurance coverage of small farmers participating in the DA-LBP SSP. The SSP is the credit component of the Food Staples Sufficiency Program of the DA. The LBP is the lending conduit of the Program. The eligible farms are those (1) with an effective irrigation system and functional drainage system; (2) with at least 0.5 hectare but not more than 5 hectares; (3) not within 200 meters of the nearest body of water or marshland; (4) reached by a regular means of transportation; and (6) located in areas that are generally peaceful and orderly. The maximum amount of cover shall be up to the amount of the loan granted by the LBP.

7. DA-LBP Sikat Saka Program (SSP) – Corn Crop Insurance

This program provides a full (100%) premium subsidy for the corn crop insurance coverage of small farmers participating in the DA-LBP SSP. The SSP is the credit component of the Food Staples Sufficiency Program of the DA. The LBP is the lending conduit of the Program. The eligible farms are those (1) with at least 0.5 hectare but not more than 5 hectares, (2) reached by a regular means of transportation, and (3) located in areas that are generally peaceful and orderly. The maximum amount of cover shall be up to the amount of the loan granted by the LBP.

8. DA Rice High Yield Technology Adoption (HYTA) Crop Insurance Program

The DA Rice HYTA Crop Insurance Program is a full (100%) premium subsidy program for subsistence farmers participating in the DA Rice HYTA Program. This special crop insurance program is funded by DA. The DA Rice HYTA Program promotes the utilization of high-quality hybrid and inbred rice seeds and yield-enhancing inputs to increase farm-level productivity. Farmers identified and listed as beneficiaries by the DA-Regional Field Offices under the DA Rice HYTA Program are eligible for insurance coverage.

9. DA-Hybrid Rice Production Crop Insurance Program

The DA-Hybrid Rice Production Crop Insurance Program is a full (100%) premium subsidy program for subsistence farmers participating in the DA-Hybrid Rice Production Program. The DA Hybrid Rice Production Program promotes and intensifies the use of hybrid rice seeds for 600,000 hectares and increases the production of rice in the country through an efficient Public-Private Partnership. The DA-RFO shall identify and endorse to the concerned PCIC Regional Office, the eligible farmer-participants in the Program.

10. DA- Masaganang Ani 200 Crop Insurance Program

The DA-Masaganang Ani 200 Crop Insurance Program is a full (100%) premium subsidy program for small oil palm growers and subsistence rice and corn farmers in Kabacan, Arakan Valley, and M'lang and Tulunan, North Cotabato participating in the DA Masaganang Ani 200 – Plant Now Pay Later (PNPL)

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(Continuation) Box 2. List of subsidized or free agricultural insurance programs for subsistence/small farmers and fisherfolk.

Program. This is a program of DA, PCIC, and Planters Products, Inc. (PPI). PPI provides production loans in the form of production inputs to these farmers. The PPI shall submit the List of Farmer-Participants to the concerned PCIC Regional Office for free insurance coverage.

11. DA- Agricultural Insurance Program for Vulnerable Farmers and Fisherfolk in Region 8 under the DA Yolanda Rehabilitation and Recovery Program (YRRP)

This agricultural insurance program under the DA-YRRP is a full (100%) premium subsidy provided by DA to insure farm investments of subsistence farmers and fisherfolk in areas in Region 8 which were directly hit by Typhoon Yolanda (Haiyan).

Qualified farmer-beneficiaries may avail of insurance for rice, corn, high-value crops, livestock, fisheries/aquaculture, non-crop agricultural assets, and accident and dismemberment. The DA- Regional Field Office (RFO) 8, in collaboration with provincial/municipal/city local government units, shall provide PCIC Regional Office No. 8 with the Master List of Qualified Farmer Beneficiaries.

The subsidy funds for special agricultural insurance program nos. 2, 3, 4, 5, 6, 7, 9, and 10 described above are sourced by PCIC from the Bangko Sentral ng Pilipinas (BSP) remittances to PCIC representing the Corporation's share in the penalties collected by the BSP from certain lending institutions for noncompliance or under-compliance with the provisions of Agri-Agra Law (RA 10000).

INNOVATIVE AGRICULTURAL INSURANCE PRODUCTS

The PCIC is continually enhancing its existing traditional agricultural insurance products to make these more responsive to the needs of its beneficiaries. However, PCIC is also open to new and innovative agricultural insurance products which offer potential advantages, such as the faster settlement of indemnity claims, payouts, and lesser loss adjustment cost. PCIC has piloted projects using these new insurance products which include the following:

Weather Index-Based Insurance (WIBI)

WIBI is an insurance scheme wherein the payout is based on an agreed index (e.g., rainfall index for rice and corn crops.) PCIC has developed WIBI products for certain rice and corn crop varieties, their corresponding location-specific rainfall-crop yield and loss indices and threshold levels, as well as systems and procedures for underwriting, claims settlement and payout, including rainfall monitoring and reporting based on PAGASA reports. These have been developed during the piloting of the following projects on the development of WIBI–low rainfall and excessive rainfall products for rice and corn crops in irrigated and rainfed areas:

- ILO-CCAP WIBI Project (2011)
  Pilot Sites: Buenavista and Remedios T. Romualdez, Agusan del Norte. (This Project was continued beyond the pilot by PCIC and collaborators up to 2015)
- PhilCCAP- Phase 1-WB-GEF WIBCI Project (2012-2016)
  Pilot Sites: Tuguegarao & Peñablanca, Cagayan; Dumangas, Iloilo
- UNDP-GEF WIBI Mindanao Project (2014 to 2017) (rice crop only)

  Pilot Sites: Bukidnon, Davao del Sur, Davao del Norte

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There are also projects in the pipeline for WIBI and these include PCIC's collaboration with the following institutions in the development of weather-crop yield and loss indices and threshold levels for certain crops: (1) USAID-Wildlife Protect, Palawan State University (PSU), and Western Philippines University (WPU)– banana, cassava, and seaweeds (aquaculture); and (2) UPLB-SESAM– rice, corn, coconut, cacao, coffee, and banana. The latter is part of UPLB-Project "Smarter Approaches to Reinvigorate Agriculture as an Industry in the Philippines Phase 2" (SARAI), a DOST-PCAARRD-funded project.

The following are the features of the WIBI-rainfall index for rice and corn crops:

- The farmer's crop is insured against low rainfall (drought) and excessive rainfall during its policy period.
- The index is subdivided into crop stages and threshold levels are set scientifically.
- Daily monitoring of rainfall is being done by PCIC based on the data given by PAGASA to analyze if a breach of the trigger/threshold level happens.
- When there is a breach (low rainfall or excessive rainfall), immediate payout procedures will be done to indemnify the farmers.
- No farm inspection is required in the determination of actual loss. Thus, the assured farmers will be paid within a reasonable time.

The major advantages offered by WIBI are the following:

- Transparency because the farmers and other stakeholders have access to climate information on which the payouts will be calculated;
- Low premium cost since the farmers have the option to choose only the type of weather insurance that will suit their farm area (e.g., if his farm area is irrigated, the farmer has the option not to include low rainfall coverage);
- Fast settlement of claims. Under the PhilCCAP project in the Tuguegarao pilot site, the WIBCI farmer-claimants received the payouts within seven days from the date of crop loss caused by excessive rainfall brought by Super Typhoon Lawin (Haima) in October 2016. As compared to the traditional crop insurance scheme, this is faster by eight days from the standard claims settlement response time (CSRT) within 15 days from submission of complete documents by the farmer insured under indemnity-based crop insurance.
- Low loss adjustment cost since no on-farm loss adjustment is required; transportation and other field verification and adjustment expenses were not incurred under WIBI procedures.
- WIBI products may be offered to private institutions; LGUs and other public institutions at the national/regional level (macro), provincial/municipal level (meso), or directly to farmers (micro).

WIBI products also have challenges as follows:

- Education: WIBI insurance policies are different from the traditional multi-peril crop insurance policies. Thus, farmers and other stakeholders need training and education on WIBI. WIBI also requires organizing and profiling of farmers and their farms and monitoring of their production activities. The start-up cost is high.
- Marketing: WIBI-Rainfall Index Insurance developed by PCIC and collaborators is limited only to low rainfall and excessive rainfall risks. The farmers are asking for typhoon/wind speed and flood risks coverage for their farms. The WIBI products with typhoon/wind speed and flood risks coverage have yet to be developed by PCIC and its collaborators.

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- Basis Risk: The major challenge in WIBI is basis risk or the mismatch between the loss experienced by the farmer and the payout.

The mismatch may happen due to these types of basis risk: (1) Spatial basis risk: local variations in the peril occurrence (e.g., rainfall) within the area surrounding a weather station; (2) Temporal basis risk: inter-annual variations in seasonal crop phases, meaning that the insurance phases are not temporally aligned with the intended crop growth stage; and (3) Product basis risk: crop losses can be caused by many factors (IFAD-WFP 2011). Basis risk may happen where there are different management practices and different crop varieties— that is, the weather risk may be correlated, but its impact is highly variable (World Bank 2011). The farms may suffer loss from pests and diseases, and other weather perils like typhoon/wind speed, flood, and extreme heat (temperature) which are not covered under rainfall index-based insurance products.

To minimize basis risk, PCIC developed the Geographic Insurance Unit (GIU) protocol. The individual farms in the pilot areas were classified and grouped according to agro-climatic conditions and crop management practices. WIBI works best in homogeneous areas. Thus, the further development of a specific index for a particular developed GIU will ensure the applicability of the index to the GIU. Although this is a complex and expensive procedure, the expected results will redound to the satisfaction of the insured farmers with WIBI because the difference between crop damage and payout will decrease. This is also a helpful technique for proper risk classification of groups of farms that serves as one of the factors in pricing.

PCIC will continue enhancing the WIBI products for rice and corn crops and will consider the inclusion of other climate risks such as wind speed/typhoon, flood, and temperature in the insurance coverage, following the suggestions of farmer-cooperators and other stakeholders.

Area-Based Index Yield Insurance (ARBY) for Irrigated Rice (2010-2011)

ARBY offers crop insurance coverage that provides a payout whenever the average yield within a specified area (e.g., an area in National Irrigation System [NIS]) falls below the trigger or average insured yield.

PCIC's experience in developing ARBY was done in collaboration with the German International Cooperation Agency (GIZ). The ARBY for rice crop was piloted in 2011 in six NIS areas in Leyte. Under the ARBY insurance scheme, it is not necessary to inspect individual farms either before coverage begins or in the event of potential loss, thus the operating cost is lower than the traditional crop insurance scheme. The pilot test proved the feasibility of the concept (GIZ 2018).

Yield Insurance Product (YIP) for High-Value Crops (HVC) under the Hybrid Scheme (combination of traditional, ARBY, and WIBI schemes)

This is an insurance scheme that covers the average annual yield of the crop. PCIC will pay the difference between the average annual yield, and the actual annual yield, i.e., the reduced yield, and/or damaged fruits caused by natural calamities and/or pests and diseases. The amount of payout or loss in production is computed based on the farm gate price of the fruits in the farm location at the time of inception of the insurance policy. YIP-HVC will encourage the lenders/commercial banks to provide long-term loans to farmers growing long-gestating crops like coconut trees because YIP assures the lenders that the loan amortizations that may start during the fruit-bearing stages/period will be paid by the farmer-borrower even if the yield/fruits are damaged by calamities and other insured perils. In case of yield loss, the amortizations will be sourced from the indemnity payment of PCIC.

This hybrid insurance scheme being developed by PCIC is a combination of traditional, ARBY, and WIBI schemes. PCIC is undertaking hybrid product development projects to reduce administrative

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costs, achieve a faster claims settlement response time (CSRT), and also eliminate or minimize basis risk in index-based insurance products. The weather-crop yield, loss indices, and threshold levels will be developed during the pilot-testing phase. Indices (e.g., rainfall, temperature: extreme heat and frost/ cold stress, wind speed/typhoon, flood) will be developed using advanced technologies and equipment, such as AWS, remote sensing, UAV (drone), and others. In addition, Geographic Insurance Units (GIUs) will be developed during the pilot phase and considered in the development of indices.

Upon development of the indices, the indices will be used to corroborate with the computed loss or fruit damage/reduction which will be assessed using the traditional scheme but on a sampling basis only.

Yield Insurance Coverage under Traditional Indemnity-Based Scheme

The PCIC developed Yield Insurance for Mango using the traditional scheme in 2011. Its implementation has proven successful and presently, PCIC is developing Yield Insurance Products (YIPs) for coconut, cacao, and coffee. The LBP, PCA, and DA-PCAF are collaborating with PCIC in the development of these products. The YIP for coconut will be pilot-tested this year in three provinces: one each in Luzon, Visayas, and Mindanao. The YIP for coconut has the potential to insure 3,565,100 hectares of coconut areas (PSA 2017) and may benefit about 2,742,000 coconut farmers.

The LBP and PCIC prioritized coconut, coffee, and cacao since these crops are DA-priority crops. The demand for coffee and cacao is increasing locally and worldwide. Planting cacao and coffee under coconut trees as intercrops could be very profitable and can easily increase by 2-4 times or up to 400 percent of the income of coconut farmers (Dar 2017). Further, an increase in high-value crop production through intercrops may help offset a potential decrease in food production due to decreasing agricultural land area. Based on PSA data, the agricultural land area has decreased by 27% since 1990, from 9.975 million hectares in 1990 down to 7.271 million hectares in 2012, a decrease of 2.704 million hectares (PSA 2018).

These innovative Agricultural Insurance Products: WIBI and ARBY "should continue to be pursued to enhance the viability of AIP as they can reduce the operating expenses of the PCIC" (Virola 2017).

PRODUCT DEVELOPMENT AND IMPLEMENTATION CHALLENGES

Major Challenges in the Development of Innovative/Index-Based Agricultural Insurance Products in the Country (Cajucom 2017; PhilCCAP 2017)

The new insurance products hold great promise in making insurance more accessible and acceptable to agricultural stakeholders. However, there are challenges to be hurdled. These include the following:

1. Need for technical assistance of scientists/ experts on the particular crop or livestock or aquaculture, subject of index-based insurance product development

The development of various weather indices and threshold levels related to the determination of effects of weather on the growth, yield, and loss of a particular crop or livestock or aquaculture at different growth stages involves science-based modeling and experimentation. These tasks require the expertise of scientists knowledgeable on the particular crop or livestock or aquaculture, subject of product development, specifically for index-based insurance products such as Weather Index-Based Insurance (WIBI), Area-Based Yield Index Insurance (ARBY; for crops), and Yield Insurance (combination of traditional, ARBY and WIBI schemes (hybrid). The development of these products also needs the collaboration of meteorologists, hydrologists, and other scientists/experts

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for the development of weather indices for rainfall, wind speed/typhoon, flood, humidity, temperature, and/or other factors relevant to the index product.

2. Availability of data relevant to the insurance product to be developed

Historical detailed data on yield or production, the extent, and causes of loss or damages to crops, livestock, and aquaculture in agricultural areas are vital information in the development and pricing of agricultural insurance products. The weather data of previous years are also important factors in the development, risk analysis, and pricing of weather insurance products. There is a need to compile, sort, and consolidate these data that may be available in various government and private institutions to facilitate access and utilization in insurance product development by public and private sectors.

Further, there is a need for a body to integrate research and development efforts in the area of risk estimation and the development of objective, science-based indices, and thresholds (SEARCA Joint Statement of the Policy Roundtable on Improving Agricultural Insurance Program to Enhance Resilience to Climate Change in Southeast Asia 2015)

3. Need for advanced technologies and equipment

The development and implementation of index-based insurance products utilize advanced technologies and equipment, such as remote sensing (e.g., normalized difference vegetation index [NDVI], other applications), Unmanned Aerial Vehicle (UAV), Automatic Weather Station (AWS), Information and Communications Technology (ICT) (e.g., digitalization, mobile apps), software programs like Decision Support System for Agrotechnology Transfer (DSSAT), Data Analytics, and others. Such technologies and equipment are costly and not yet widely available or used in the Philippines, especially in remote areas.

For instance, on utilization of AWS for WIBI operation in the country, PAGASA clarified in 2016 that the current PAGASA infrastructure is not yet designed for WIBI application. PAGASA explained that for the immediate implementation of WIBI (within 1-3 years), "PCIC can use the existing PAGASA synoptic (58) and agromet station (22) in the scaling up of weather index based insurance." However, PAGASA stated the following limitation/current condition of PAGASA infrastructure before the stations can be used for WIBI application:

> PCIC has plans of expanding its coverage for weather-based index insurance and currently the infrastructure of PAGASA is not designed for the application of weather based index insurance. Scaling up can only be achieved if there is systematic coverage of observing stations in the country, with weather stations sufficiently close to the insured parties. Mapping of the current weather recording infrastructure on the ground would be a crucial step in supporting scaling up. (PAGASA Situationer, PhilCCAP-AWS Investment Plan Writeshop Minutes, December 2016)

The sparse distribution of PAGASA weather stations around the country with roughly only one gauging station per province is also a crucial factor to consider. These weather gauging stations are often located near airports and coastal areas primarily for navigational purposes (Lansigan 2015).

Further, the farmers and fisherfolk participating in the WIBI group crop insurance scheme need modern farm equipment to enable efficient and cost-effective farm production (e.g., equipment for synchronized planting of the same crop variety in contiguous farm areas, ICT equipment to access: information from PAGASA weather reports, DA's advisory services on crop production management: climate-smart decision support

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system [CS-DSS], and communication with WIBI insurer, lender, and technical support providers).

Thus, there is a need to invest in AWS and other advanced technologies and equipment to enhance farm production and support WIBI operations in the country.

4. Continued collaboration with insurance product development partners until completion of the pilot project

Pilot projects require many meetings, literacy programs, and other cooperative activities to facilitate the accomplishment of related tasks. Science-based index insurance product development takes a long period (years/crop seasons) of crop modeling and experimentation. Thus, ensuring the continuing interest, support, and commitment of partners is crucial to the project's success.

5. Adequate funds for product development processes

Agricultural insurance products, especially index-based products, are developed using science-based modeling and experimentation requiring the technical assistance of experts/ consultants, advanced technologies and equipment, holding collaboration activities, and taking a long period to develop. These factors require adequate allocation of funds to sustain the development process up to its completion.

6. Need to address basis risk in index-based insurance products.

Basis risk, referring to the mismatch between the loss experienced by the farmer and the payout, results in "unequal payouts even if damages are the same." (ILO-CCAP 2011). Eliminating or at least minimizing basis risk needs measures such as the development of GIUs in areas where the index-based insurance products will be offered. Such measures will take time, manpower, expertise, and funds to develop.

Major Challenges to the Implementation of Agricultural Insurance Program in the Country

1. Limited insurance capacity of PCIC

PCIC, the sole traditional crop insurance provider in the country has limited insurance capacity. It has a capitalization of only PHP 2 billion. Thus, it cannot adequately meet the large demand for agricultural insurance protection. Based on January 2016 data from the Registry System for Basic Sectors in Agriculture (RSBSA), the total number of poor farmers and fisherfolk in the country is about 13,516,337. This raises the need to find ways of increasing funding for agricultural insurance from both the government and private sector.

2. Reduction and management of climate risks

As discussed in previous chapters, the Philippines is one of the most vulnerable countries to natural hazards and other risks. Such vulnerability makes the innovation of measures that will reduce and manage risks to minimize losses in the agricultural insurance business an urgent necessity.

Recommendations and Conclusions

There is a need to take two approaches to increase the effectiveness of insurance as a climate change adaptation instrument in the Philippines. One is to address the challenges to new and innovative product development and the other is to improve the implementation of the country's existing agricultural insurance program. The following measures are thus recommended:

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Recommendations on Product Development of Innovative/Index-Based Agricultural Insurance Products

Generally, the WIBI and ARBY insurance schemes require expertise, data, and equipment on the part of project implementers, on one hand, and knowledge and acceptance on the part of the farmers and fisherfolk, on the other. These requirements have only been partially achieved and further measures have to be taken. The following steps are recommended to address these issues:

1. Tap agricultural State Universities and Colleges (SUCs) in the development of weather-crop yield and loss indices and threshold levels for WIBI Products. The participation of SUCs can help ensure the adequate number of available experts/scientists and at the same time ensure continuity of modeling and experimentation. Since there are many types of crops, livestock, and aquaculture, these can be distributed among the SUCs.

Each SUC can focus on the particular crop/s and/or livestock grown or raised that is suited to the agroclimatic conditions within or near their areas of operation. They will select the most climate-resilient and productive, high-yielding varieties/species of the crop/livestock that will be considered in the research project. The professors and students will collaborate with PCIC and private insurance providers in the modeling and experimentation. Since the SUCs must be equipped for their science-based research and development activities, the SUCs have to be provided with the necessary technology and equipment, infrastructure/laboratories/off-site stations, and more importantly, research and development funds. The experts in SUCs will form part of the group of experts/consultants who will work on the development of weather-crop yield and loss indices/parametric and related protocols. This arrangement will be cost-effective and will help ensure the sustainability of the project. Private educational institutions supportive of this objective should also be encouraged to collaborate in this undertaking.

For the fisheries sector, additional adequate support is needed to fully harness the wealth of the country's fisheries and aquaculture resources and protect these against climate and man-made risks. This support is crucial considering the Philippines has 220,000,000 hectares of maritime waters and 183,000 hectares of inland waters compared to the country's land area of only 29,817,000 hectares. One important example of additional support is in education. There is an immediate need to increase SUCs for fisheries to augment the few existing SUCs providing fisheries courses in the country. SUCs and fisheries professionals are also needed in identifying and enhancing the climate change-resilient varieties/species; developing weather-crop yield and loss indices and threshold levels for various aquaculture crops/stocks; and training and educating of fisherfolk.

2. Create a data infrastructure necessary for the development of agricultural insurance products.

Insurance requires high-quality data. From an insurance perspective, data is of high quality if it is timely (so that claims can be paid quickly), relevant (so the product offers reliable protection), audited to international reinsurance standards, and available over a sufficiently long time horizon (time series). High quality data forms the basis for high quality, reliable insurance solutions. Without such data, insurance markets are unlikely to develop in a sustainable manner (World Bank 2015).

To make high-quality data available for agricultural insurance purposes, governments have important roles to play in establishing a framework for data collection, auditing, financing, and management (World Bank 2015).

To create a data infrastructure for the development of agricultural insurance products in the country, there is a need to compile, sort, and consolidate previous years' weather data,

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weather forecasts, information on agricultural production and damages, soil suitability maps, risk maps, and other related data. Likewise, the compilation, sorting, and consolidation of all research studies on crops, livestock, and aquaculture, which can be utilized in insurance product development, should also be done. A government institution should be commissioned to handle the development and management of the data infrastructure and make it accessible to public and private insurance providers, lending institutions, agricultural producers, and related industries. These data should be made available in digital format.

It would also be advantageous to create a body that will integrate and manage all government research initiatives on agriculture and fisheries/ aquaculture to facilitate the attainment of agricultural development goals, consolidation of related studies, and its applications on food security and business solutions like financing and agricultural insurance.

3. Acquire adequate advanced technologies and equipment and educate and train implementers and other stakeholders on these advanced technologies and equipment for its use in the development and operation of index-based insurance products.

There is a need to review, update, and implement the AWS Investment Plan crafted by BSWM and PAGASA. This plan describes standard parameters for the acquisition, installation, and maintenance of AWS equipment and contains directives for identifying set-up locations, as well as guides on the technical specifications appropriate for each identified site and use (PhilCCAP 2017).

To acquire knowledge on advanced technologies, the continued participation of our country in product development, training workshops, consultative meetings, and information and knowledge exchange programs of ASEAN and other countries piloting or implementing index-based insurance products will be very helpful. Continued collaboration with international technical cooperating agencies/ donors (e.g., SEARCA, NAST, GIZ, ADB, WB, IFC, UNDP, ILO, USAID, FAO, JICA, APO, CIAT, APRACA, CDF Canada, GEF, IFAD) and certain insurers and reinsurers will need to be done.

For these technologies and equipment to reach the farmers and fisherfolk, there is a need to cluster and organize them to undertake collective farming and fisheries management to achieve economies of scale and maximize sharing of advanced technologies and equipment. “In a predominantly smallholder-based agricultural system, especially where prior land reform efforts had deliberately moved that sector in that direction, small producers need to achieve greater economies of scale through the ability to cluster together” (Habito 2016). The bundling of credit and insurance should be continued to encourage lenders to provide credit to small farmers and fisherfolk. Lending institutions will more likely lend to organized groups than to individual farmers for the purchase of equipment.

4. Forge a formal agreement among collaborators, insurance product development partners, and agricultural insurance stakeholders at project inception to ensure and facilitate cooperation during the entire project duration. The collaborators’ commitment to invest time, manpower, and funds for incidental expenses is necessary until project completion.

The Local Government has an important role to play. Early orientation and sustained engagement with local government are essential for the progress and sustainability of climate change adaptation initiatives. In relation, there is a need to align climate change adaptation initiatives with the development priorities of the local government (World Bank 2017)Index insurance works best when integrated into broader programs for development and disaster management (Hellmuth et al. 2009). In WIBI Mindanao Project, LGUs have been found to

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provide financing to farmers and this must be explored for potential linkages on WIBI products (UNDP-GEF 2018).

Likewise, the farmer-cooperators must be motivated to participate until project completion to ensure continuity of crop modeling in the pilot site. Explaining the benefits of the project to their welfare will help in getting the farmers' continuing involvement.

5. Source adequate funds for technical support, acquisition of advanced technologies, and conduct of research to ensure continuity and success of the pilot project. Initiatives should be undertaken to access funds from the national government, LGUs, other government institutions, foundations, and international agencies supportive of this kind of project.

6. To minimize basis risk, develop Geographic Insurance Units (GIUs) to avoid erroneous payouts above the actual damage or on the contrary, fail to pay the actual cost of damage to farms. Geographic Insurance Unit (GIU) refers to the grouping of different farmers' lands with similar characteristics that can be the object of insurance coverage. The insurer will classify the individual farms in the areas for insurance coverage into groups that have similar homogeneous conditions. The individual farms are analyzed and classified according to the following: 1) their agro-climatic conditions and crop management (e.g., soil type, slope, topography, and distance from nearest Automatic Weather Station (AWS)); 2) crop and variety cultivated; 3) climate-type classification; 4) weather risks, surrounding environment; 5) distance to other sources of water; and 6) irrigation classification and other risks/exposures/factors.

The insurer will need to develop GIU-specific weather indices (e.g., crop growth and loss indices) and appropriate WIBI packages. Although a complex and expensive procedure, the development of a specific science-based index applicable to a GIU is ideal for WIBI to reduce the basis risk. The satisfaction of insured farmers with agricultural insurance will depend on the adequate payout for the loss they may suffer from calamities. Thus, the development of GIUs may spell the success of WIBI.

GIU protocol is also applicable to indemnity-based insurance products. This technique also helps in the risk classification of a group of farms and pricing of insurance coverage (Cajucom 2016).

Recommendations on the Implementation of Agricultural Insurance Program in the Country

Although the PCIC has proven that its agricultural insurance operation is viable, the Corporation seeks to ensure a greater number of farmers and fisherfolk and attain a higher level of effectiveness as a risk adaptation instrument. The following recommendations are made to accomplish these objectives:

1. Pursue the following strategies to provide insurance protection to a significant number of farmers and fisherfolk and other stakeholders in the agriculture, fisheries, and forestry sectors:

1.1 Work for the increased capitalization of PCIC. Support bill filed in Congress strengthening PCIC, increasing its capitalization, and authorizing PCIC to act as a reinsurer (HB 6923 2018).

1.2 Enhance Public-Private Partnership (PPP) on agricultural insurance. Provide technical support and incentives allowed by law to private insurance providers to encourage them to engage in the agricultural insurance business. Continue conducting consultative meetings on PPP with the private insurance sector (e.g., PIRA, PLIA, various insurance and reinsurance companies, and brokers), lending

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institutions/commercial banks, CSOs, and other stakeholders.

Moreover, fast-track the implementation of the Agriculture Microinsurance Framework issued by the Insurance Commission (IC) under Circular Letter 2015-53 dated 15 October 2015. The Framework aims to promote public and private collaboration for the 1) development and provision of agriculture microinsurance products and services that are simple, affordable, and accessible to the vast population dependent on agriculture and 2) innovation and design of insurance products tailored to the needs of clients (e.g., parametric-based: wind speed, temperature, rainfall, and other similar indices that may be permitted by the Insurance Commission).

Under the Framework, the Insurance Commission is responsible for the issuance of the guidelines that will govern the agricultural insurance operation of the private insurance industry. The PCIC is tasked to assist in product development, engage in tie-ups and product bundling, provide training for microinsurance providers and financial education for clients, and act as an aggregator of risks and/or reinsurer, whenever possible. The PCIC, acting as an aggregator of risks and/or reinsurer, is vital to the successful scale-up of agricultural insurance in the country. FAO, in its 2011 report on Agricultural insurance in Asia and the Pacific region, stated that:

> Government intervention is also often justified on the grounds of systemic risks (as a result of droughts, floods and epidemic diseases), which often exceed the capacity of local insurers and their reinsurers to cover as they involve potentially huge financial losses. Governments therefore often act as a catastrophe reinsurer of last resort or form national reinsurance companies to assume these liabilities. (FAO 2011)

As cited by Senator Cynthia A. Villar in the Explanatory Note of SB 1759, the PCIC has had too few participants and very minuscule outreach compared with the total number of farmers that it is supposed to serve. There is a need for the country to involve the private sector and adopt a more relevant strategy and also safeguard the food security of the broader rural population (Villar 2018 SB 1759 2018).

Immediate action needs to be taken to establish and stabilize the PPP for the country's insurance program. With an established PPP, the goal of reaching a larger number of farmers and fisherfolk will be possible.

Presently, PCIC is performing its social mandate of insuring largely the poor farmers and fisherfolk under government-subsidized special agricultural insurance programs. It is also providing market-based insurance to other agricultural producers. The following are some of the conceivable arrangements for a PPP composed of PCIC and private insurance companies:

a) A PPP to provide market-based insurance to poor farmers and fisherfolk. This goal requires the formulation of special measures for a feasible and sustainable PPP operation. On the part of the national government, the special measures may require its provision of government premium subsidy (GPS) for the poor farmers and fisherfolk to be downloaded through the private agricultural insurance providers with tax exemption incentives for agricultural insurance transactions. The PCIC can act as a reinsurer. These measures need the passing of a law and the appropriation of funds for their implementation (Cajucom 2009).

b) A PPP to provide pure market-based insurance protection to medium and large agricultural producers. The capitalization of PCIC should be increased to enable the corporation to provide adequate participation in this form of partnership. This is another cooperation that is worth test-piloting to determine its feasibility in the country.

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The private insurance companies, on their own, have the option to provide pure market-based insurance protection to small, medium, and large agricultural producers. However, Mahul and Stutley in their 2010 book entitled, "Government Support to Agricultural Insurance: Challenges and Options for Developing Countries" stated that:

> Agricultural insurance is a complex line of business that requires highly technical expertise, in both the development and the operational phases. It can expose insurers to major losses because of the systemic component of most agricultural production risks. Private insurance markets have proved to be efficient for dealing with nonsystemic risk (such as hail) and large farmers; purely commercial insurance may not be viable for systemic risks or smaller farmers (Mahul and Stutley 2010).
>
> Systemic risk is a risk that affects a large number of economic units, such as farmers and herders, simultaneously (Mahul and Stutley 2010).

1.3 Integrate and align the plans, policies, and proposals for the expansion of PCIC operations and the formation and operation of a strong Public-Private Partnership for agricultural insurance in the development plans of all government institutions (i.e., DA, DAR, DENR, DILG, DOST, DOF, DBM, DTI, IC, CCC, NEDA, NDRRMC, PAGASA, NIA, BSWM, ATI, PCAF, CDA, SUCs, BSP, LBP, DBP, AGFP, ACPC, and PCW) involved in development programs for farmers and fisherfolk.

The support of government institutions, especially those directly providing data and information, training and education, financial, technical, and other forms of support to farmers and fisherfolk will be needed by the private sector. The concerned institutions should exert efforts to coordinate, collaborate, and exchange information with the private sector to encourage their participation in agricultural insurance.

The Climate Change Commission has the great potential to help in this strategy as one of the "Powers and Functions of the Commission" under Republic Act No. 9729, SECTION 9, (g) is:

> Create an enabling environment for the design of relevant and appropriate risk-sharing and risk-transfer instruments (RA 9729 2009)

2. Implement risk reduction and management measures to minimize losses in the agricultural insurance business. Although the country is vulnerable to climate risks and other hazards, PCIC has demonstrated that the agricultural insurance business is viable in the Philippines, provided that a proportionate volume of insurance production, on one hand, and program costs, on the other, is attained, and more importantly, that proper risks management is consistently applied in insurance operations. Following are some of the major risk management measures that can be done toward achieving this goal:

2.1 Continue and expand the training and education of farmers and fisherfolk on good agricultural practices (GAP) under DA-ATI's Enhanced Climate Smart-Farmers Field School (ECS-FFS) Program and DA's crop management advisory services to farmers.

To scale up awareness and knowledge even among the young population, the school curriculum at all levels (grade school, high school, and college) must be reviewed, updated, and revised to integrate agriculture, fisheries and forestry concepts, and related financing and insurance concepts as well.

2.2 Continue coordination of PCIC, insurers with PAGASA, LGUs, MAFC, PAFC, NIA, DA, and

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other government agencies in determining planting cut-off dates. This is to avoid or minimize losses during the forecasted period of drought, heavy rainfall, typhoons, and floods in the particular farm location of farmers and fisherfolk.

2.3 Spread the risks, seek reinsurance, and transfer a portion of the risks on insured farms and properties to domestic and international reinsurers. Encourage domestic and international reinsurers to accept agricultural insurance risks underwritten by insurance providers in the country. In addition to a reinsurance facility, a risk-pooling set-up among insurance providers (public and private) may also be formed to increase insurance capacity, share the risks, and gain economies of scale.

Conclusions

Considering the high vulnerability of the Philippines to natural disasters due to its location in the Pacific Ring of Fire and typhoon belt and the country's large loss experience in agriculture and properties caused by destructive effects of climate change that may continue due to observed continued global warming, it is imperative to expand the country's insurance protection to agricultural producers and other stakeholders as one of the climate change adaptations of the country.

The immediate undertaking of the following major tasks will facilitate the realization of a sustainable agricultural insurance operation in the country: (1) establishment of a Public-Private Partnership on Agricultural Insurance. The participation of private commercial insurance companies in providing market-based insurance to agricultural producers will complement PCIC's limited insurance capacity and encourage commercial banks and other lenders to provide agricultural loans bundled with insurance; (2) further development and implementation of innovative/index-based agricultural insurance products. The development of WIBI, ARBY, and Yield Insurance for High-Value Crops and other crops will enable the PCIC and private insurers to provide insurance services at lesser loss adjustment cost and make faster settlement of claims possible; and (3) integration of plans for agricultural insurance program in the development and implementation plans of all concerned government institutions involved in agriculture, fisheries, and forestry sectors to ensure timeliness, adequacy, and sustainability of the program.

On their own, the small farmers and fisherfolk cannot cope with rapid changes in climate that affect their livelihood. The clustering and organizing of small farmers and fisherfolk for collective farming activities and a large-scale literacy program should be implemented to equip them with knowledge on adaptation strategies, such as climate-smart agriculture and insurance, and knowledge to minimize losses on their farms and prevent casualties. Adaptation strategies have long lead times and so these need to start NOW (Godilano and Cajucom 2012).

Overall, the implementation of an expanded agricultural insurance operation in the country through a sustained and robust Public-Private Partnership, together with the agricultural producers' use of climate change adaptation measures and science-based, cost-effective modern farming practices will significantly contribute to the government's food security and poverty alleviation programs, enhance the country's resilience to the negative effects of climate change, and boost its efforts to attain global competitiveness for its agricultural products and services.

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