

**Lessons Learned:**

**The Philippines  
Parametric  
Catastrophe  
Risk Insurance  
Program Pilot**



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**Lessons Learned:**

# **The Philippines Parametric Catastrophe Risk Insurance Program Pilot**

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# Contents

<b>Acknowledgments</b>	<b>3</b>
Executive Summary	5
Abbreviations	11
 <b>1. Introduction</b>	<b>13</b>
 <b>2. Evaluation Questions and Methods</b>	<b>15</b>
2.1 Evaluation Questions	16
2.2 Methods	18
2.3 Limitations	19
 <b>3. Background</b>	<b>21</b>
 <b>4. Overview of Product</b>	<b>25</b>
4.1 Product Structure	26
4.2 Selection of Coverage	28
4.3 Premium Payment	29
4.4 Program Institutional Structure	30
4.5 Insurance Portfolio Structure	30
4.6 Post-Event Loss Calculation and Payout Timelines	31
4.7 Legal Issues and Documentation	32
 <b>5. Approaching the Markets</b>	<b>33</b>
 <b>6. Policy Payouts: What Happened</b>	<b>35</b>
6.1 Policy Year 1	37
6.2 Policy Year 2	39
6.3 Loss Ratio of the Program	42
 <b>7. Lessons Learned</b>	<b>43</b>
7.1 Evaluation Questions Answered	44
7.2 Key Lessons	52
<b>Appendixes</b>	<b>55</b>
A Key Informant Questionnaire	56
B Program Background Information	60
C Catastrophe Risk Model	63
D Payout Structure Options	68
E Mitigating Risk in the Structure	69
F Post-Event Loss Calculation Process	72
G Legal Documentation	74
H Risk Analysis and Due Diligence	76
<b>References</b>	<b>78</b>



A farmer overlooking his rice fields near Palo, Leyte, eight months after the super typhoon Haiyan destroyed the province. Photo © Dominic Chavez/World Bank



# Executive Summary

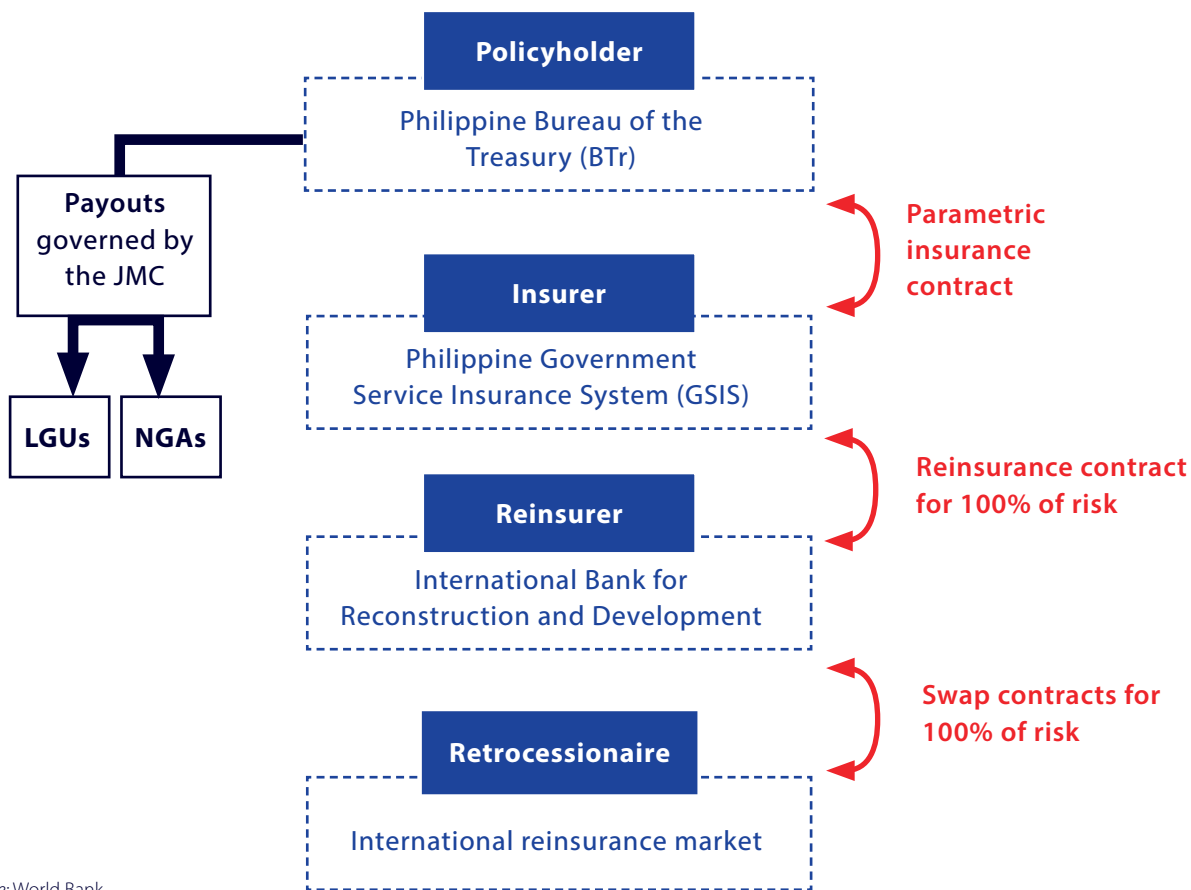


The World Bank and the Government of the Philippines (GOP) have a long-standing collaboration on disaster risk finance and insurance (DRFI) and disaster risk management (DRM). Since 2012, the World Bank has supported the GOP in the development of a country-specific catastrophe risk model for typhoon and earthquake risk. The World Bank has also supported the GOP in developing and implementing a DRFI strategy to strengthen the country's financial protection from natural disasters. The strategy sets out a vision that addresses national, local, and individual concerns for disaster risk financing and insurance activities in the Philippines.

*Many of the lessons learned and technical work undertaken have proved useful in the subsequent preparation and placement of the GOP catastrophe (CAT) bond in December 2019.*

The Philippine Parametric Catastrophe Risk Insurance Program (the “parametric program”) represents a key milestone in this partnership. In July of 2017, the Philippines placed on the international financial markets a portfolio of catastrophe risk that transferred typhoon and earthquake risk from the Philippines through the World Bank to the international reinsurance market in local currency. In 2018, the GOP purchased a second insurance policy, doubling the amount of coverage. The two-year pilot has now ended, although many of the lessons learned and technical work undertaken have proved useful in the subsequent preparation and placement of the GOP catastrophe (CAT) bond in December 2019. As part of closing this activity, the World Bank commissioned a lessons-learned evaluation to help all parties involved better understand the successes and challenges of the program, and guide their continued efforts to improve financial preparedness to disasters in the Philippines. The evaluation is also meant to build the evidence base on parametric insurance and allow for knowledge sharing with similar programs that are being explored or implemented in other countries. This report discusses the findings from the evaluation.

**FIGURE ES.1. STRUCTURE OF THE PHILIPPINE PARAMETRIC CATASTROPHE RISK INSURANCE PROGRAM**



Source: World Bank.

The program was designed such that the Philippine Bureau of Treasury (BTr) was the policyholder and the Government Service Insurance System (GSIS) of the Philippines, a state-owned insurance company, was the primary insurer. On behalf of the International Bank for Reconstruction and Development (IBRD), the World Bank Treasury reinsured 100 percent of the risk from GSIS and retroceded 100 percent of the risk through catastrophe swaps to a panel of international reinsurers. The World Bank also coordinated all aspects of program placement. Figure ES.1 provides an overview of the program structure.

The policy provided maximum coverage of ₱10.4 billion (US\$206 million) in the first year, and ₱20.5 billion (US\$406 million) in the second year, split across two components: (i) coverage for 25 provincial governments—Local Government Units (LGUs)— against emergency losses from major typhoons; and (ii) coverage for National Government Agencies (NGAs) against emergency losses from major typhoons and earthquakes for national government assets (based on losses in the 25 selected provinces).

Key facts on the transaction are provided in Table ES.1.



**TABLE ES.1. PHILIPPINE PARAMETRIC CATASTROPHE RISK INSURANCE PROGRAM: KEY FACTS**

<b>Feature</b>	<b>Explanation</b>
Currency	Philippine peso
Perils	Typhoon, earthquake
Trigger	Modeled loss trigger
Payout structure	Predefined partial payout with 10 percent probability of occurrence Predefined full payout with 3.3 percent probability of occurrence
Policyholder	Philippine Bureau of the Treasury
Intended Beneficiaries	50 percent for National Government Agencies 50 percent for provincial governments of 25 select provinces
Total coverage	Year 1: ₱10.4 billion (US\$206.4 million); Year 2: ₱20.5 billion (US\$406.7 million) <sup>a</sup>
Policy term	Year 1: July 2017 to July 2018; Year 2: December 2018 to December 2019

Source: World Bank.

a. Based on January 2020 exchange rate: US\$1 = ₱50.4.

The original World Bank project document for the technical support to establish this program specified several program outcomes: (i) enabling rapid liquidity in the aftermath of a disaster to empower LGUs as the first responders and reduce reliance on assistance from the national government, as this assistance may be subject to lengthy approval processes; (ii) transferring a portion of the Philippine typhoon and earthquake risk to the international reinsurance market; (iii) building government capacity in DRFI; and (iv) facilitating, in the medium term, a future catastrophe risk transfer mechanism in the form of an LGU-owned facility supported with or without

World Bank assistance. With these objectives in mind, the evaluation team posed several questions addressing what worked well about the program and what presented challenges. To answer these questions, the team conducted a desk review and key informant interviews. Key findings from the review include the following:

**Parametric insurance can be a useful tool in providing governments with rapid liquidity post-disaster.** The experience from the Philippines demonstrates that parametric insurance is an appropriate instrument where the intention is to provide rapid liquidity following a disaster, and

that it is possible to structure and execute such a program even in countries with limited experience in disaster risk finance and insurance. The GOP was able to successfully secure coverage through the international reinsurance markets. In total there were three payouts over two years, one in the first year of the policy and two in the second year. All three payouts were delivered to the GOP on time within the tight time frames set out in the insurance contract.

It is not possible to assess the financial value for money of an insurance program over only a two-year period, as any comparison of the level of payouts to the amount of premium paid will be influenced by the events that unfolded during the periods of coverage. It is particularly difficult in the case of an insurance program that provides payouts for medium and severe disaster events, which by definition are not expected to occur frequently. However, it can be observed that the average Loss Ratio (payouts/premiums paid) for the program over the two periods of coverage is 47.4 percent, which is slightly higher than the average recovery rate of non-life insurance coverage in the Philippines (41.5 per cent) and slightly lower than the corresponding ratio for Fire & Allied Perils (55.4 per cent) (GOP Insurance Commission 2018).

**There is broad interest within the private sector in well-designed parametric insurance programs.**

In the case of the Philippines, reinsurers expressed very strong interest in participating, likely as they saw the program as a way to diversify their own risk portfolios. The number of counterparties doubled in the second year of the policy. The World Bank also had interest from nontraditional parties such as pension funds. This is an indication that through supporting innovative programs the World Bank is able to support the expansion of private insurance capital being made available to vulnerable countries.

**While the transaction itself was a success, the program did not meet one of its key objectives: providing liquidity to the NGAs and LGUs.**

Originally the program was structured with the LGUs as the policyholders. However, due to several challenges (among them LGUs' inability to pay premiums and lack of familiarity with the instruments), in the end the national government paid the premium on behalf of the LGUs. Given the BTr's mandate to manage the financial resources of the GOP, it was deemed most appropriate for BTr to make the premium payment and therefore be the policyholder. The payouts were successfully transferred from the international reinsurance market to the GOP, but the funds were subsequently not released to the NGAs and LGUs. While the GOP put in place the institutional structures needed to manage the distribution of the payout, these structures were still open to some interpretation and in places unclear. GOP might also have been able to support LGUs through other means and with other sources of funds; that is, the national government may not have actually needed the rapid liquidity from the parametric program to provide support for the events that resulted in payouts.

**This program confirmed that establishing clear and binding rules for how payouts will be used (budget execution) is just as important as the source of post-disaster financing (in this case parametric insurance).**

In the case of this program being evaluated, if the intended beneficiaries were the LGUs then it would have been beneficial to have this stated either in a new regulation or within the insurance policies issued by GSIS. Alternatively, if the objective was to provide rapid liquidity to BTr then it was appropriate that BTr were the named beneficiary in the policy, but the expectations of the LGUs should have been managed accordingly. Further, while the program did establish a Technical Working Group to manage the program in compliance with the rules established regarding the distribution of payouts this still left room for differing interpretations and subsequent delays in decision making.

One way of avoiding this would have been for the intended beneficiaries to have been named within the insurance policies, ensuring any payouts were made to them directly despite the LGUs not being the designated policy holder.

**Positive basis risk can be just as problematic as negative basis risk, especially when rules for how payouts will be used do not account for this.** The first payout yielded a unique scenario where the payout amount proved to be larger than the actual damages sustained by the province that triggered the payout. According to those interviewed, there was significant disagreement on whether the BTr (the policyholder) should (i) send money to this province even though damages were light; (ii) give the money to other provinces that did sustain large damages but were not part of the insurance contract; or (iii) allocate the money for other national government expenditures such as future premiums. Because the TWG could not reach an agreement on how to allocate the payout, the funds were not released to the LGU that triggered the payout. In response to this situation, the outlined process for distribution was significantly changed in the second policy year to allow the TWG to allocate payouts to provinces other than those that triggered the payout under the parametric policy.

**Building the capacity and infrastructure needed to successfully understand and leverage risk finance and insurance is a slow process; and what seem like small success stories matter within the bigger picture and process.** Several challenges were met in this program that helped to build understanding of stakeholders across government, resolve institutional or regulatory challenges, and strengthen commitment to improved risk financing—in turn paving the way for future DRFI products.

**Strong political and technical buy-in within government is instrumental to success.** The program benefitted from strong support from the Department of Finance (DOF) over several years

for building GOP's knowledge and understanding of disaster risk financing, and this program was an integral part of implementation of the national DRFI Strategy. However, a big turning point for this particular initiative was when the program also received strong support from members of the Philippines senate, which secured sufficient budget for the premiums. Following this the strong and sustained support of BTr carried the program through to policy signature. It is clear that in order for innovative programs to succeed there needs to be strong technical justification coupled with support at senior political levels.

**Building the market appetite for emerging market catastrophe risk programs involves effort and time.** Catastrophe risk modeling, transparent product design, and regular interactions with reinsurers during the preparation phase led to significant interest from financial markets in this program, which was oversubscribed. While the softness of the insurance market at the time of placement may have helped generate more interest than in a hard market, this still provides a good indication that, with proper (but significant) policy and technical support in the preparation phase, future programs can be supported at favorable terms with a diversified and international placement.

**It is possible to develop procedures that are replicable and scalable.** Any new transaction is unfamiliar and requires significant time and effort to implement and execute; but the procedures developed for this program should allow for faster and more cost-effective transactions in the future. For example, many of the steps undertaken in the development of this program helped enable the placement of the GOP CAT bond in December 2019. This was the first sovereign CAT bond placed in Asia.

**This program contributed to the shifting approach to DRFI in the Philippines as well as efforts to reduce disaster risk.** The experience of this program and its implementation increased

capacity and understanding of disaster risk within GOP. Further considerations and technical analysis have focused GOP efforts and resources on protecting against more severe disaster events at the national level (through the issuance of the CAT bond) and also against losses to critical public assets through a new indemnity insurance program. The preparation of a national catastrophe risk model has also informed better risk understanding and supported a broader engagement on disaster risk management in the Philippines, with strong leadership by DOF.

**The needs and incentives of the intended beneficiaries must be considered when designing DRFI programs.** In the context of this program, the potential effectiveness to the intended beneficiaries (LGUs and NGAs) can only be appropriately determined in light of the actual contingent liability faced by the beneficiaries should a disaster event occur. During the design and implementation of this program frequent consultations with participating LGUs were held, although it was not possible to obtain data on either the expenditures made by LGUs for past disasters, nor the expected share of expenditures between the national government and LGUs for different possible future disaster scenarios. Further analytical work on understanding the contingent liabilities for different LGUs as well as GOP regulations to clarify post-disaster expenditure sharing would help in designing any future financial protection programs to provide the most benefit to LGUs.

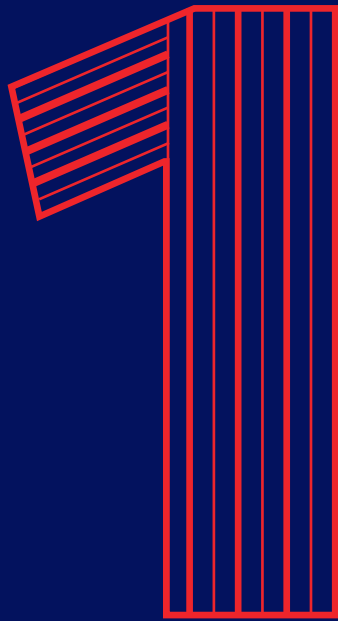
**Preparation and execution of a new program requires a significant amount of technical assistance and advisory support over an extended period, which often is enabled through donor funds.** Donor funds executed through World Bank trust funds were important for supporting this program from initial concept through execution. The Philippine DRFI engagement under which this program was carried out was supported by the World Bank, with financial assistance from the UK Department for International Development (DFID; Foreign, Commonwealth, and Development Office) through the Global Facility for Disaster Reduction and Recovery (GFDRR). The European Union (also through GFDRR) further supported analytical work that played a critical role in enabling this program. Through these funds the World Bank was able to provide a multi-disciplinary team of advisors with relevant experience of delivering similar parametric insurance programs in other countries. Sustained technical and policy related support during the design, development, design, execution and renewal was critical to the success of the program.

# Abbreviations

<b>AAL</b>	Average Annual Loss	<b>IBRD</b>	International Bank of Reconstruction and Development
<b>AIR</b>	AIR Worldwide	<b>ISDA</b>	International Swaps and Derivatives Association
<b>BTr</b>	Bureau of the Treasury	<b>JMC</b>	Joint Memorandum Circular
<b>CAA</b>	Calculation Agency Agreement	<b>LGU</b>	Local Government Unit
<b>CAT bond</b>	Catastrophe Bond	<b>NatRe</b>	National Reinsurance Corporation
<b>CAT-DDO</b>	Catastrophe-Deferred Drawdown Option	<b>NCA</b>	Notice of Cash Allocation
<b>COA</b>	Commission on Audit	<b>NGA</b>	National Government Agency
<b>DBM</b>	Department of Budget and Management	<b>OCD</b>	Office of Civil Defense
<b>DepEd</b>	Department of Education	<b>PDEX</b>	Philippine Dealing System
<b>DFID</b>	Department for International Development (UK)	<b>PDRA</b>	Pre-Disaster Risk Assessment
<b>DILG</b>	Department of the Interior and Local Government	<b>P-DRFF</b>	Philippine Disaster Resilience Financing Facility
<b>DOF</b>	Department of Finance	<b>PIRA</b>	Philippine Insurers and Reinsurers Association
<b>DRFI</b>	Disaster Risk Financing and Insurance	<b>RA</b>	Republic Act
<b>DRFIP</b>	Disaster Risk Financing and Insurance Program	<b>TWG</b>	Technical Working Group
<b>DRM</b>	Disaster Risk Management		
<b>DRRM Fund</b>	Disaster Risk Reduction and Management Fund		
<b>FX</b>	Foreign Exchange		
<b>GFDRR</b>	Global Facility for Disaster Reduction and Recovery		
<b>GOP</b>	Government of the Philippines		
<b>GSIS</b>	Government Service Insurance System		



Philippines. Photo: Benedikt Signer



# Introduction

Located within the Pacific Ring of Fire—a region of the Pacific Ocean where most of Earth’s volcanic eruptions and earthquakes occur—and within the Pacific Typhoon Belt, the Philippines is highly prone to devastating natural calamities. On average, the Northwest Pacific Basin is hit by an estimated 27 typhoons a year (JTWC 2016), and the Philippines has experienced about 8,000 earthquakes of magnitude 5.0 or greater since the 16th century. Typhoon Yolanda, which struck the Philippines in November 2013, was one of the most powerful typhoons to ever make landfall. It killed 6,200 people, left another 1,700 missing, and cost the country an estimated ₱571 billion (US\$11 billion) in damage and economic losses (World Bank 2017).

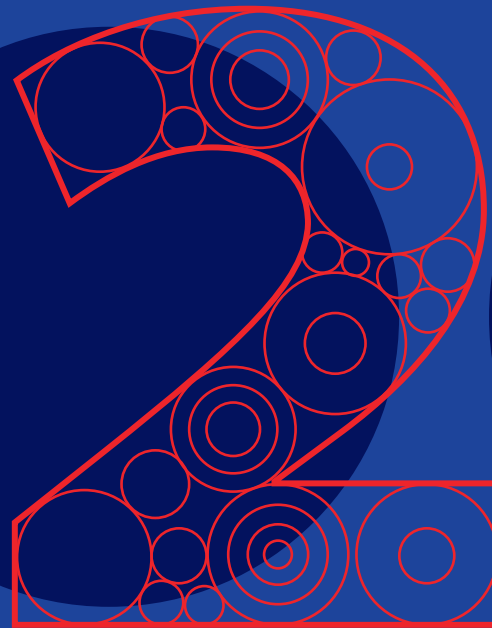
Since 2010, the Government of the Philippines (GOP) has significantly enhanced its capacity for disaster risk management (DRM) and disaster risk finance and insurance (DRFI). It has shifted its emphasis from emergency response to disaster preparedness, risk reduction, and financial protection. Contributing to this transition is a long-standing collaboration between the World Bank and the GOP. Since 2012, the World Bank has supported the GOP in developing a country-specific catastrophe risk model for typhoons and earthquakes, and in designing and implementing a DRFI strategy to strengthen the country’s financial protection to natural disasters. The strategy sets out a multi-level vision—one that addresses national, local, and individual concerns—for disaster risk financing and insurance activities in the Philippines. These efforts were supported by financial assistance from the UK Department for International Development (DFID) and the European Union, through the Global Facility for Disaster Reduction and Recovery (GFDRR).

As part of the implementation of the DRFI strategy, in July 2017 the GOP purchased its first parametric insurance policy under the Philippine Parametric Catastrophe Risk Insurance Program (the “parametric program”). In doing so, the government successfully transferred some of its disaster risk to the international reinsurance markets. In 2018, the GOP purchased a second insurance policy (renewal) under the program, approximately doubling the amount of coverage offered by the first policy.

Since the parametric program has now ended, the World Bank has commissioned a lessons-learned evaluation to better understand the successes and challenges of the program. This evaluation will help guide continued efforts to improve financial preparedness to disasters in the Philippines. It will also build the broader evidence base on parametric insurance and be shared with similar programs being explored or implemented in other countries.

This report discusses the findings from this review. It begins by briefly outlining the research methods and questions (Section 2) and then offers some background on the GOP’s efforts on DRFI (Section 3). It next discusses the key components of the parametric program (Section 4), the approach to markets (Section 5), and the unfolding of the payout process for three events (Section 6). It concludes with lessons learned, framed in terms of the identified evaluation questions (Section 7).





# **Evaluation Questions and Methods**

## 2.1 Evaluation Questions

As part of the World Bank’s support to the GOP on the implementation of the DRFI Strategy the World Bank prepared a project to support the ‘Joint Catastrophe Risk Insurance Program for Local Government Units’. The World Bank’s Quality Enhancement Review (QER) of this project identified the following project development objective: “ascertain the viability of market-based catastrophe risk transfer solutions for local government units (LGUs) in order to increase the financial protection to natural disasters (typhoons and earthquakes) of participating LGUs” (World Bank 2015). Expected program outcomes included the following:

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Enabling rapid liquidity in the aftermath of a disaster to empower LGUs as the first responders and reduce reliance on assistance from the national government, as this assistance may be subject to lengthy approval processes

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Transferring a portion of the Philippine typhoon and earthquake risk to the international reinsurance market

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Building government capacity in DRFI

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Facilitating, in the medium term, a future catastrophe risk transfer mechanism in the form of an LGU-owned facility, supported with or without World Bank assistance

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With these objectives in mind, and with the awareness that the design of the product evolved over time (see Section 4), the following key evaluation questions were developed to document lessons learned:

**EQ1:** **What worked well (and not so well) in the design and implementation of the parametric program?**

- Which design features were most appreciated by stakeholders? Which features worked as planned? What were the design challenges?
- How effective were the collaborations between key stakeholders, including National Government Agencies (NGAs), LGUs, and members of the program's Technical Working Group (TWG), in the design and implementation of the program?

**EQ2:** **Did the program meet the objectives and needs of stakeholders? How and in what ways?**

- Was parametric insurance an appropriate instrument for meeting the objective of providing rapid liquidity for a portion of emergency response costs after a disaster? And to whom was that liquidity provided?
- Was the final policy design appropriate to meet the GOP's objectives for the parametric program?
- Did stakeholders consider the parametric program a good value-for-money investment? Why or why not? What might be improved?

**EQ3:** **Did this program help the GOP advance its knowledge of disaster risk finance? How and in what ways?**

- Was the World Bank's involvement appropriate and helpful in supporting GOP's efforts to improve its understanding and use of financial protection against disasters?

**EQ4:** **Did the insurance payouts improve post-disaster outcomes? How and in what ways?**

These questions are explored in detail in Section 7.1.

## 2.2 Methods

Given a limited time and scope for this review, the methods consisted of a short desk review (Table 2.1), and several key informant interviews (Table 2.2). The information gathered from these combined activities informs the lessons learned section of this report (Section 7). The background information on the parametric program, including the overview of the insurance product, builds on prior learnings and information collected by the World Bank’s Disaster Risk Finance and Insurance Program (DRFIP) staff.

The **desk review** included key documents related to (i) the design of the product, such as the project Quality Enhancement Review document, reinsurance agreements, and the insurance policy documents; (ii) operational implementation and specifically how premiums are to be paid and payouts distributed; and (iii) the actual payout processes and procedures, such as the government’s Joint Memorandum Circulars (JMCs) and the Event Briefing reports. Together, these documents showed how the program operated and the context in which it was implemented.

**TABLE 2.1. DESK REVIEW**

Document type (number) and description

<p style="text-align: center;"><b>World Bank Project Document</b> (1)</p> <p style="text-align: center;">Describes the Joint Catastrophe Risk Insurance Program for Local Government Units in the Philippines project and its development objectives</p>	<p style="text-align: center;"><b>Insurance and Reinsurance Agreement</b> (2)</p> <p style="text-align: center;">Spells out the legal agreements between i) the Bureau of the Treasury (BTr) and the Government Service Insurance System (GSIS); and ii) GSIS and the International Bank for Reconstruction and Development (IBRD) to cover any potential insurance claims upon notice and determination of an “applicable event”</p>
<p style="text-align: center;"><b>Joint Memorandum Circular</b> (3)</p> <p style="text-align: center;">Provides official guidelines for GOP stakeholders in the parametric program, namely the TWG, on how to implement, monitor, and report on the parametric insurance product</p>	<p style="text-align: center;"><b>AIR Event Briefing</b> (4)</p> <p style="text-align: center;">Describes the disaster event and impact and the loss calculation results based on the catastrophe model</p>

Source: World Bank.

Kimetrica, the research and evaluation firm that was hired to conduct this evaluation,<sup>1</sup> designed the key informant questionnaire based on information extracted from the desk review and from informal interviews with World Bank DRFIP staff (see appendix A). The first section of the questionnaire discusses the design and implementation of the parametric program. The second section focuses on the insurance payouts that occurred over the two years that the policy was in place. The third section explores stakeholders' reflections on the value of the parametric program and lessons learned.

In total, the team conducted eight key informant interviews. World Bank staff who worked on the parametric program conducted all the in-country interviews; Kimetrica conducted those with the World Bank Treasury and DFID; and a joint team conducted the more technical interview with AIR Worldwide (AIR), the independent risk modeling firm hired by the World Bank to undertake the post-event loss calculation. Table 2.2 describes each of the organizations identified as relevant stakeholders and indicates whether a representative from the organization could be reached for an interview.

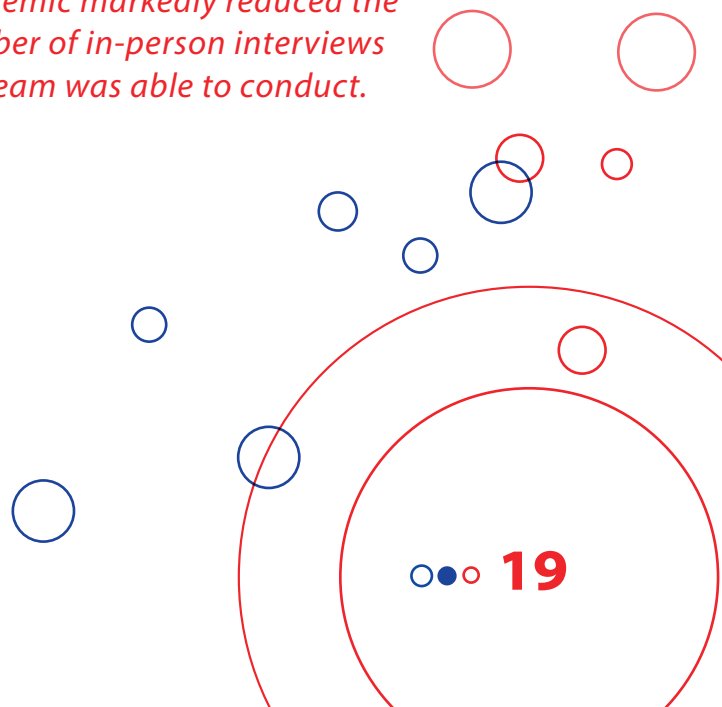
## 2.3 Limitations

There were several limitations to this study. First, the onset of the COVID-19 pandemic markedly reduced the number of in-person interviews the team was able to conduct. In many cases, efforts to reach respondents by phone were not successful. In particular the team recognize that interviews with participating LGUs would have been helpful in understanding the relative successes and challenges of the program from the perspective of LGUs.













A second limitation involved the transition of government staff. Several of the people most involved in the design and implementation of the parametric program had left their role in government by the time of the evaluation and could not be reached. Finally, World Bank staff conducted all the in-country interviews rather than an independent evaluator. Since this study focused on lessons learned rather than impact, however, the study design was deemed acceptable.

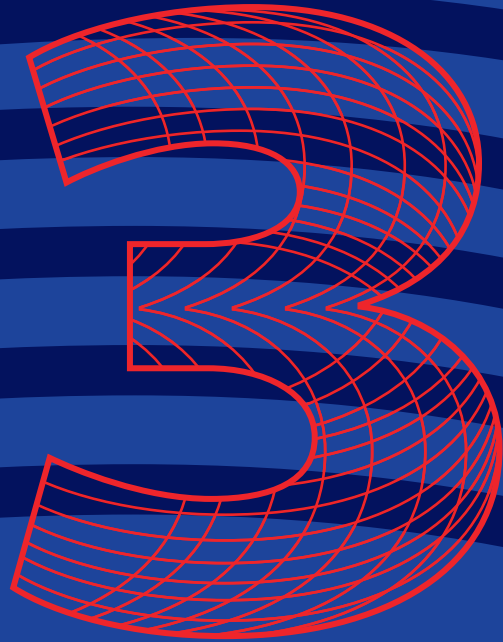
Notwithstanding these limitations, the detailed review of the program components, coupled with the interviews conducted, provide ample information about the successes and challenges of the program that can be shared with future initiatives of this kind.

*The onset of the COVID-19 pandemic markedly reduced the number of in-person interviews the team was able to conduct.*



**TABLE 2.2. KEY INFORMANT INTERVIEWS**

Organization	Description	Interviewed
Bureau of the Treasury	<b>Member of the TWG and insurance policy holder.</b> In the event of a payout, responsible for facilitating the release of the proceeds to appropriate NGAs and/or administering the direct transfer of proceeds to the appropriate LGUs following a Notice of Cash Allocation (NCA) issued by the Department of Budget and Management.	
Government Service Insurance System	<b>TWG member and the primary insurer.</b>	
International Finance Group within the Department of Finance	<b>Member and co-chair of the TWG.</b> Responsible for ensuring that proposed policy design and payout process are consistent with the principles outlined in the JMC and with the GOP's DRFI Strategy.	
Office of Civil Defense	<b>TWG member.</b> Responsible for preparing a situational report (rapid post-disaster assessment) within two weeks after the disaster to inform the allocation of payout proceeds. Also responsible for providing an early recovery and post-disaster needs assessment with gender analysis in accordance with the LGU or agency-prepared local disaster risk reduction and management plan. Participates in monitoring of payout use.	
Department of Interior and Local Government	<b>TWG member.</b> In partnership with the Union of Local Authorities of the Philippines, responsible for ensuring smooth coordination with the LGUs.	
Department of Budget and Management	<b>Member and co-chair of the TWG.</b> Responsible for ensuring the timely issuance of budget release documents for the premium payment; also responsible for the timely release and/or transfer of any payout proceeds through issuance of an NCA to BTr.	
Commission on Audit	<b>TWG member.</b> Responsible for auditing the use of payout proceeds subject to the rules and procedures of the JMC. Commission rules regulate the sourcing of premiums, utilization of insurance proceeds, and accounting of fund flows of premiums and insurance proceeds.	
National Economic and Development Authority	<b>TWG member.</b> Participates in monitoring the use and implementation of any payout proceeds.	
World Bank Treasury	<b>Reinsurer of the insurance policy.</b> Accepts transfer of 100 percent of the risk.	 (2)
DFID	<b>Donor providing funding for World Bank technical assistance during the design and implementation of the transaction.</b>	
AIR	<b>Designer of the catastrophe model that underpins the insurance policy.</b> Responsible for conducting the loss calculation results in the event of a disaster to determine whether the event will trigger a payout under the policy conditions.	
LGUs	<b>Local Government Units covered by the program against emergency losses from typhoons.</b> Could not be interviewed due to the outbreak of the COVID-19 Pandemic	



**Background**

The devastating impacts of Typhoons Ondoy and Pepeng in 2009 brought about a paradigm shift in the GOP's thinking about disasters and led the government to adopt a more proactive DRFI approach. The GOP made improving its financial resilience to natural disasters a priority and toward that end sought to develop innovative catastrophe risk transfer instruments, such as parametric risk insurance. Indeed, between the shift in the Philippines' approach to DRFI, which began in 2010, and the execution of the first catastrophe risk parametric insurance policy in July 2017, DRFI in the Philippines evolved considerably. The details of this transition are discussed extensively in appendixes B and C. Here some key points are highlighted:

**Political momentum.** Several key milestones occurred that helped lay the foundation for this program: in 2010, the enactment of the Disaster Risk Reduction and Management Act; in 2011, the approval of the first World Bank contingent credit line; and in 2014, the release of the national Disaster Risk Finance and Insurance Strategy (see appendix B).

**Commercial momentum.** In 2014, with the assistance of the World Bank, the GOP completed its first nationwide catastrophe risk assessment. By offering an overview of potential disaster losses to public and private assets, this assessment allowed the GOP to analyze the costs and benefits of various risk financing instruments as well as the efficiency gains from combining or layering different instruments for different types of risks. Over the next several years, the World Bank and GOP invested further in the catastrophe risk model used in the assessment, improving the asset exposure database and the historical loss database, in part by adding local government assets and their associated loss data. For more information see appendix C.

**Capacity building around DRFI.** Since 2014, the World Bank has supported the Philippine

Department of Finance (DOF) in the preparation and implementation of the DRFI Strategy at the national, local, and individual levels. The World Bank team conducted extensive capacity building to help both national and local governments evaluate their exposure to earthquake and typhoon risk, understand DRFI concepts and options, and design and select an insurance program. By 2018, 77 officials from line ministries had received technical training and 170 LGU officials had been briefed either in workshops or through provincial visits (DFID 2018).

The capacity-building program consisted of the following:

- Roundtable events/workshops with NGA/LGU representatives (three events)
- Technical workshops with DOF, BTr, and GSIS staff (two workshops)
- Visits to 16 LGUs, including briefings with 12 governors
- High-level briefings to national government officials
- One-on-one technical discussions with LGU staff

For local governments, it was important to have the support of the Department of the Interior and Local Government (DILG), which oversees LGUs. It was also crucial for the DILG field staff (regional directors, provincial directors, etc.) to have a close relationship with the provincial governments. This ensured DILG's access to senior LGU officials and technical staff and facilitated discussions about the insurance program. It also facilitated coordinating and convening of LGUs.

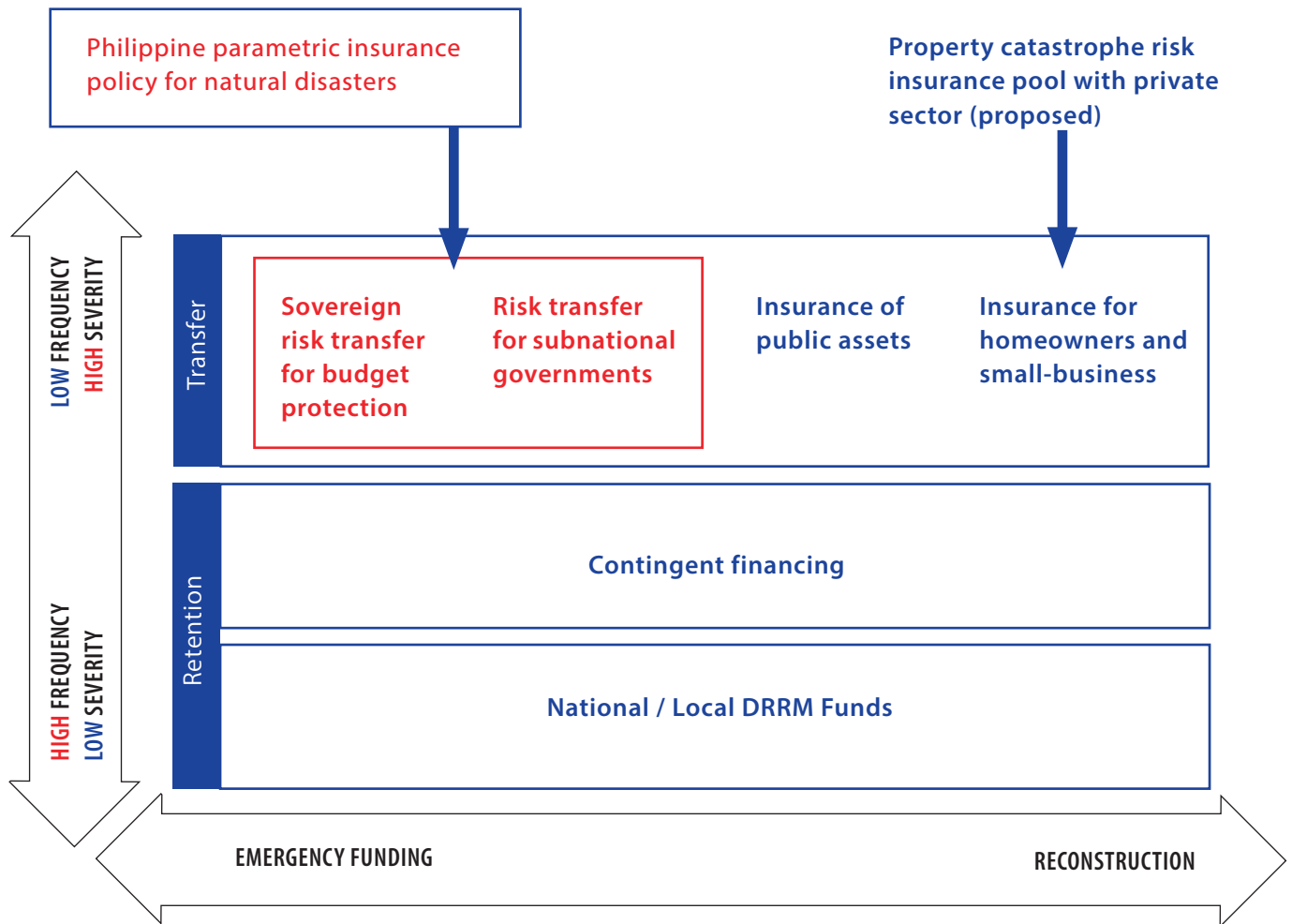
**Risk-layering approach.** As part of the broader DRFI Strategy, the Philippines adopted a risk-layering approach that combines different instruments to protect against events of different frequency and severity (Figure 3.1). Risk layering ensures that



less expensive sources of money are used first and that the most expensive financial instruments are used only in exceptional circumstances (World Bank 2018). For the GOP, the strategy secures funds for recurring disaster events through budgetary sources (National Disaster Risk Reduction and Management [DRRM] Fund; and Local DRRM Fund) and allows risk transfer instruments to be used for low-frequency, high-cost events. Starting in 2011, the GOP secured contingent financing (contingent lines of credit) both from the Japan International Cooperation Agency (JICA) and from the World

Bank, through the US\$500 million Development Policy Loan with a Catastrophe-Deferred Drawdown Option (CAT-DDO). The trigger for drawdown was the declaration of a state of calamity by the president, and the full amount was disbursed in December 2011 following Typhoon Washi. In December 2015, the World Bank CAT-DDO was renewed with another US\$500 million contingent credit line (CAT-DDO2), which had disbursement conditions similar to those of the original loan. The CAT-DDO2 was fully disbursed for Typhoon Ompong in September 2018.

**FIGURE 3.1. PHILIPPINE RISK-LAYERING APPROACH**



Sources: Philippine Department of Finance; World Bank.

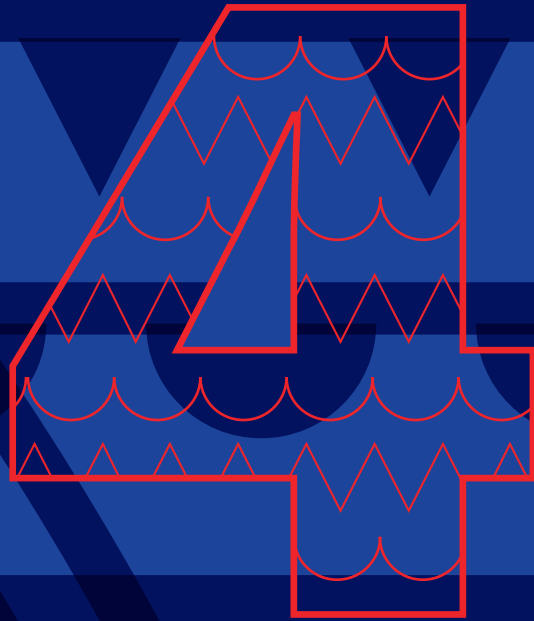
As of this review, the Philippines had established, or is in the process of preparing, several types of risk transfer mechanisms to support its risk-layering approach:

- **Sovereign risk transfer for budget protection.** Through the Philippine Parametric Catastrophe Risk Insurance Program—the subject of this report—the GOP had access to parametric insurance to provide budget support to both NGAs and LGUs during large-scale disaster events. This program ended in 2019, and rather than renew it, the government placed a catastrophe bond in December 2019 to protect against the most severe events. The GOP is also in the process of preparing an indemnity-based insurance program for public assets (see below).
- **Indemnity-based insurance of public assets.** The World Bank is working with BTr and GSIS to establish a comprehensive national program of insurance for critical public assets. This is expected to be placed by mid-2021. GSIS already offers various non-life insurance product lines

to both NGAs and LGUs. All LGUs are mandated by law to insure their public assets and any insurable interest with the GSIS. Noncoverage of assets and underinsurance persist, however.

- **Catastrophe risk insurance pool for homeowners and small businesses.** The establishment of a catastrophe risk insurance pool for households and small businesses is currently proposed. This initiative is led by representatives from the Philippine Insurers and Reinsurers Association (PIRA), the National Reinsurance Corporation (NatRe), and the Insurance Commission. In January 2020, PIRA, NatRe, and the Insurance Commission signed a memorandum of understanding to establish the Philippines Catastrophe Risk Insurance Facility by early 2021.

*The devastating impacts of Typhoons Ondoy and Pepeng in 2009 brought about a paradigm shift in the GOP's thinking about disaster and led the government to adopt a more proactive DRFI approach.*



# Overview of Product

## 4.1 Product Structure

The World Bank worked with GSIS and the DOF for over two years to design a risk transfer product that met the national and local priorities of the Philippines' DRFI Strategy. A key objective of the product was to provide rapid liquidity for some portion of emergency response costs following a disaster. To meet the needs of both NGAs and LGUs, the product was designed as a parametric insurance policy with several key features:

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Fast payouts (two to four weeks after an insured event)

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Clear rules and process for determining and settling payouts

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A simple structure with predefined (and easily understandable) payouts and payout trigger points

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The ability to leverage financial resources of the international reinsurance and/or capital markets.

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While traditional insurance requires a physical assessment of actual individual losses after an event, parametric instruments assess losses using a predefined formula based on variables that are exogenous to both the individual policyholder and the insurer but that are strongly correlated to losses. Examples of exogenous variables include the physical parameters of the event such as typhoon wind speed or a measure of ground shaking in an earthquake. Parametric models allow for fast claims settlement—usually within two to four weeks.

Once the decision was made to design a parametric insurance product, the GOP needed to decide on the exact parameters of the payout trigger. Several possible parametric trigger options are outlined in Table 4.1. Given that the Philippine catastrophe risk model had already been developed on a modeled loss basis, the GOP decided to use modeled loss as the basis for the triggers in the policy. (Whether this approach was appropriate for the context

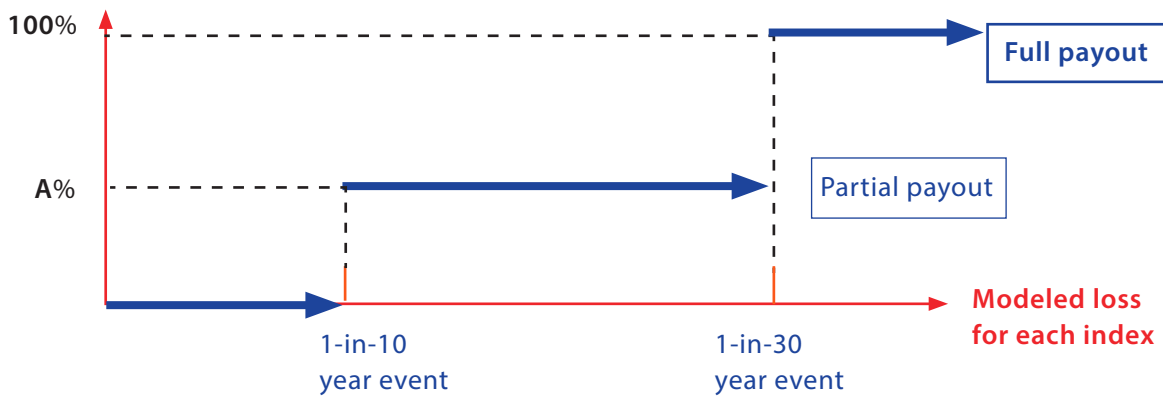
remains a question, however, as it proved difficult for stakeholders to understand; see Section 7.1). The country's catastrophe risk model combined with third-party reported hazard parameters formed the basis of the product trigger.

Next, the GOP needed to determine a payout structure for the parametric product. The GOP chose a stepped payout with two attachment points based on the modeled losses equivalent to a one-in-10-year event and one-in-30-year event, respectively. The partial payout was set to equal 40 percent of the full payout (see Figure 4.1). A more detailed explanation of the various types of payout structures is in appendix D. The GOP chose this structure because it was simple and easy to explain, but also because—compared to a binary structure with only one level of payout—it allowed for more efficient coverage of medium (one-in-10-year) events and more severe (one-in-30-year) events.

**TABLE 4.1. PARAMETRIC TRIGGER OPTIONS**

Feature	Modeled loss	First generation (Cat-in-a-box)	Second generation
Thresholds	A transparent modeling process is established; the loss is modeled after an event occurs to determine if a payout will be made.	Classic: Zones are defined with a triggering magnitude or wind speed.  Gridded: High-resolution areas are defined with a triggering magnitude or wind speed.	An index of measured intensity measures is defined (e.g., seismographs); if the index exceeds a threshold, a payout is triggered.
Ability to meet target loss metrics	Yes (precisely)	Yes (+/- small tolerance)	Yes (+/- small tolerance)
Payout speed	Medium	Fast	Medium to slow
Ease of explanation	Low	High	Low/medium
Basis risk sources	Model and intensity calculation process	Model and design process	Model, network, and design process

**FIGURE 4.1. STEPPED PAYOUT STRUCTURE**



Source: World Bank.

## 4.2 Selection of Coverage

With the support of the World Bank, the GOP evaluated the risk profiles of individual provinces to identify those most at risk of typhoons and earthquakes based on the estimated losses from the catastrophe risk model. The relative exposure of individual provinces to typhoon and earthquake risk was also examined.


The GOP used this information to evaluate the options for risk coverage. With the assistance of an Excel-based analytics tool developed by the World Bank, the GOP was able to assess the following:

- The potential losses due to typhoons and earthquakes in specific LGUs and/or a selection of LGUs and the associated likelihood (probability) of such losses occurring
- The potential costs associated with providing relief and recovery for disaster events of varying severity in specific LGUs and/or a selection of LGUs
- The estimated payouts from a parametric insurance program for a given premium amount and payout structure (such as the payout structure indicated in Figure 4.1) covering specific LGUs and/or a selection of LGUs
- Indicative payout amounts for a selection of historical events for a selected insurance program and premium amount, had the selected program been in place at the time of each event


Following a detailed review of the risk profiles and potential coverage options, the GOP selected 25 individual provinces to participate in the program.<sup>2</sup> The selected payout structure was the same for all 25 provinces to keep the design and approach simple.

In addition to choosing cover for individual LGUs, the government selected cover for NGAs based on the estimated losses for a specific region of the Philippines. Following a detailed evaluation of different options, the regional cover selected was based on the aggregate risk profile of the same 25 individual provinces. At the regional level, the government selected coverage against both typhoon and earthquake risk. The amount of coverage chosen for typhoon and earthquake risk was determined based on the estimated losses associated with the selected regional area.

The coverage selected at both the provincial and regional level is described in Table 4.2.



*“Following a detailed review of the risk profiles and potential coverage options, the GOP selected 25 individual provinces to participate in the program.”*



**TABLE 4.2. COVERAGE SELECTED**

Feature	Regional cover	Provincial cover
Allocation of premium	50%	50%
Intended beneficiaries	NGAs	LGUs
Policyholder	Bureau of the Treasury	Bureau of the Treasury
Perils covered	Typhoon (79%) Earthquake (21%)	Typhoon (100%)
Indexes included	Two regional indexes of losses (one for typhoon and one for earthquake) for the 25-province region	25 province-specific typhoon indexes, for the following: Albay, Aurora, Batanes, Cagayan, Camarines Norte, Camarines Sur, Catanduanes, Cebu, Davao Del Sur, Davao Oriental, Dinagat Islands, Eastern Samar, Ilocos Norte, Ilocos Sur, Isabela, Laguna, Leyte, Northern Samar, Pampanga, Quezon, Rizal, Sorsogon, Surigao del Norte, Surigao del Sur, Zambales
Modeled loss	Estimated emergency loss <sup>a</sup>	Estimated emergency loss <sup>a</sup>
Partial payout attachment point	1-in-10-year loss	1-in-10-year loss
Full payout attachment point	1-in-30-year loss	1-in-30-year loss
Partial payout percentage	40%	40%
Term	1 year	1 year

Source: World Bank.

a. The emergency loss represents an estimate of the loss that the national government could sustain as a result of providing necessary relief and undertaking recovery efforts. This is calculated as a proportion of the direct loss. See AIR Worldwide (2018).

## 4.3 Premium Payment

The Philippines had a fixed budget available for premium payment, so the total coverage was determined based on the coverage offered by the reinsurance market for the selected premium, minus the applicable taxes and fees. In the first year of coverage, the GOP made an allocation of ₱1 billion (US\$19.84 million) for the payment of insurance premium. This amount increased to ₱2 billion (US\$39.68 million) in Year 2.<sup>3</sup>

The budget allocations were made under the National DRRM Fund of the General Appropriations Acts of 2017 and 2018, respectively. In accordance with the relevant provision, each year the DOF

and the Department of Budget and Management (DBM) issued a Joint Memorandum Circular to provide guidelines on implementing, monitoring, and reporting on the use of the allocation.<sup>4</sup> GSIS was also heavily involved in the design of the JMC but was not a signatory, given that it is under the oversight of DOF.

The way in which the premium payment was allocated changed between the first and second years of the policy. In the first year, it was split equally among the 25 provinces. In the second, it was allocated according to categories of risk (high, medium, and low). See Section 6.2 for more details.

## 4.4 Program Institutional Structure

To oversee the guidelines contained in the JMCs, the DOF and the DBM formed a Technical Working Group. Members of the group included the DOF, DBM, GSIS, DILG, BTr, Commission on Audit (COA), Office of Civil Defense (OCD), and National Economic and Development Authority. Each agency's role is described in Table 2.2.

While the policyholder for the program was the BTr, the intended beneficiaries of payouts were the NGAs under the regional coverage component and the individual LGUs under the provincial coverage component. In the first year of the program, payouts for the 25 eligible LGUs following an eligible event were to match the partial and full payouts according to the insurance contract. For the NGAs, however, the payout allocations were not

fixed but rather determined by the TWG based on a process outlined in the JMC. According to the JMC, following an event, the OCD was to prepare a rapid post-disaster assessment, which the TWG would then use to determine the percentage allocation of any payout across NGAs. Note, however, that these procedures changed in the second year of the policy (see Section 6.2).

The TWG also had the responsibility to monitor the use and implementation of payout proceeds by the beneficiary NGAs. Proceeds of the insurance coverage were intended solely for post-disaster recovery and rehabilitation activities relating to government infrastructure and facilities needed to restore operations and delivery of basic services.

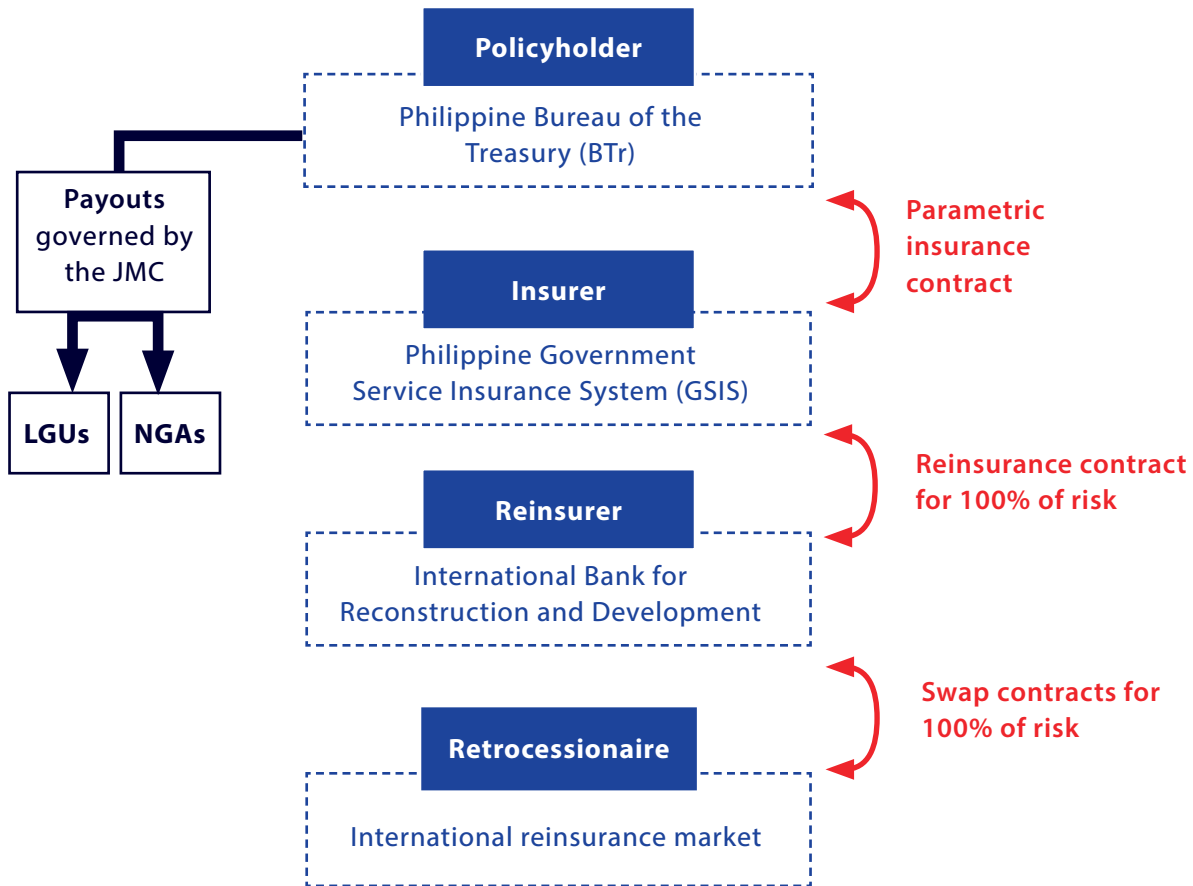
## 4.5 Insurance Portfolio Structure

The World Bank took on the role of reinsurer, responsible for reinsuring the risk from the GSIS and passing the risk on (that is, retroceding it) to the market (see Figure 4.2). As the product is structured, proceeds from any payout flow from the international reinsurance market (the retrocessionaires) directly to the World Bank. The World Bank passes the proceeds to GSIS, the insurer. GSIS then passes the proceeds to the BTr as the policyholder, which in turn distributes funds to the intended beneficiaries (LGUs and NGAs).

The program identified four key risks inherent in the structure: (i) credit risk, or the risk that one of the parties to the transaction defaults; (ii) basis risk, or the risk that the payout from the product does not match the actual losses sustained; (iii) foreign exchange risk, or the risk created by the need to convert Philippine pesos, the currency in which the program was denominated, into a currency acceptable to the international market (in this case US dollars); and (iv) risk of nonperformance by the calculation agent. More details about these risks and how the World Bank addressed them are found in appendix E.



**FIGURE 4.2. PARAMETRIC INSURANCE STRUCTURE**



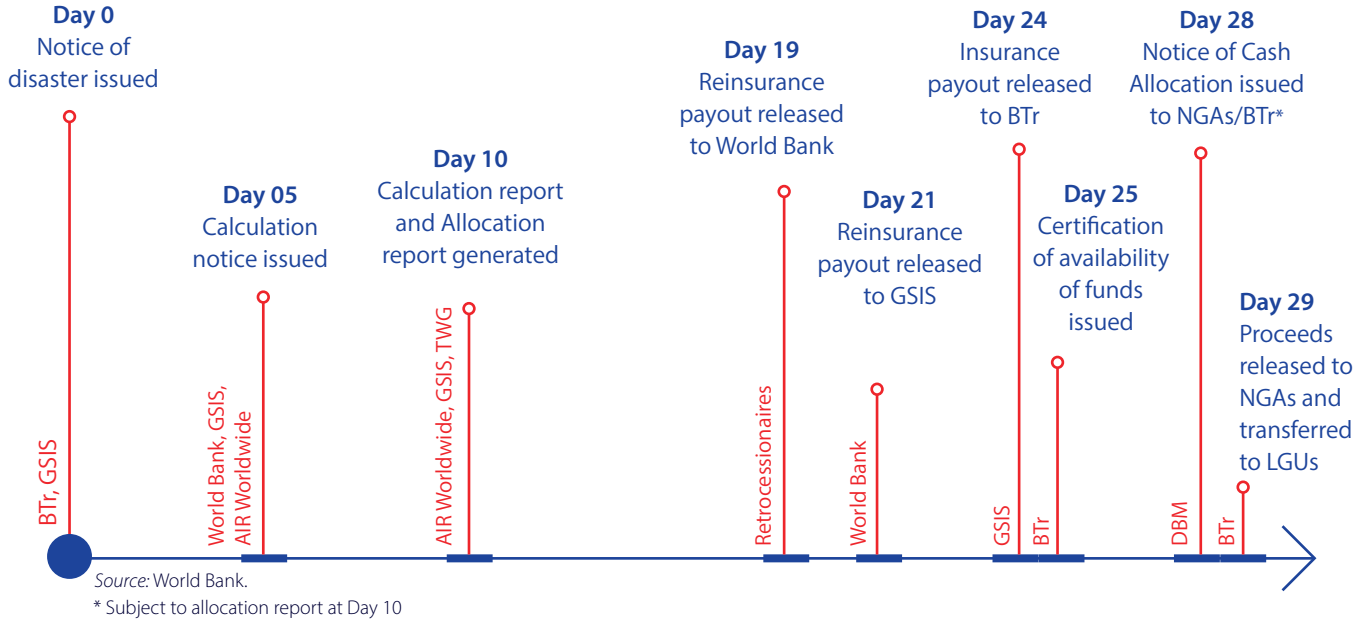
## 4.6 Post-Event Loss Calculation and Payout Timelines

The World Bank engaged the independent risk modeling firm AIR Worldwide to undertake the post-event loss calculation. This relationship was governed by a Calculation Agency Agreement. While the World Bank, by contract, was responsible for initiating a calculation in the event of a disaster, the CAA stipulated that both the BTr (as the policyholder) and the GSIS (as the insurer) could request a calculation notice. Furthermore, the contract built in a safety net that allowed the World Bank

to initiate a calculation if neither the BTr nor the GSIS made a calculation request following an event deemed significant by the World Bank.

The expected timeline for the payment of insurance proceeds from the market to the intended beneficiaries is outlined in Figure 4.3. For more information on the stakeholders and the legal structure around the post-event loss calculation, see appendix F.

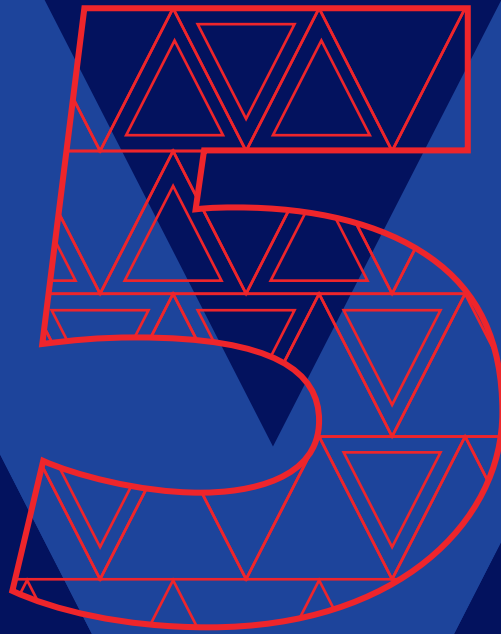
**FIGURE 4.3. PAYOUT OF INSURANCE PROCEEDS: EXPECTED TIMELINE**



## 4.7 Legal Issues and Documentation

The program consisted of three underlying contracts (between BTr and GSIS, GSIS and the World Bank, and the World Bank and a panel of reinsurers.) that needed to be executed simultaneously for the risk to pass through as intended. The GSIS was responsible for executing the program with the BTr and at the same time requesting cover with the World Bank. Once the World Bank received an

official request from the GSIS, it was responsible for approaching the market on behalf of GSIS and executing the program at the best possible price. The BTr-GSIS contract could not be executed until the World Bank confirmed the final market price, as this determined the final coverage provided by the GSIS to the BTr for the available premium. These steps are further described in appendix G.



# **Approaching the Markets**

The World Bank approached the market with a detailed analysis of the parametric program, including (i) details of the AIR model that underpinned the program; (ii) the modeled risk profiles of each LGU included in the policy and also the program as a whole; and (iii) details of how the parametric program would have responded for a selection of historical events. Reinsurers tended to quote a price for a given capacity (share) of the portfolio, with differences in terms across reinsurers. Some reinsurers quoted different prices for different tranches of the portfolio—for example, a quoted price for a low layer of insured risk and another lower quoted price for a higher layer of the insured risk. Some reinsurers segregated the portfolio in this way but then only provided a quote for a low layer of risk, choosing not to offer coverage for higher layers of risk (i.e. excluding the tail risk). Other reinsurers put conditions on their quotes, requiring, for example, that the contract be written as traditional reinsurance business.

The World Bank discussed various methods for structuring the placement to achieve the best price for the GOP. In the final framework for negotiating the deal, price was the main driver, but some differentiation in pricing was allowed to ensure a fully subscribed program and (if possible and within boundaries) to promote diversified regional participation.

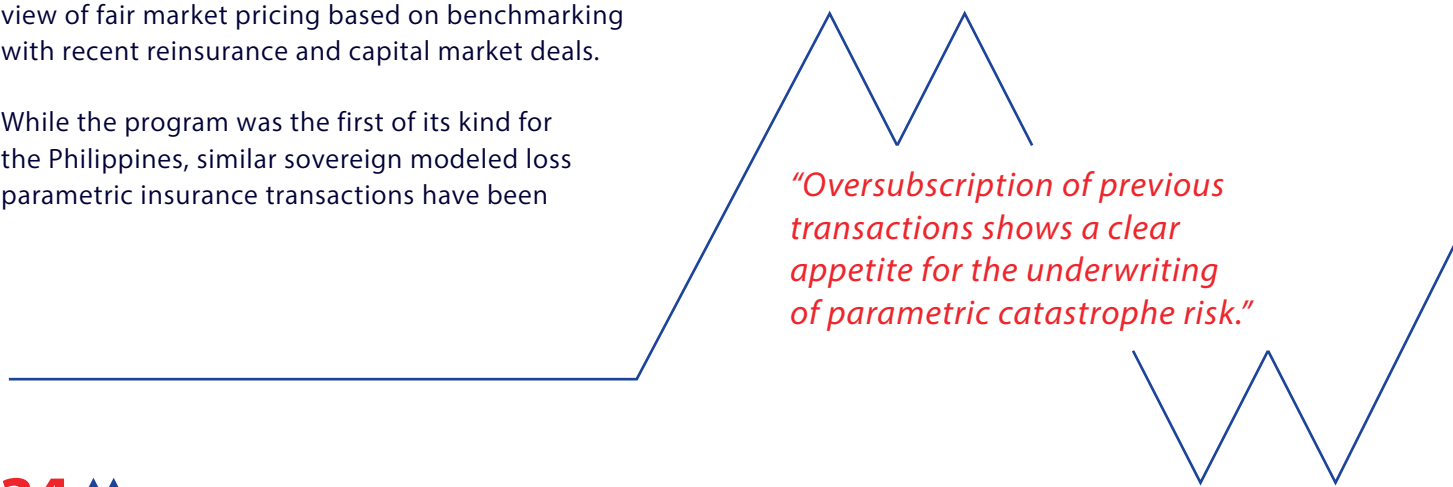
The World Bank used a standard reinsurance pricing formula to form a view of the program’s expected technical price.<sup>5</sup> In addition, it had an established view of fair market pricing based on benchmarking with recent reinsurance and capital market deals.

While the program was the first of its kind for the Philippines, similar sovereign modeled loss parametric insurance transactions have been

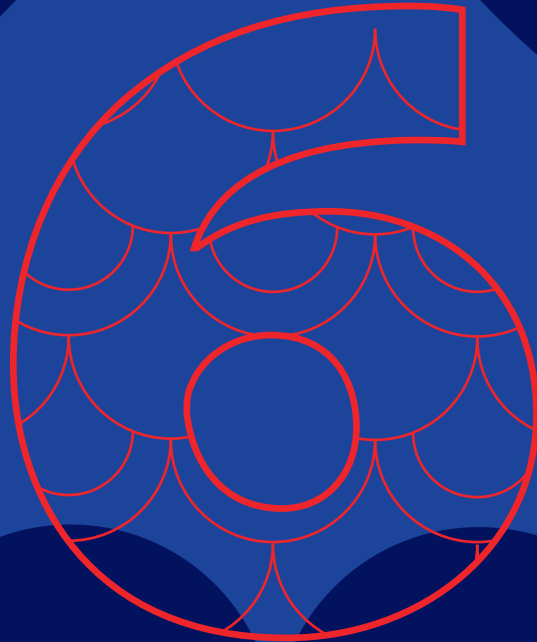
placed. For example, the Caribbean Catastrophe Risk Insurance Facility (CCRIF) reinsurance program has placed sovereign parametric insurance policies for 17 countries on the international market since 2007. Similarly, the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) has placed sovereign parametric insurance policies for five countries on the international market since 2013. While the softness of the insurance market at the time of placement of the Philippines program may have helped generate more interest than in a hard market, this still provides a good indication that there is clear appetite from reinsurers for the underwriting of parametric catastrophe risk.

The Philippine program proved no exception. For the first placement, five reinsurers across three continents subscribed: Nephila Capital, Swiss Re, Munich Re (via its subsidiary NewRe), Axa, and Hannover Re. In the second year, these same reinsurers were joined by Hiscox Re, Allianz, and SCOR, as well as Swedish state pension fund AP3 (Tredje AP-fonden). Due to the strong demand from reinsurers, the price achieved was comparable to other parametric programs that have been placed in the international market.

After the program was executed, it was widely publicized by the Philippines GOP and the World Bank through press releases, followed by several news articles and social media posts.



*“Oversubscription of previous transactions shows a clear appetite for the underwriting of parametric catastrophe risk.”*



# **Policy Payouts: What Happened**

This section describes in more detail what happened over the two years that the pilot parametric insurance program was in place.

Table 6.1 shows details of the insurance policy for each year, including the coverage period, premium amounts, and coverage limits. Coverage doubled, from ₱10.4 billion (US\$205.9 million) to ₱20.5 billion (US\$406.7 million), from the first to the second year of the policy. The figure also shows the number of calculation requests made during each policy period, along with the number and total value of these payouts.

The Rate on Line indicates that the price of coverage increased slightly between year 1 and year 2, with a corresponding decrease in the leverage (ratio of coverage limit to premium paid). This was due to an increase in the transaction fees associated with the placement rather than the pricing offered by reinsurers (which was largely unchanged between the two policy years).

**TABLE 6.1. CATASTROPHE INSURANCE POLICY DETAILS, POLICY YEARS 1 AND 2**

<b>Policy Year 1:</b> July 2017–July 2018		<b>Number of calculation requests submitted to and reviewed by AIR</b>	<b>Number of payouts</b>	<b>Total value of payouts</b>
<b>Premium</b>	<b>Coverage limit</b>			
₱1 billion (US\$19.8 million)	₱10.4 billion (US\$206.4 million)  Rate on Line (premium/coverage limit) 9.62%  Leverage (coverage limit/premium) 10.4 times	2 typhoon	1 typhoon	₱83,516,981 (US\$1,657,083)
<b>Policy Year 2:</b> December 2018–December 2019				
₱2 billion (US\$39.7 million)	₱20.5 billion (US\$406.7 million)  Rate on Line (premium/coverage limit) 9.76%  Leverage (coverage limit/premium) 10.25 times	11 (2 typhoon, 9 earthquake)	1 typhoon, 1 earthquake	₱1,338,715,094 (US\$26,561,807)

Source: World Bank.

## 6.1 Policy Year 1

In the first year the insurance product was in place, the World Bank submitted two calculation requests to AIR. The policy made one payout, in the amount of ₱83,516,981 (US\$1,657,083), for Typhoon Tembin (Vinta), which made landfall on December 21, 2017. All the contractually obligated time frames were met, from the initial calculation notice request to the policy payment date. See Table 6.2 for the timeline.

This payout represents an interesting case study because it was subject to positive basis risk: the payout amount, based on modeled losses, was more than actual losses observed in the province that triggered the payout, Davao del Sur (see Box 6.1). The literature on parametric insurance for disaster response has many examples where basis risk undermines the success of the product,<sup>6</sup> but in most cases the issue is negative basis risk, where actual losses are higher than the payout. One might assume that a payout amount larger than the actual damages would be less problematic. However, the case of Typhoon Tembin demonstrates that a mismatch between losses and payouts—in either direction—can cause misunderstandings that have longer-term consequences.

The payout, while welcome, proved to be problematic due to the lack of clarity in the rules on how the funds would be distributed given the positive basis risk event. The TWG, which must produce an allocation report before the funds can be released to NGAs and LGUs, could not agree on how to distribute the funds. The TWG felt that as the national government had paid the premiums then there had to be a strong justification for payouts to be transferred to LGUs or NGAs, which was difficult following a positive basis risk event. According to key informants interviewed, some members of the TWG felt that the funds should be given to Davao del Sur, the triggering province, to demonstrate

**TABLE 6.2. YEAR 1 PAYOUT TIMELINE**

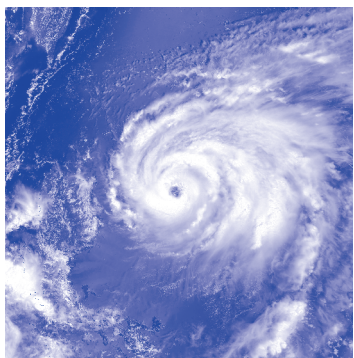
Event/action	Date
Typhoon Tembin (Vinta)	December 21, 2017
Calculation notice	December 27, 2017 <i>6 days after event</i>
Calculation reporting	January 11, 2018 <i>3 weeks after event</i>
Reinsurance payment	January 24, 2018 <i>5 weeks after event</i>
Policy payment	February 1, 2018 <i>6 weeks after event</i>

Source: World Bank.

the usefulness of the insurance product. Others felt that payout funds should go to the neighboring provinces most in need. Still others believed that the GOP should retain the funds to help support future premium payments. Given differing interpretations and lack of clarity in the JMC, an allocation report was not produced. Procedurally, according to the JMC, the DBM needed this report to trigger the Notice of Cash Allocation (NCA) which, in turn would allow the BTr to release the funds. Since an NCA was never submitted, the funds remained in the Bureau of the Treasury.

According to interviews, this situation presented the TWG with a very difficult decision in an environment where the national government continues to face enormous challenges and scrutiny over allocating funding in an appropriate and fair way. Ultimately this situation highlighted the difficulties of allocating public funds in a post disaster environment and significant changes were made to the JMC and the process of distribution for the second policy year.

### BOX 6.1. TYPHOON TEMBIN POST-EVENT LOSS CALCULATION



Typhoon Tembin, known locally as Vinta, made landfall on December 21, 2017. Tembin caused more than 200 fatalities and displaced thousands of people. Based on the Philippines' catastrophe risk model, several provinces experienced damage, including three of the 25 LGUs that were included as part of the insurance policy: Davao del Sur, Davao Oriental, and Surigao del Sur (AIR Worldwide 2017). However, only in Davao del Sur did the modeled emergency losses exceed the attachment point and result in an insurance payout. Yet actual losses in Davao del Sur were minimal. How did this happen?

In the first year of the policy, the GOP decided to allocate coverage (and the premium payment) equally across all 25 participating LGUs. This meant that all provinces would receive the same payout amount, should the attachment point be reached. While this type of structure is easy to understand, it does not adequately consider the varying risks of different provinces. It allows a province with historically low risk of typhoons to get a large (fixed) payout relative to modeled damages at the trigger points for a payout. This scenario played out with Typhoon Tembin. Davao del Sur, the LGU that triggered the payout, has a historically low risk of a typhoon, so even a small event (with limited damages) can and did trigger a payout. The challenge for the GOP became what to do with the payout. While Davao del Sur had limited actual losses, other provinces suffered much higher damages. Should the GOP send the money to the Davao del Sur or to where it might be more needed?

The GOP learned from this event and in Year 2 changed the way it allocated coverage (and thus premium payment). To determine the amount of premium that each of the 25 LGUs would "contribute" to the total premium amount, the GOP categorized the participating LGUs by risk level—high, medium, or low—for typhoons and earthquakes and then allocated a percentage of the total notional amount for local coverage (₱1 billion, or US\$19.8 million) to each LGU.

*Allocating coverage (and the premium payment) equally across all 25 participating LGUs does not adequately consider the varying risks of different provinces.*

Sources: Philippines Department of Finance; World Bank.



## 6.2 Policy Year 2

Several things happened between Years 1 and 2 of the parametric program.

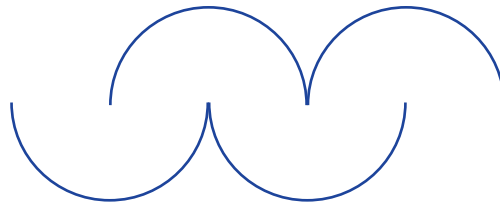
First, the GOP decided to double the premium, providing almost double the amount of insurance coverage (see Table 6.1). The impetus for the increase in coverage was a desire by the government to provide rapid disaster funding to the Department of Education (DepEd). At first, the GOP considered creating a second policy for the DepEd, based on modeled losses to school buildings. In the end, however, it decided to simply double the coverage of the original product and allocate 50 percent of any proceeds to the DepEd.<sup>7</sup>

During the discussions on coverage, the GOP also made a major change in how premiums were allocated between the 25 provincial LGUs named in the policy. Instead of splitting the premium equally among the 25 provinces, provinces were rated according to their relative risk (high, medium, or low; see Box 6.1).

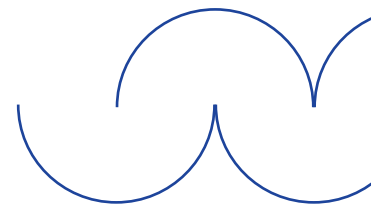
Second, the TWG made significant changes to the JMC, the document that governs how stakeholders manage payouts (see Table 6.3). Following the positive basis risk event that occurred during the first policy year, for the second policy year the TWG removed much of the language requiring that payouts automatically go to the triggering LGUs. Instead, the 2018 JMC stated that payouts would be made in accordance with the allocation report produced by the TWG, which could include payouts to LGUs that were impacted by the event but were not part of the parametric program.

The second-year JMC also revised downward the responsibilities of the Office of Civil Defense in conducting post-disaster assessments; these went from “rapid damage and needs assessments” to production of a “situational report.” One of the issues during the first year was that the OCD took a very long time to produce a rapid damage and needs assessment report, slowing down the allocation report and thus the flow of funds to the LGUs. With a requirement that the OCD simply produce a more limited situational report, the TWG hoped to improve timelines for distribution of the payouts.

The TWG would also allocate payouts to DepEd based on a Rapid Assessment of Damages Report and a Program of Works prepared by DepEd’s Disaster Risk Reduction and Management Service and Education Facilities Division.



*The GOP decided to double the premium, providing almost double the amount of insurance coverage*



**TABLE 6.3. CHANGES TO JMC FROM POLICY 1 TO POLICY 2**

<p style="text-align: center;"><b>Policy 1</b> JMC (June 2017)</p>	<p style="text-align: center;"><b>Policy 2</b> JMC (December 2018)</p>
<p style="text-align: center;">The OCD will conduct a rapid damage and needs assessment to inform the allocation of payout proceeds.</p> <p>In case of a disaster event,</p> <ul style="list-style-type: none"> <li>• The GSIS will provide the calculation report within 10 business days.</li> <li>• In parallel, the OCD will provide the rapid damage and needs assessment to the TWG.</li> <li>• Subsequently, the TWG will determine the percentage allocation across beneficiaries of any possible payout from any insurance cover.</li> <li>• The TWG will prepare the allocation report; this is required for the DBM to issue the NCA both to the NGAs for the release of payout proceeds and to the BTr for the transfer of payout proceeds to the LGUs' bank accounts.</li> <li>• The GSIS will release any triggered payout to BTr. This process will take six business days. The proceeds will be recorded as trust receipts.</li> <li>• The BTr will issue the pertinent certification of availability of funds.</li> <li>• Thereafter, the DBM will issue the corresponding NCA to the NGAs and/or to the BTr for the transfer of payout proceeds to LGUs.</li> <li>• Upon issuance, the payout proceeds will be made available to the NGAs through the Modified Disbursement System and/or transferred to the LGUs' bank accounts. This process will take five business days.</li> </ul>	<p style="text-align: center;">The OCD will provide a situational report within two weeks after the disaster to inform the allocation of payout proceeds.</p> <p style="text-align: center;">DepEd will provide a Rapid Assessment of Damages Report and a Program of Works prepared by DepEd's Disaster Risk Reduction and Management Service and Education Facilities Division, also within two weeks after the disaster.</p> <p>If a payout is triggered,</p> <ul style="list-style-type: none"> <li>• The GSIS will provide the calculation report within 10 working days from the date of submission of the event calculation to the calculating agent.</li> <li>• The corresponding amount of payout based on the calculation report will be deposited by GSIS with the BTr within six working days from receipt of proceeds by GSIS from the reinsurer.</li> <li>• Upon receipt, the BTr will record the payout as trust receipts, which will be disbursed in accordance with the purpose for which it is created, subject to applicable accounting and auditing rules and regulations.</li> <li>• The TWG will prepare an allocation report to be approved and signed by the members of the TWG and endorsed by the Secretary of DOF and sent to BTr.</li> <li>• Upon receipt of the allocation report, the BTr will request from DBM the release of the NCA to transfer the payout to the corresponding LGU Internal Revenue Allotment MDS (Modified Disbursement System) account/DepEd (MDS) Trust account. The supporting documents to be provided shall be as follows:             <ul style="list-style-type: none"> <li>– Certification from BTr that it has received the policy payout</li> <li>– Calculation report from the calculating agent detailing the provinces that triggered such payout</li> <li>– Allocation report</li> <li>– Matrix of payout based on emergency modeled loss</li> <li>– Corresponding MDS account where the NCA will be released</li> </ul> </li> </ul>

Sources: DOF and DBM 2017, 2018.

All these changes in conjunction with changes in leadership at GSIS had the effect of delaying the issuance of the second-year policy until December 2018.

In the second year of coverage, the World Bank made 11 calculation requests and the policy paid out for two events, the Zambales earthquake (in the amount of ₱848,594,656) and Typhoon Tisoy (Kammuri) (in the amount of ₱490,120,438); see Table 6.4). As in Year 1, all the contractually obligated time frames were met, from the initial calculation notice request to the policy payment date.

Some information on Year 2 of the program is unavailable due to the onset of the COVID-19 pandemic, which made it impossible to finish conducting interviews with the full range of stakeholders involved in this transaction, most notably the International Finance Group (co-chair of the TWG) and second-year recipient LGUs.

It is known that, as of the time of writing (July 2020), none of the payout proceeds have made it to the LGUs or to NGAs, including DepEd. According to the JMC, the BTr requires the receipt of an NCA from the TWG in order to disburse the funds. Since the NCA was not prepared or received for either event, the funds remain in the BTr account.

**TABLE 6.4. YEAR 2 PAYOUT TIMELINE**

Event/action	Zambales earthquake	Typhoon Tisoy (Kammuri)
Event date	April 22, 2019	December 2, 2019
Calculation notice date	May 8, 2019 <i>16 days after event</i>	December 5, 2019 <i>3 days after event</i>
Calculation reporting date	May 17, 2019 <i>25 days after event</i>	December 11, 2019 <i>9 days after event</i>
Reinsurance payment date	June 3, 2019 <i>6 weeks after event</i>	December 23, 2019 <i>3 weeks after event</i>
Policy payment date	June 17, 2019 <i>8 weeks after event</i>	January 7, 2020 <i>5 weeks + 1 day after event</i>

Source: World Bank.

## 6.3 Loss Ratio of the Program

It is difficult to assess the value for money of an insurance program over a short time period, as any comparison of the level of payouts to the amount of premium paid will be influenced by the events that unfolded during the period of coverage. This is particularly the case for insurance that provides payouts for medium and severe disaster events, defined in this program as having an annual probability of occurrence of 10% and 3.3% respectively.

Notwithstanding this clear limitation, it is possible to calculate the Loss Ratio of the program, defined thus:

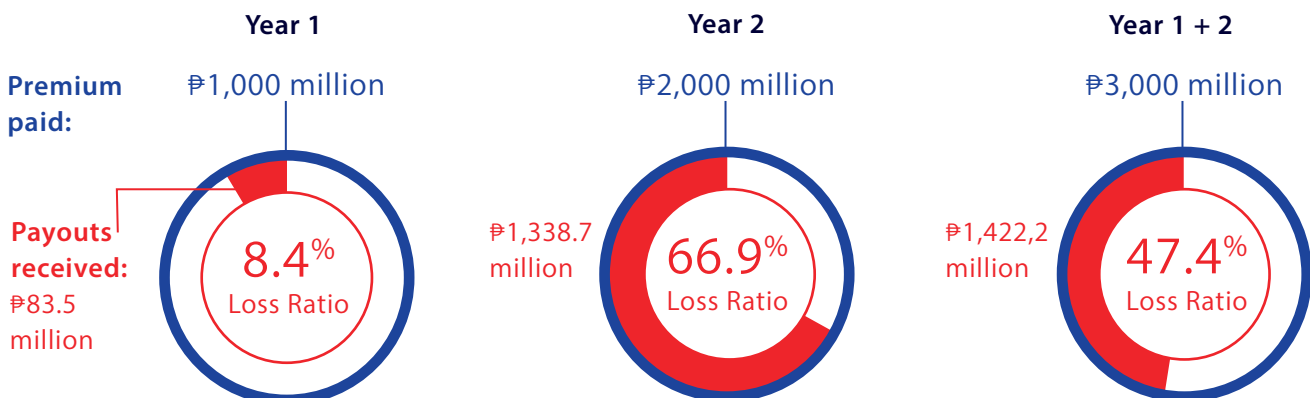
$$\text{Loss Ratio} = \frac{\text{total payouts received}}{\text{premium paid}}$$

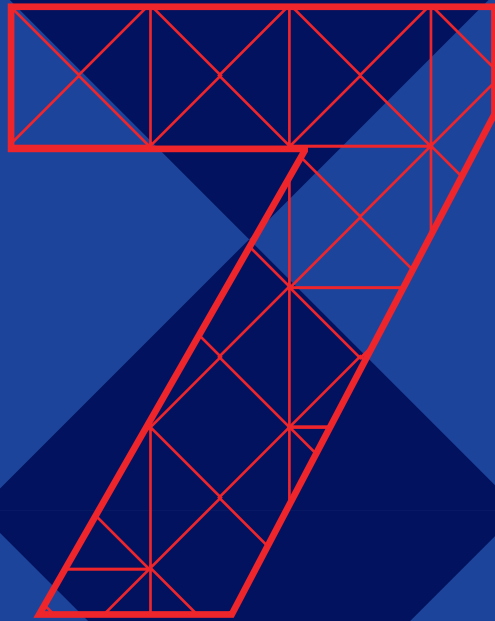
The Loss Ratio for the program is shown in Table 6.5.

The differing Loss Ratios for Year 1 and Year 2 highlight the difficulties of using this metric to indicate value for money: the Loss Ratio depends on the payout amounts, which depend entirely on the events that occur during the policy periods. However, it is possible to say that an overall Loss Ratio of 47.4 percent—the rate for Year 1 and Year 2 combined—is slightly higher than the average recovery rate of non-life insurance products in the Philippines. For example, data from the GOP Insurance Commission (2018) indicates that the average recovery rate for non-life insurance coverage in 2014–2018 ranged from 39 percent to 44 percent with an average of 41.5 percent. The Loss Ratio for the program is also comparable to the average loss ratio for Fire & Allied Perils coverage in Philippines of 55.4 percent.

Despite this observation, it should be noted that a much longer time series is required to be able to assess the value for money of the program in financial terms. Over such a short period, the main predictable and tangible benefits of such a pilot program are nonfinancial aspects, as described in the following section.

**TABLE 6.5. PROGRAM LOSS RATIO**





# Lessons Learned

The first part of this section refers to the original evaluation questions and summarizes the key points that serve to answer them. The second part offers a concise set of lessons learned from the parametric program.

## 7.1 Evaluation Questions Answered

Despite the limited set of data, the review reveals many useful insights that can help inform future programming in this area.

### **EQ1: What worked well (and not so well) in the design and implementation of the pilot Philippine parametric catastrophic insurance product?**

- Which design features were most appreciated by stakeholders? Which features worked as planned? What were the design challenges?
- How effective were the collaborations between key stakeholders, including National Government Agencies (NGAs), LGUs, and members of the program's Technical Working Group (TWG), in the design and implementation of the pilot program?

**Premium funds flow worked as planned.** Once the allocation for the premium was approved by Congress and added to the budget, the flow of money for the premium worked smoothly. BTr transferred the money to the GSIS and the GSIS in turn paid the premium to the World Bank Treasury. These flows and timelines were outlined in both the insurance and reinsurance contracts.

**The payout process went smoothly and as expected.** One big success of this pilot was the efficient payout process from the international reinsurance market (the retrocessionaires) to the World Bank (the reinsurer) to GSIS (the insurer) to BTr (the policyholder). The flows outlined in the contract worked on time and as planned. This process demonstrates that funds can be mobilized

quickly in response to a disaster even with multiple intermediaries.

### **The transaction successfully navigated strict procurement laws regarding reinsurance.**

Legislation dictates that any insurance provided to GOP must be provided by GSIS, but GSIS's Board of Trustees determined that GSIS could not retain any risk of the parametric program given their lack of prior experience with this kind of policy. GSIS therefore had to seek 100% reinsurance for the program, which exceeded the capacity of the domestic insurance market. The GOP and World Bank therefore had to invest significant time to overcome strict laws governing GSIS procurement of international reinsurance, based on the standard GOP procurement guidelines. These guidelines,

developed for goods and services, are not well suited to the purchase of (re)insurance cover. This issue made it challenging for international financial markets to provide direct reinsurance cover to GSIS. Working through the World Bank helped address the challenge, as it allowed GSIS to get the necessary approval to transfer risk to the World Bank. As one respondent explained:

*“GSIS’s risk retention is approved by the Board of Trustees and it was determined that GSIS could not retain any risk of the parametric program. Before risk could be ceded to the World Bank, we had to register the World Bank as a reinsurer with the Insurance Commission. Once this issue was overcome the placement of reinsurance with the World Bank worked without any problems.”*

Working out these details created a precedent that potential future transactions can follow.

**Whether the modeled loss trigger was appropriate for the context remains a question.** In the design phase, the team purposefully decided to go with a payout structure that was easy to understand: the payout was either 40 percent or 100 percent of a predefined amount dependent on the severity of the event (the probability of a payout), the premium paid, and the pricing offered by reinsurers. What was less clear was the trigger itself—that is, under what circumstances modeled losses would reach the attachment point. The reaction of the model to a given event was much more difficult to explain than it would have been for, say, a cat-in-a-box trigger design (shown in Table 4.1), which is based solely on features of the disaster (e.g., wind speed, ground shaking intensity) rather than on predicting how those features would affect damage estimates.

The complexity of using modeled losses as a trigger presents one explanation as to why there were so many calculation requests in the second year. The GOP preferred to err on the side of caution and make the request rather than risk missing a potential payout. Indeed, one respondent noted that having to wait for the model to be run to determine a payout creates uncertainty, in particular for government officials who need to explain the results to policy makers.

The complexity of using modeled losses as a trigger was also recognized by other stakeholders outside of government. Indeed, according to one respondent, the brokers and structuring agents working with the World Bank to place the transaction also noted that modeled losses were hard to understand and explain to potential counterparties (see appendix H).

**The renewal process from Year 1 to Year 2 did not go smoothly.** There was a six-month delay between the time the first policy ended and the second was put in place. Typhoon Ompong occurred during this period and would have resulted in a payout had the policy conditions been maintained. The delays were largely due to significant changes in the policy coverage and the JMC (discussed in Section 0).

**There was a breakdown of coordination at the TWG level.** The TWG was meant to be the coordinating body across different in-country stakeholders tasked with facilitating the flow of funds to the LGUs and NGAs. Initially the group worked well. It successfully established the first JMC, which outlined the coordinating agreements among stakeholders for premium payment and payout distribution. But when payout procedures became subject to differing interpretations and it was unclear how to proceed, the group ultimately could not complete the work as planned. With respect to the policy for the second year of coverage, the JMC clearly provides that the TWG shall prepare the allocation report duly approved by its members.

However, as of the writing of this report, the TWG has yet to send the allocation report to the BTr. As a result, to date, none of the three payouts have been released from the BTr account.

There remain conflicting views as to why the process broke down. One respondent noted:

*“There should be more of an explicit agreement between national government and LGUs such that LGUs are directly the beneficiaries of payouts in the insurance policy. This would remove the need for the JMC and process of deciding how to allocate the payouts, but this would only be possible if LGUs pay at least part of the premium themselves. While the national government pays the full premium, then [it] will always see the insurance as for [the national government] rather than for the LGUs.”*

A second respondent noted:

*“The fact the payout process did not go as planned is not a fault of the program—there should have been provisions in the contract such that payouts were made directly to the affected LGUs.”*

**Positive basis risk can be just as problematic as negative basis risk.** The very first payout from the first-year policy demonstrates the challenge posed by positive basis risk. The province that triggered the payout (via the model) did not have substantive damages (see Box 6.1). According to those interviewed, there was significant disagreement among TWG members on whether the BTr (the policyholder) should (i) send money to this province; (ii) give the money to other provinces that sustained large damages but were not part of the insurance contract; or (iii) allocate the money

for other national government expenditures such as future premiums. According to one point of view, it was important to pay the LGU to demonstrate that the program could work:

*“If the group wants to encourage LGUs to purchase insurance protection, then making the payout would be a good example of the benefits of this type of insurance.”*

Another view was that the TWG should have the authority to manage the basis risk:

*“The feeling was that the TWG should have discretion over whether (and how much of) an amount is paid out to NGAs or LGUs following a payout because in this particular event, (i) there were very low actual damages suffered by the province that triggered the first payout; (ii) the national government used other funds to support other LGUs that did suffer damages from the event that triggered the payout; and (iii) there were other transfers from the national government to affected LGUs, for example through the calamity fund.”*

Ultimately the JMC was changed for the second policy year to make the payout process simpler, and also to allow the TWG more discretion over which LGUs to provide payouts to, including the possibility of providing payouts to LGUs that were not included as indexes in the parametric program. This change indicates how GOP reflected upon and learned from the problems of the positive basis risk in the first year of the policy and worked to improve the program by adjusting the JMC to address this issue.



## **EQ2: Did the program meet the objectives and needs of stakeholders? How and in what ways?**

- Was parametric insurance an appropriate instrument for meeting the objective of providing rapid liquidity for a portion of emergency response costs after a disaster? And to whom was that liquidity provided?
- Was the final policy design appropriate to meet the GOP's objectives for the program?
- Did stakeholders consider the pilot a good value-for-money investment? Why or why not? What might be improved?

**The program demonstrated that parametric insurance can be an effective way of providing rapid liquidity after climate shocks.** As noted above, the program was successful in terms of the placement of the policy in the market and the smooth payout process following the three events that triggered payouts. However, the program also demonstrated that placing an insurance policy alone does not guarantee liquidity for disaster response. Any financial transaction requires careful integration in complex institutional and public finance processes.

**The pilot provided rapid liquidity to the policyholder, the Bureau of the Treasury, but it did not ultimately lead to increased liquidity for the NGAs and LGUs.** The success of the high-level transaction should be lauded. The insurance product did its job in providing rapid liquidity from the international reinsurance market to the GOP. However, this rapid liquidity did not extend to the NGAs and LGUs, arguably the primary beneficiaries of the program. The government's internal process faced unexpected bottlenecks and challenges. As noted previously, the initial payout generated disagreement within the TWG as the process became subject to various interpretations and the defined process remained unclear.

**Although the funds never reached the LGUs, several stakeholders indicated that the pilot did produce value for money.** First, the process—including the capacity building and the establishment of the legal and financial structure for a parametric insurance product—helped demonstrate to LGUs that insurance protection can be a useful financial lever to support rapid disaster response. When asked whether the pilot provided value for money, one respondent noted:

*“Yes, in the sense that the program provided financial protection for those provinces that are most exposed to the risk of typhoon and earthquake events. The program also highlighted to individual LGUs the risks they face and has paved the way for LGUs to use their own funds for insurance protection in the future. Going forward, LGUs stand to receive much larger budget allocations in the Local DRRM Fund [under the Mandanas Law], so in the future they may wish to take out parametric insurance themselves, as the mechanism and infrastructure now exist.”*

A second argument is that the pilot has expanded the options available to and being considered by the GOP.

“The parametric program was always seen as a pilot program to learn about this type of insurance and its uses. The national government is now wanting to diversify the type of financial instruments used to manage disaster risk, hence the shift towards using a catastrophe bond and indemnity insurance.

Currently there is another parametric insurance program [the parametric insurance program for cities proposed by the Asian Development Bank], which has only been made possible through the initial work done through the World Bank program for provinces.”

Finally, some saw value for money in the way that the pilot led to necessary legal changes that now allow options for LGUs to finance their own premiums. As one person noted,

*“Yes, it was a good initiative. The COA issuing their new regulation was very helpful, as this gave LGUs comfort to spend part of their budgets on insurance protection.”*

**A further consideration in determining whether the program met the objectives of the intended beneficiaries (LGUs and NGAs) is an understanding their respective needs and incentives.**

In the context of this program, the potential effectiveness of this program to the intended beneficiaries should be evaluated against the actual contingent liability faced by the beneficiaries should a disaster event occur. During the design and implementation of this program frequent consultations were held with LGUs, although it was not possible to obtain data on either the expenditures made by LGUs for past disasters, nor the expected share of expenditures between the national government and LGUs for different possible future disaster scenarios. Further analytical work on understanding the contingent liabilities for different LGUs as well as GOP regulations to clarify post-disaster expenditure sharing would help in designing any future financial protection programs to provide the most benefit to LGUs.

### **EQ3: Did this program help the GOP advance its knowledge of disaster risk finance? How and in what ways?**

- Was the World Bank's involvement appropriate and helpful in supporting GOP's efforts to improve its understanding and use of financial protection against disasters?

**The program significantly advanced GOP knowledge on DRFI.** Before this program, the GOP had no prior experience working with parametric insurance. Indeed, there was very little institutional knowledge about parametric insurance within the GSIS or more broadly within the GOP. Through multiple workshops and meetings, the World Bank worked extensively with the GOP to build this understanding and capacity. This collaboration worked not only to explain the new concept to stakeholders, but also helped overcome challenges (e.g., relating to procurement, the design of legal documents, etc.) As one respondent noted: "The World Bank were very helpful in the design process and in drafting of the final policy wordings. This was critical to the success of the policy."

**The World Bank played a critical role in ensuring that the reforms making this transaction possible were enacted.** By integrating the development of the parametric program as a prior action and result indicator in a Development Policy Loan (the second CAT-DDO), the World Bank helped take this project from the initial idea to successful placement. The agreement by the government and the World Bank to develop this program as part of the policy reform program created a formal commitment that ensured the GOP would focus on delivering this program. At the same time, the agreement helped mobilize and bind World Bank technical support to the GOP. This multiyear in-depth technical support provided by the World Bank to many government stakeholders was key to the program's implementation.

### **The capacity-building efforts around this program were largely well received, although there is room for improvement in reaching LGUs.**

Overall, the World Bank workshops and meetings held during the design of the product were well received. Several interviewees indicated that the workshops improved their understanding of risk and of parametric insurance. Others noted that these workshops helped improve understanding of the benefits of this type of product for LGUs. As one respondent noted,

*"This program . . . put parametric insurance into the consciousness of both LGUs and the national government."*

Another respondent noted that having the World Bank work with GSIS, the local insurance agent, was beneficial, and that this type of collaboration helps build local capacity so that ultimately the local agent can place the insurance without requiring the World Bank as an intermediary.

Several respondents believed that LGUs largely remained unaware of the program and potential payouts, despite efforts to include LGUs in capacity building. As one respondent put it:

*"While much was done to include LGUs through the process, not all participating LGUs were able to send representatives to the group workshops, and so some LGUs may not even know they were ever part of this program."*

Another respondent noted that it is still very difficult to explain models and insurance to government, in particular at the provincial level. For instance, in one meeting at the provincial level at which the whole process/transaction was explained, one official asked, “So, if we pay the premium and nothing happens, do we get it back?”

To increase LGUs’ awareness of the program, one participant suggested a greater media presence—around both the program and payouts: “This would also make other LGUs aware of the program and the benefits of this kind of insurance, which would encourage them to purchase this kind of insurance protection in the future.”

**The experience with this parametric program has led the GOP to think more strategically about managing its disaster risk, paving the way for other instruments that may be more suitable for the GOP’s needs.** Most notably, the GOP has placed a catastrophe bond that uses the same catastrophe risk model. The program has also further highlighted the need to strengthen the flow of funds through government systems, which every insurance program should consider in parallel to exploring risk transfer solutions. These successes build on the following efforts from a long-term relationship between the GOP and the World Bank:

- **Strong and continued policy dialogue on DRFI and DRM with Department of Finance.** This program materialized after six years of continued dialogue on DRFI and DRM with the DOF. This dialogue included extensive explanation of the value of catastrophe risk insurance as part of fiscal risk management of natural disasters.

- **Integrated DRFI Strategy. This program is only one component of the DRFI strategy of the government of the Philippines.** It is complemented by existing budgetary funds at the national and subnational levels, a World Bank contingent line of credit, and other policy advisory services to strengthen the financial resilience of the national and local governments.
- **Neutral, independent technical advisory services.** Ongoing technical advice to DOF on catastrophe risk modeling, product design, actuarial analysis, insurance underwriting, and other areas was provided to enable the government to proceed with a large program of this type.
- **Strong political and technical support.** A market-based program requires significant up-front investment to build political support and an enabling policy environment. Because paying a large premium on a risk transfer program is often politically contentious, extensive technical work is needed to establish a sufficient level of comfort in technical staff, to gain high-level support from policy makers, and to gain high-level support in official government policies (e.g., the official DRFI Strategy). For this program, the political support of a powerful senator opened the door to the financing of the program, and the technical support of the treasurer helped push it through to policy signature.

**EQ4:** **Did the insurance payouts improve post-disaster outcomes?  
How and in what ways?**

These questions are explored in detail in Section 7.1.

This question is difficult to answer given the limited scope of the evaluation. Since to date none of the proceeds from the three payouts have reached the LGUs, one can argue that post-disaster outcomes did not improve. However, arguments can be made that outcomes may have improved, at least indirectly. For instance, in the aftermath of these three disasters, the GOP still supported the LGUs

through other programs. It is possible that the extra money from these payouts made funds from elsewhere available. As the parametric program will not be renewed, budget has opened up for other initiatives such as the CAT bond and the indemnity insurance program for public assets, which will arguably improve future post-disaster outcomes.

## 7.2 Key Lessons

**Parametric insurance can be a useful tool in providing governments with rapid liquidity post-disaster, but it needs to be evaluated in the full context of the government's public financial management of disasters, and both costs and benefits of parametric insurance should be carefully weighed.** The experience from the Philippines demonstrates that it is possible to structure a parametric insurance program in countries with limited experience in disaster risk finance and insurance. The model the Philippines used, whereby a domestic insurance agent (GSIS) provided the initial coverage and the World Bank served as a reinsurer, was highly successful in securing coverage through the international reinsurance markets. There was great interest from the private sector in these transactions, with a rising number of counterparties showing interest each year. Furthermore, the use of a parametric trigger and the funds flow from the financial markets to the insured were also highly successful. All three of the payouts over the two years of the program were delivered on time within the tight time frames set out in the contract.

**There is broad interest within the private sector in well-designed parametric insurance programs, resulting in pricing comparable to other parametric programs placed in the international market.** In the case of the Philippines, reinsurers saw the program as a way to diversify portfolios. The number of counterparties doubled in the second year of the policy, and several different counterparties asked whether the policy was going to be renewed for a third year. The World Bank also had interest from nontraditional parties such as pension funds. Due to the strong demand, the price achieved was comparable to other parametric programs that have been placed in the international market.

**Establishing clear and binding rules for how payouts will be used (budget execution) is just as important as the source of post-disaster financing (in this case parametric insurance).** Examples from Mexico's Natural Disaster Fund (FONDEN) provide strong evidence of the developmental benefits of having in place clear and binding rules for how payouts will be used alongside financial transactions to provide financing for disasters (see Box 7.1). In the case of the Philippines parametric program, if the intended beneficiaries were the LGUs then this could have been stated either in a new regulation or within the insurance policies issued by GSIS. Alternatively, if the objective was to provide rapid liquidity to BTr then it was appropriate that BTr were the named beneficiary in the policy, but the expectations of the LGUs should have been managed accordingly. Further, while the program did establish a Technical Working Group to manage the program in compliance with the rules established regarding the distribution of payouts this still left room for differing interpretations and subsequent delays in decision making.

**One way of supporting effective budget execution is to state the intended beneficiaries within the insurance contract.** While the program was designed with the objective of ensuring a clear and transparent process for the distribution of payouts (as evidenced in the structure of the first JMC), without the LGUs as beneficiaries being named in the insurance policy the process was ultimately open to interpretation and confusion, and the effectiveness of the program suffered because the flow of funds was still subject to discretionary decisions.

### BOX 7.1. COMBING BUDGET MOBILIZATION AND BUDGET EXECUTION: EXPERIENCE OF MEXICO AND PERU



Mexico's Natural Disaster Fund (FONDEN) is a fund set up by the Mexican government to manage risk created from natural disasters. The fund program is financed by a protected budget appropriation and through a risk financing strategy, including insurance and placement of catastrophe bonds. The disbursement of funds through FONDEN is determined by a clear set of operational rules for how costs will be shared between the national government and state governments, including rules regarding procurement. This system balances accountability and transparency concerns with a timely disbursement of funds.

A 2016 study by the World Bank found that on average, state governments that had access to FONDEN saw an increase in post-disaster local economic activity of 2–4 percent compared to those that did not have access – indicating the value of not only securing post-disaster finance but also having a set of clear and binding rules for how funds will be used in a post-disaster context.

Source: World Bank (2016)

**Building the capacity and infrastructure needed to successfully understand and leverage risk finance and insurance is a slow process; and what seem like small or gradual success stories matter within the bigger picture and process.**

A great example of the importance of small or gradual steps was the change/clarification in the COA rules that allowed LGUs to use funds from the Local DRRM Fund to finance premium payments. This change has opened the door for LGUs to fund future insurance products. A second example is the World Bank's long-standing engagement with the GOP to support establishment of all the necessary antecedents for this program, such as the DRRM Act, the DRFI Strategy, etc., which have opened the door to new options such as the catastrophe bond.

**Strong political and technical buy-in within government is instrumental to success.** As mentioned above, within the DOF there was strong support for building disaster risk financing capacities, and for designing and implementing the national DRFI Strategy. However, the program really took off when an influential senator took interest in the program and managed to secure the budget for the premiums. Then the strong, sustained support of the treasurer carried the program through to policy signature.

**Building the market appetite for emerging market catastrophe risk programs involves effort and time.** Catastrophe risk modeling, transparent product design, and regular interactions with reinsurers during the preparation phase led to significant interest from financial markets in this program, which was oversubscribed. This result is a good indication that with proper (but significant) policy and technical support in the preparation phase, further programs can be supported at favorable terms, with a diversified and international placement.

**It is possible to develop procedures that are replicable and scalable.** Any new transaction is unfamiliar and requires significant time and effort to implement and execute, but the procedures developed for this program should allow for faster and more cost-effective transactions in the future. Indeed, some simple suggestions emerging from the interviews could help improve the operations of future similar transactions:

- **Put relevant contact information into legal documents.** One stakeholder suggested it would be helpful for legal documents to include contact information not just for political people but also for operational people. This change would allow the right people to receive calculation and other notices and take appropriate action.
- **Strive to have a few in-person meetings to build personal connections.** This idea emerged in several interviews but is best crystallized by one respondent who noted that a trip to the Philippines between one transaction and the next made all the difference because it created the connections needed to get the job done. WhatsApp numbers were exchanged, allowing informal contact for quick answers, which could then be followed up more formally via email. Such small efforts greatly facilitated communications.

**Preparation and execution of a new program requires a significant amount of technical assistance and advisory support over an extended period, which often is enabled through donor funds.** Donor funds executed through World Bank trust funds were important for supporting this program from initial concept through execution. Patience is critical in achieving such a program, as it takes time to carry out all the preparatory work and finalize the placement—in the case of the Philippines, over five years.





# Appendixes

# Key Informant Questionnaire

## LESSONS LEARNED EVALUATION

### Philippine Parametric Catastrophe Risk Insurance Program

Organization: \_\_\_\_\_

Name of interviewee: \_\_\_\_\_

Title of interviewee: \_\_\_\_\_

Name of interviewer: \_\_\_\_\_

Date of interview: \_\_\_\_\_

1. Can you briefly describe your role in BTr and how you were involved in the design and implementation of the Philippine Parametric Catastrophe Risk Insurance Program pilot?

## PILOT PROGRAM DESIGN AND IMPLEMENTATION

2. Did the premium funds flow as planned (i.e., NCA by the DBM and payment of the premium by BTr to GSIS)?

3. In your opinion did the TWG function effectively? What were the challenges within the TWG?

**INSURANCE PAYOUTS**

There were three insurance payouts under the program, with payment dates below according to the calculation reports produced by AIR:

Event name	<u>Policy year 2017–18</u>	<u>Policy year 2018–19</u>	
	<b>Typhoon Tembin (Vinta)</b>	<b>Zambales earthquake</b>	<b>Typhoon Tisoy (Kammuri)</b>
Payout amount	PHP 83,516,978.49	PHP 848,594,656.00	PHP 490,120,438.00
Event date	20 Dec 2017	22 Apr 2019	2 Dec 2019
Calculation notice date	27 Dec 2017	8 May 2019	5 Dec 2019
Calculation reporting date	11 Jan 2018	17 May 2019	11 Dec 2019
Reinsurance payment date	24 Jan 2018	3 Jun 2019	23 Dec 2019
Policy payment date	1 Feb 2018	17 Jun 2019	7 Jan 2020

4. Did the payout process happen as expected and according to the dates shown above?

YES  NO

5. Following Typhoon Tembin (Vinta) was the process described in the first JMC (dated July 2017) followed? If not, why not? What worked well? What were the challenges?

6. How was the money used at the national level? At the LGU? Was this process monitored? What worked well or not so well?

7. The JMC was changed for the second year of the policy and following a disaster event the OCD was to conduct a situational report and BTr had a more defined allocation process to disburse funds to NGAs and LGUs. Was this process an improvement from the first year? What were the challenges?

8. How was the money used at the national level? At the LGU? Was this process monitored? What worked well or not so well?

**CAPACITY BUILDING**

9. Do you feel that the understanding of parametric insurance has improved within members of the TWG as a whole?

**REFLECTION ON PARAMETRIC INSURANCE PROGRAM**

10. Do you think the program provided good value for money to the Government of the Philippines?

11. Has your experience with the pilot program informed your views of whether this type of insurance makes sense for the Philippines? For national government? For LGUS? In what circumstances?

12. The GOP has decided not to renew this insurance policy for a third year. In your opinion, what are the primary reasons for this decision?

13. The GOP has however decided to purchase a catastrophe bond which is similar in structure to the parametric program. In your opinion do you believe a CAT bond with parametric triggers is a more appropriate financial instrument for GOP to raise rapid liquidity after a disaster event? Why?

14. Do you have any thoughts/recommendations for other countries on what you might do differently when designing and implementing this type of insurance program?

## Program Background Information

### Political Momentum and Key Achievements

Between the shift in the Philippines' approach to DRFI, which began in 2010, and the execution of the first parametric catastrophe risk insurance policy in July 2017, DRFI in the Philippines evolved considerably. Key achievements are outlined in Table B.1. Several of these achievements are further detailed in the following sections.

**TABLE B.1. GOP'S KEY ACHIEVEMENTS IN DRFI**

2010	<ul style="list-style-type: none"> <li>• DRRM Act enacted</li> </ul>
2011	<ul style="list-style-type: none"> <li>• First World Bank contingent credit line approved (SEPTEMBER)</li> <li>• World Bank contingent credit fully disbursed following Typhoon Washi (DECEMBER)</li> </ul>
2012	
2013	<ul style="list-style-type: none"> <li>• First national catastrophe risk model released</li> <li>• National DRFI Strategy designed by DOF (JULY)</li> </ul>
2014	<ul style="list-style-type: none"> <li>• Preparation of Philippine Disaster Resilience Financing Facility (P-DRFF) begun</li> </ul>
2015	<ul style="list-style-type: none"> <li>• Commercial catastrophe risk model, including subnational level, released (AUGUST)</li> </ul>
2016	<ul style="list-style-type: none"> <li>• Allocation of ₱2 billion (US\$39.6 million) made under the National DRRM Fund of the 2018 General Appropriations Act for the payment of insurance premium for the second policy year</li> <li>• Joint Memorandum Circular Issuance No. 2018-1 issued by DOF and DBM to provide guidelines on implementing, monitoring, and reporting on the use of the insurance premium allocation (DECEMBER)</li> </ul>
2017	<ul style="list-style-type: none"> <li>• Second parametric insurance policy (providing cover at national and local levels) executed through the intermediation of the World Bank with international insurance and reinsurance companies (DECEMBER)</li> </ul>
2018	<ul style="list-style-type: none"> <li>• Allocation of ₱1 billion (US\$19.8 million) made under the National DRRM Fund of the 2017 General Appropriations Act for the payment of insurance premium</li> <li>• Joint Memorandum Circular Issuance No. 2017-1 issued by DOF and DBM to provide guidelines on implementing, monitoring, and reporting on the use of the insurance premium allocation (JUNE)</li> <li>• First parametric insurance policy (providing cover at national and local levels) executed through the intermediation of the World Bank with international insurance and reinsurance companies (JULY)</li> </ul>

Source: World Bank

## Legal Mandate for Management of Climate and Disaster Risks

The Philippines was one of the first emerging markets to devise a strategy for comprehensively managing the costs of disasters. In 2010, through the DRRM Act and the Strategic National Action Plan for Disaster Risk Reduction, the government adopted a proactive approach to understanding and managing the risks faced by the country, which included efforts to increase its financial resilience to disasters.

The Philippine DRRM Act of 2010 provides the policy framework for disaster risk management in the country. The law emphasizes disaster risk prevention, mitigation, and preparedness over post-disaster emergency relief and response. The National DRRM Framework and Plan (2011–2028) sets out strategies for the implementation of the law and identifies priorities for engagement by government ministries

and agencies. The strategies laid out by the framework also identify the private sector and civil society as key partners that can bring additional financial and technical resources to the table. The framework and plan build on commitments made by the Philippines under the [Hyogo Framework for Action](#) (UNISDR 2005).

To implement the provisions of the DRRM Act, the government brought about significant institutional and budgetary reforms. For example, the DRRM councils that cascade from the national to the barangay level were expanded and strengthened. The DRRM Act also reformed the calamity fund, now two funds called the National DRRM Fund and the Local DRRM Fund, which can be used to support both ex ante and ex post disaster-related actions (see Box).

### BOX B.1. NATIONAL DRRM FUND AND LOCAL DRRM FUND

The National DRRM Fund is a regular line item in the Philippines' national budget, appropriated annually. Any excess balance at the end of the fiscal year does not accrue to the fund but reverts to the General Fund. The National DRRM Fund is for the aid, relief, and rehabilitation of communities following natural or man-made disasters, including repair and reconstruction of damaged assets. The fund can likewise be used for ex ante activities; due to the limited budget appropriated to the fund, however, ex post financial requirements usually take precedence. There is no set rule on what the annual amount appropriated should be, and the amount is usually based on historical data. Recently, the National DRRM Fund account included special provisions, such as insurance premium for parametric insurance, funding for the People's Survival Fund, and reconstruction budget for specific cases.

The Local DRRM Fund focuses on subnational layers of government. Under Philippine law, LGUs must set aside a minimum amount equal to 5 percent of regular income sources for the Local DRRM Fund. LGUs can access the Local DRRM Fund for ex ante investments in disaster risk reduction (i.e., 70 percent of the fund's total appropriation) without the need for a local declaration of a state of emergency. The fund is partitioned into the 70 percent Mitigation Fund (for ex ante investments in disaster risk reduction) and the 30 percent Quick Response Fund (for emergency relief expenditures, accessed upon issuance of a state of calamity by the local council). Any unspent balance at the end of each fiscal year accrues to a special trust fund for five years, after which the remaining balance reverts to the General Fund.

Source: Government of the Philippines.

The National DRRM Plan identifies financial protection as a priority under the theme of disaster risk prevention and mitigation. The DOF (including BTr) leads this priority area, acting in cooperation with other government agencies, private and public insurance institutions, and government and foreign financing institutions. As indicators of success, the plan identifies insurance of government assets along with the ability of the people and local governing groups to access risk financing options, such as insurance and microinsurance.

### National DRFI Strategy

In 2015, with technical support from the World Bank, the GOP formulated and adopted the National DRFI Strategy (Figure B.1), which aims to sustain economic growth by protecting economic gains from natural disaster shocks and by reducing the impact of disasters on the poorest and most vulnerable.

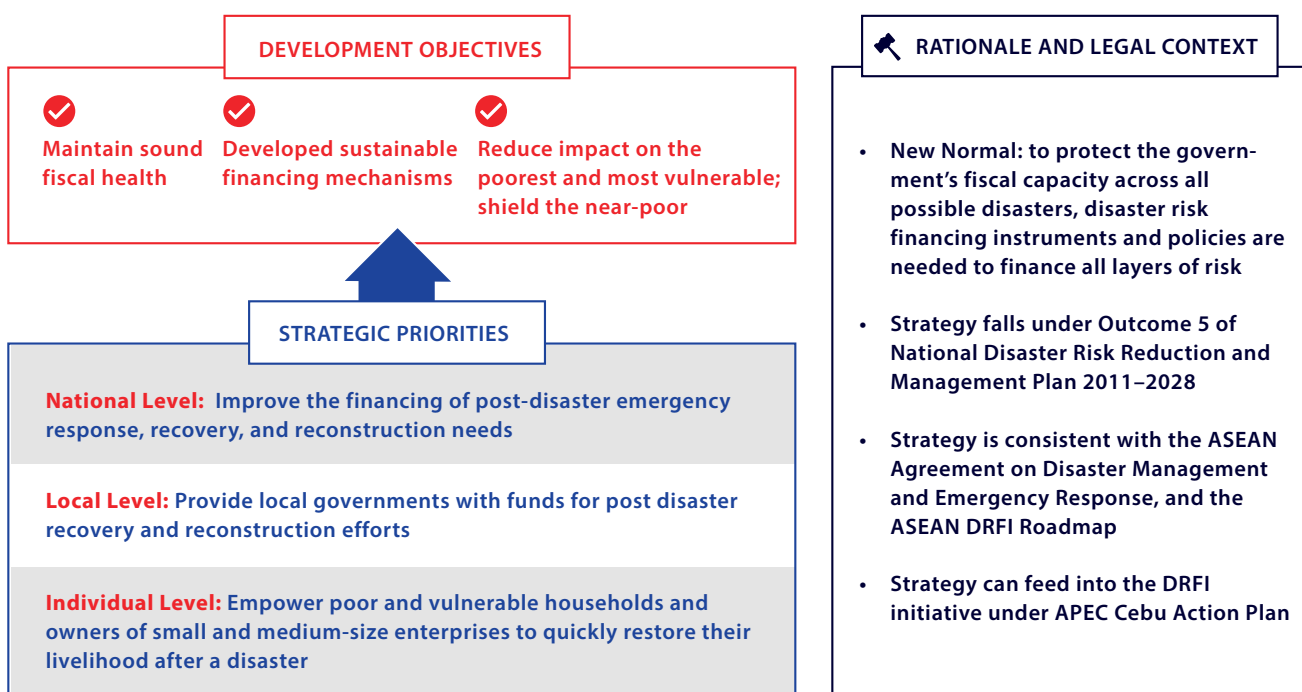
The GOP identified three overarching goals in managing the financial effects of natural disasters:

- To **maintain sound fiscal health** at the national government level, necessary to support long-term rehabilitation and reconstruction needs
- To **develop sustainable financing mechanisms** for LGUs, necessary to provide immediate liquidity at the onset of a disaster
- To **reduce the impact on the poorest and most vulnerable** and prevent them from being trapped in a cycle of poverty, while also shielding the near-poor from falling into poverty

The DOF formulated three priorities to support these development goals:

- **National level:** Improve the financing of post-disaster emergency response, recovery, and reconstruction needs.
- **Local level:** Provide local governments with funds for post-disaster recovery and reconstruction efforts.
- **Individual level:** Empower poor and vulnerable households and owners of small and medium enterprises to quickly restore their livelihoods after a disaster.

**FIGURE B.1. PHILIPPINE NATIONAL DRFI STRATEGY**





## Catastrophe Risk Model

Using state-of-the-art modeling techniques well known to the reinsurance markets, the Philippine catastrophe risk model was built to capture typhoon and earthquake risk. Such risk models comprise three main elements (illustrated in Figure C.1): a hazard module, which generates the hazard conditions for a specific real-time historical or simulated event; an exposure module, which assigns value and characteristics to the assets at risk; and a vulnerability module, which aims to convert the hazard parameter for each asset (depending on its characteristics) to a loss rate that is then applied to the asset value.

According to the AIR Philippines Catastrophe Risk Assessment and Modeling Brochure (AIR Worldwide 2018), the catastrophe risk model shows that on a long-term average basis, the Philippines is expected to incur ₱177 billion (US\$3.5 billion) per year in losses to public and private assets due to typhoons and earthquakes. In the next 50 years, the Philippines has a 40 percent chance of experiencing losses exceeding ₱1.7 trillion (US\$33.6 billion) in any given year, and a 20 percent chance of experiencing losses exceeding ₱2.7 trillion (US\$53.4 billion) in any given year.

Of the ₱177 billion average annual loss (AAL), 96 percent, or ₱169 billion (US\$3.3 billion), relates to private assets, and 4 percent, or ₱8 billion (US\$158.4 million), relates to public assets. Of the ₱8 billion AAL to public assets, 75 percent (₱6 billion, or US\$118.8 million) relates to typhoons and 25 percent (₱2 billion, or US\$39.6 million) relates to earthquakes.

The typhoon model is a stochastic, event-based model and captures the effects of typhoon winds, precipitation-induced flooding, and storm surge on properties in the Philippines. The earthquake model is a stochastic, event-based model and captures earthquake-induced ground shaking, liquefaction, and tsunami risk for properties in the Philippines. The typhoon historical catalog includes events from 1951 to 2014; the earthquake historical catalog includes events from 1600 to 2014.

**FIGURE C.1. COMPONENTS OF A RISK MODEL**



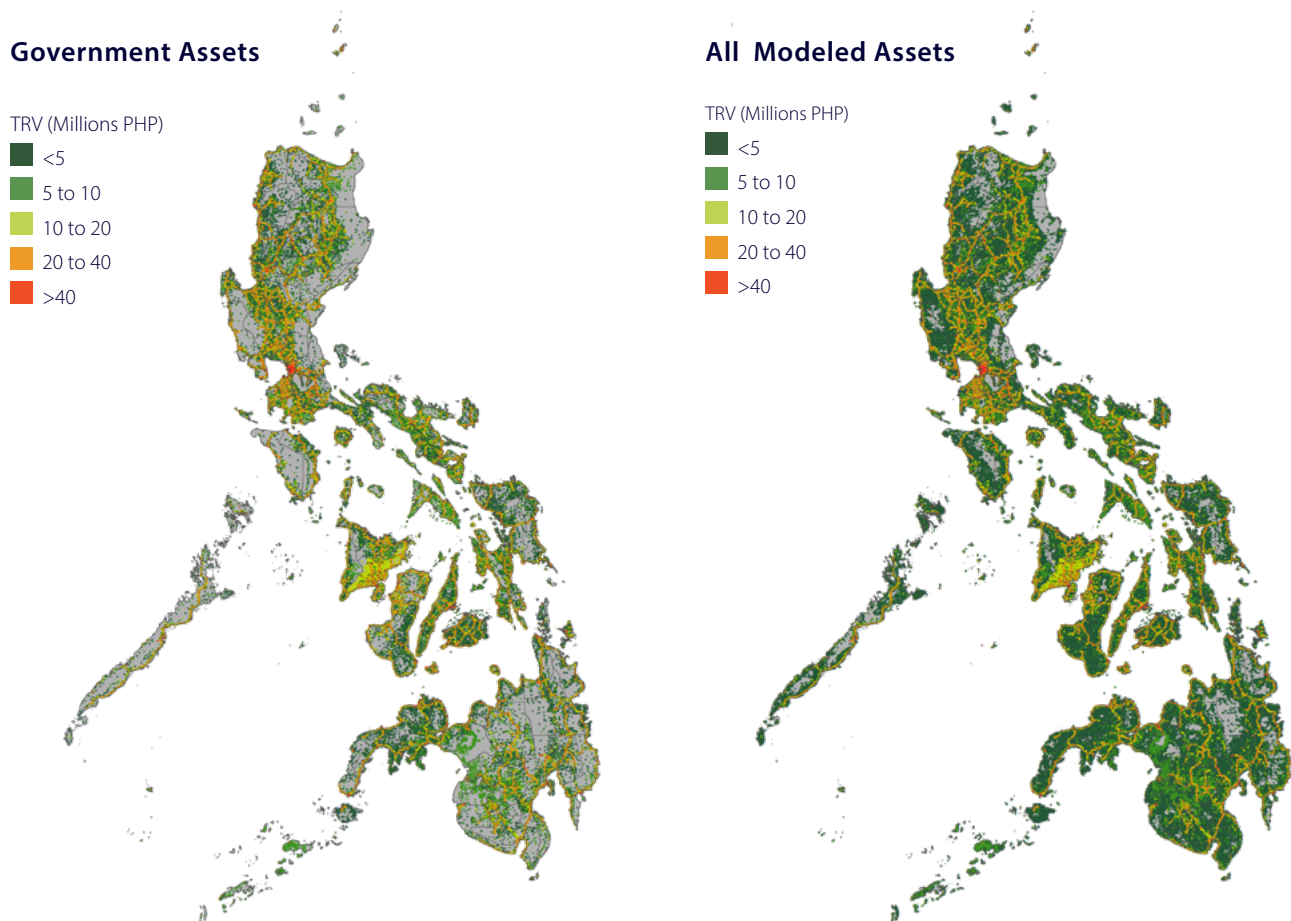
Note: Graphic adapted from the original source

### Asset Replacement Value

A detailed asset exposure database includes an inventory of private and public property assets at risk. Private assets include residential, commercial, and industrial buildings. Public assets include airports, ports, hospitals, clinics, power plants, prisons, public administration buildings, public schools and universities, rail tracks and stations, bridges, and

roads. The database used in the risk model was assembled using information from a variety of official agencies in the Philippines, including the National Statistics Office, Department of Public Works and Highways, Department of Education, and numerous publicly available sources. Figure C.2 shows the total replacement value of government assets (left) and all modeled assets (right).

**FIGURE C.2. TOTAL REPLACEMENT VALUE (TRV) OF GOVERNMENT ASSETS AND ALL MODELED ASSETS**

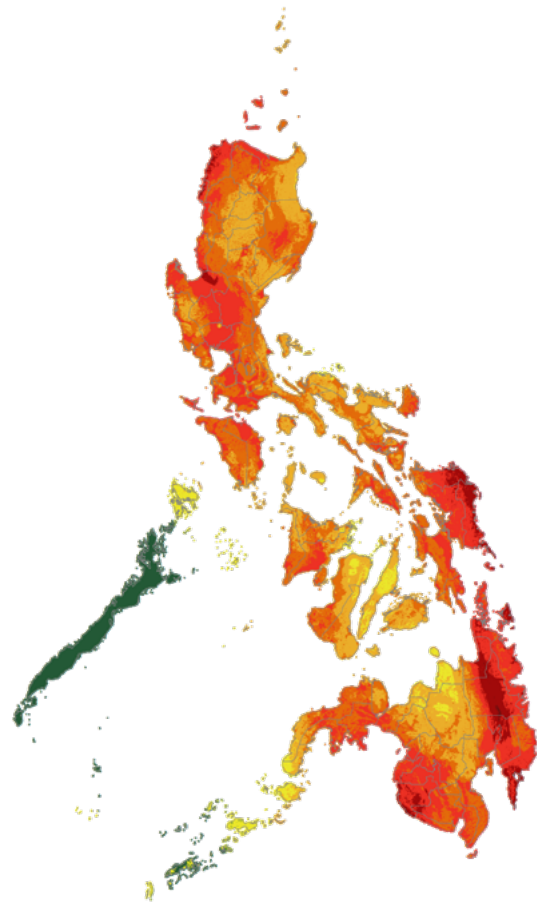


Source: AIR Worldwide.

**Earthquake Risk**

The Philippines is situated along the Pacific Ring of Fire, which aligns with the boundaries of major tectonic plates. These boundaries contain active seismic zones, capable of generating powerful earthquakes. The earthquake risk model is developed using data from more than 80,000 historical earthquakes that occurred within the model domain between 1600 and 2014. Figure C.3 shows the earthquake hazard map for the Philippines.

**FIGURE C.3. EARTHQUAKE HAZARD MAP**



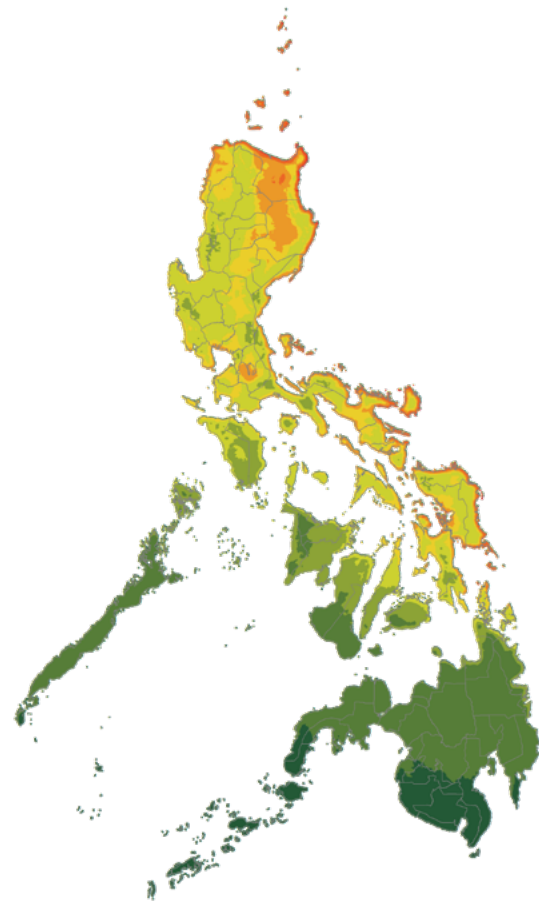
Instrumental intensity	I	II-III	IV	V	VI	VII	VIII	IX	X+
Peak acceleration (% g)	< 0.17	0.17–1.4	1.4–4	4–9	9–17	17–32	32–61	61–114	> 114
Potential damage	None	None	None	Very light	Light	Moderate	Moderate/heavy	Heavy	Very Heavy
Perceived shaking	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme

Source: AIR Worldwide.

### Typhoon Risk

The Philippines is one of the most natural hazard-prone countries in the world, due to its location in the Northwest Pacific Basin—known for frequent typhoons with damaging winds, rain, and storm surge. On average, 27 typhoons occur in the basin each year, including 7 that make landfall in the Philippines. Typhoon activity in the basin peaks between July and November. Figure C.4 shows the typhoon hazard map for the Philippines.

**FIGURE C.4. TYPHOON HAZARD MAP**



Category	Tropical storm		1		2		3		4		5	
<b>Sustained winds (km/h)</b>	< 59	59–119	119–136	136–154	154–166	166–178	178–194	194–209	209–231	231–252	252–276	> 276
<b>Potential damage</b>	Light		Moderate		Extreme		Devastating		Catastrophic		Catastrophic	

Source: AIR Worldwide.

**Loss Estimates**

AIR Worldwide’s simulated event catalogs provide a measure of the likelihood of incurring a loss. These results can be used to calculate a fully probabilistic loss distribution, which is typically expressed as a loss exceedance probability curve. The exceedance probability curve represents the probability that a certain level of loss will be met or exceeded in any given year. The mean of this distribution is the AAL, which represents the average loss expected to be incurred each year.

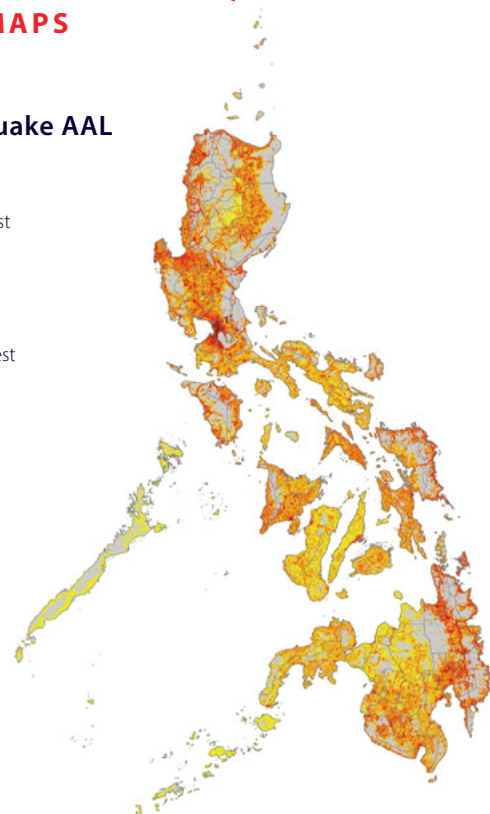
In each simulated year, loss values are expressed as either the sum of all event losses (aggregate) or the maximum event loss (occurrence). Figure C.5 shows average annual loss due to earthquake (left) and typhoon (right) in the Philippines.

**Calculating the Probability of Exceeding Loss Levels**

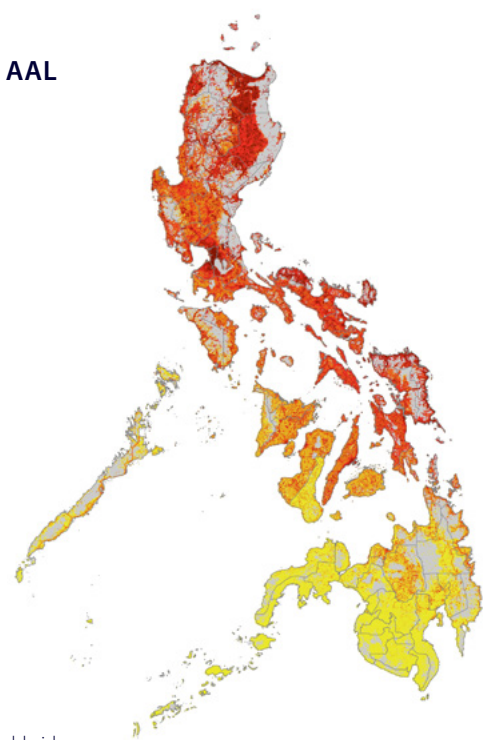
To generate the modeled loss exceedance probability distributions, a catalog of simulated events is run against the database of public and private assets. Next, the loss for each event in each of 10,000 simulated years is calculated. Then the largest simulated event loss in each year is ranked from largest to smallest. The largest loss in the catalog is met only one time in 10,000 simulated years, which corresponds to an exceedance probability of  $1/10,000 = 0.0001$  or, equivalently, a 10,000-year return period. Similarly, a loss that is met or exceeded 1,000 times in 10,000 simulated years corresponds to an exceedance probability of  $1,000/10,000 = 0.1$  or 10 percent, or, equivalently, a 10-year return period.

**FIGURE C.5. EARTHQUAKE AND TYPHOON AAL MAPS**

**Earthquake AAL**



**Typhoon AAL**

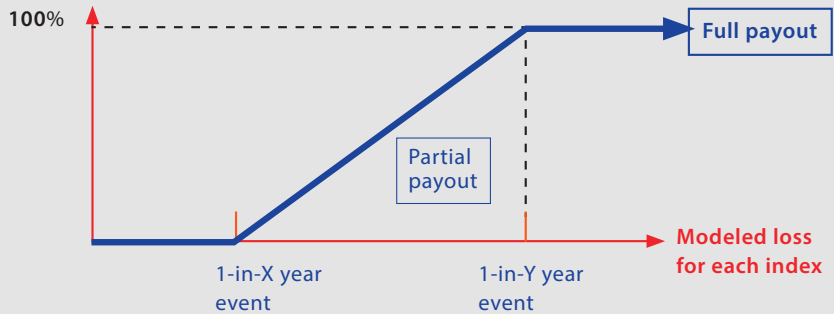


Source: AIR Worldwide.

## Payout Structure Options

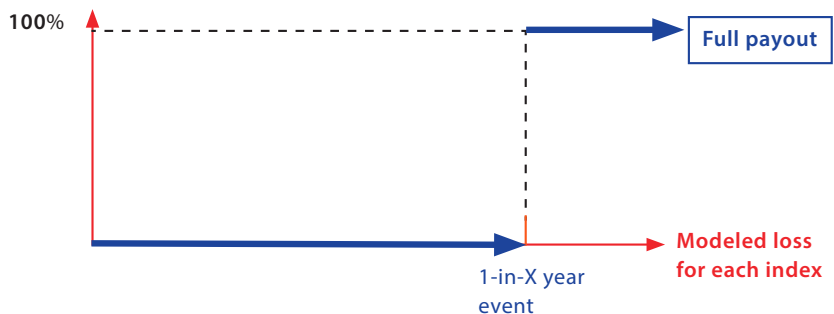
1.

A **LINEAR** payout structure provides a payout following an event based on a proportion (known as the ceding percentage) of the covered loss (the modeled loss above a certain predefined threshold) subject to a maximum amount.



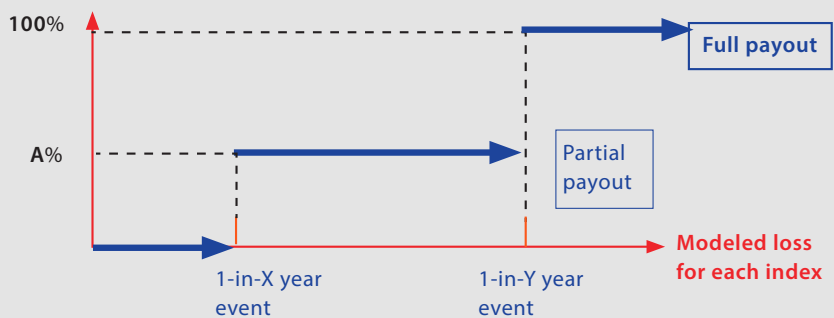
2.

A **BINARY** payout structure provides a predefined payout subject to the modeled loss being above a certain predefined threshold.



3.

A **STEPPED** payout structure provides two or more predefined partial payouts subject to the modeled loss being above certain predefined thresholds, and a full payout subject to the modeled loss being above a certain predefined threshold.



Source: World Bank

## Mitigating Risk in the Structure

The program identified four key risks inherent in the structure of the insurance product: (i) credit risk, or the risk that one of the parties to the transaction defaults; (ii) basis risk, or the risk that the payout from the product does not match the actual losses sustained; (iii) foreign exchange (FX) risk, which occurs because the local currency in which the program is denominated is a nondeliverable currency in the offshore market; and (iv) risk of failure by the calculation agent. Each is discussed below.

### Credit Risk

To ensure that the World Bank followed its internal policies in its role as reinsurer, it was necessary for the product structure to carefully mitigate credit risk (i.e., the risk that one of the parties would default). The product mitigated credit risk through the following arrangements:

- The portfolio was diversified across several retrocessionaires.
- Retrocessionaires were required to have a minimum credit rating of A+.
- The premium was paid quarterly in arrears (through a swap contract).

This last arrangement—premium payment in arrears (every quarter)—required flexibility on the part of the retrocessionaires, since it involved a nonstandard premium payment schedule that left certain exposure to currency risk to the market side.

### Basis Risk

The key disadvantage of any parametric-type trigger is basis risk—the risk that the payout from the product does not match the actual losses sustained. One of the product’s main goals was to provide rapid liquidity for some portion of the government’s emergency response costs; having payments match sustained

emergency response costs was important, but not as important as speed of payout and the ability to implement the product in the near term (which would not have been feasible with an indemnity-type trigger). Hence the existence of basis risk was accepted within this preferred program structure.

Under JMC Issuance No. 2017-1, the Government of the Philippines had the discretion to decide on the allocation of any insurance payouts from the regional and provincial coverage. This gave the government some flexibility in the distribution of payouts to counteract cases in which an event demonstrated significant basis risk.

### Foreign Exchange Risk

The GOP required a program denominated in local currency, the Philippine peso, to avoid any FX exposure on its side of the program. The international market signaled that it was willing to accept a program denominated in Philippine pesos (both for premium and payout). Because the Philippine peso is a nondeliverable currency in the offshore market, the payments were settled in US dollars at the foreign exchange rate of a pre-agreed source determined four business days prior to the payment date, according to market practice. The program was structured such that the retrocessionaires accepted the FX risk, and the World Bank, GSIS, and BTr had no exposure to FX fluctuations (assuming they could match the spot FX rate used to settle the program).

The World Bank worked closely with GSIS in designing a mechanism that would allow GSIS to match the fixing of the FX rate used in the contract. GSIS was responsible for matching those rates. The mechanism’s design is described below and is illustrated in Figure E.1.

#### For the premium payment:

1. GSIS receives the premium in Philippine pesos from BTr on the effective date of the program, and the policies become effective two business days after execution of the program.

2. GSIS pre-orders a spot FX at the fixing rate (the spot rate for settlement in one Manila business day, reported by the Philippine Dealing System, or PDEX).
3. As calculation agent for the foreign exchange, the World Bank sets the Philippine peso to the US dollar rate at the PDEX fixing based on publicly available information on a pre-agreed date.
4. GSIS pays the premium in US dollars to the World Bank.
5. The World Bank makes payments of the premium to the retrocessionaires in US dollars quarterly in arrears; payments are in equal installments of the total amount determined in number 3.

**For the reinsurance payout:**

1. Payout amounts in Philippine pesos are determined by the calculation agent following the occurrence of a disaster event.
2. GSIS pre-orders a spot FX at the fixing rate four business days later.
3. The FX fixing day occurs six business days after the Philippine peso payout amounts have been determined by the calculation agent (or four business days prior to the payment date). On this day, GSIS closes a spot FX at the day's fixing rate, buying Philippine pesos and selling US dollars.
4. The World Bank receives a payment from the retrocessionaires in US dollars and passes the payout amount in US dollars to GSIS. GSIS exchanges the US dollars for Philippine pesos from the spot FX.

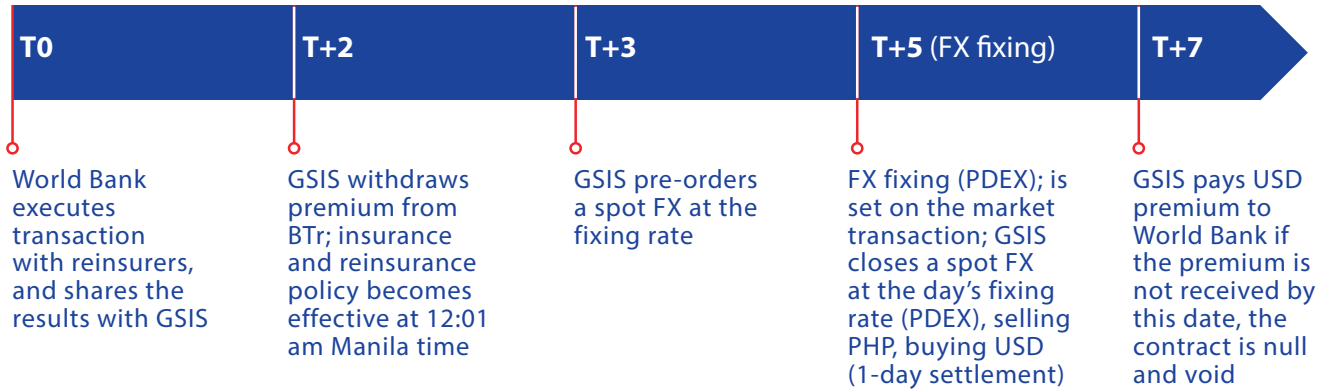
**Failure of the Calculation Agent**

To reduce the risk that the calculation agent would be unable to perform the calculation, the Calculation Agency Agreement included detailed procedures for the execution of a calculation after an event, sufficiently specific to allow a replacement calculation agent to undertake the calculation relying exclusively on the instructions contained in the agreement.

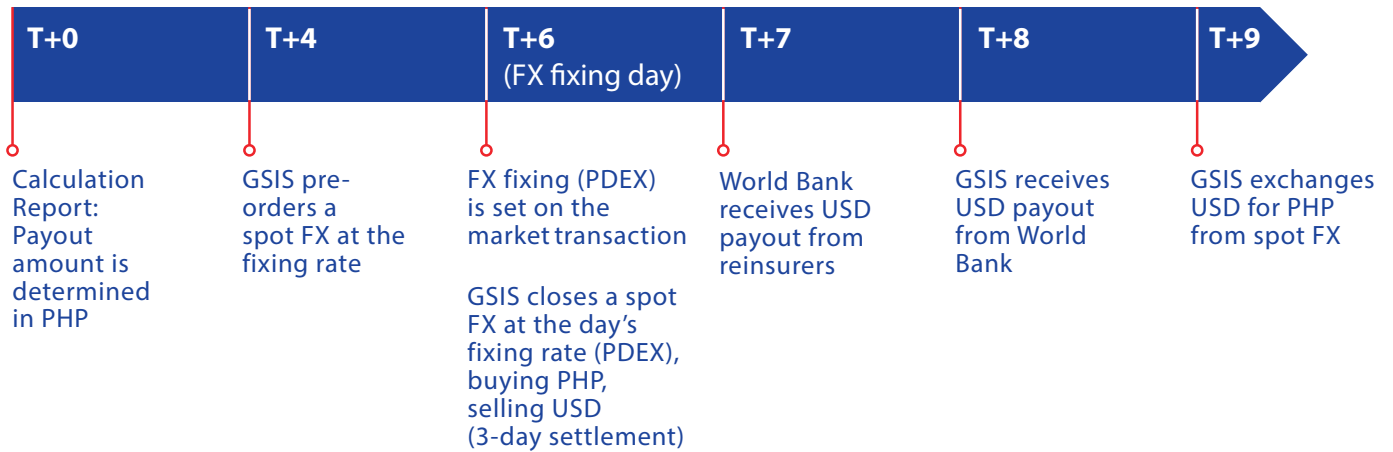


**FIGURE E.1. FX SETTLEMENT TIMELINE FOR PREMIUM PAYMENT AND REINSURANCE PAYOUT**

**PREMIUM PAYMENT TIMELINE**



**REINSURANCE PAYOUT PAYMENT TIMELINE**



**i** **PHP/USD Fixing Rate:** The Spot Rate for settlement in one Manila Business Day, reported by the Philippine Dealing System PDEX.

Source: World Bank  
Note: PHP = Philippine peso; USD = US dollar.

## Post-Event Loss Calculation Process

The post-event loss calculation process defines what happens after a disaster occurs. It answers several key questions: *Who requests that the model be run to determine whether there is a payout? What are the time frames for requesting, running, and reporting on model results? How are model results disseminated?*

Three roles in this process are critical: those of the **initiator**, the **calculation agent**, and the **escrow agent**.

The **initiator** requests a calculation, and the **calculation agent** is contracted to run the model. Precedents for such programs dictate that the calculation itself be undertaken by an independent third-party calculation agent; or, if a counterparty included in the deal undertakes the calculation, that it be verified by an independent third party.

For the Philippine transaction, the DOF wanted to use international markets in the risk transfer. In this case, the parametric program used a parametric trigger combined with a catastrophe swap contract. The World Bank took on the role of reinsurer, responsible for reinsuring the risk from the GSIS and passing the risk on (or retroceding it) to the market. The World Bank engaged the independent risk modeling firm AIR Worldwide to undertake the calculation and signed a Calculation Agency Agreement with AIR.

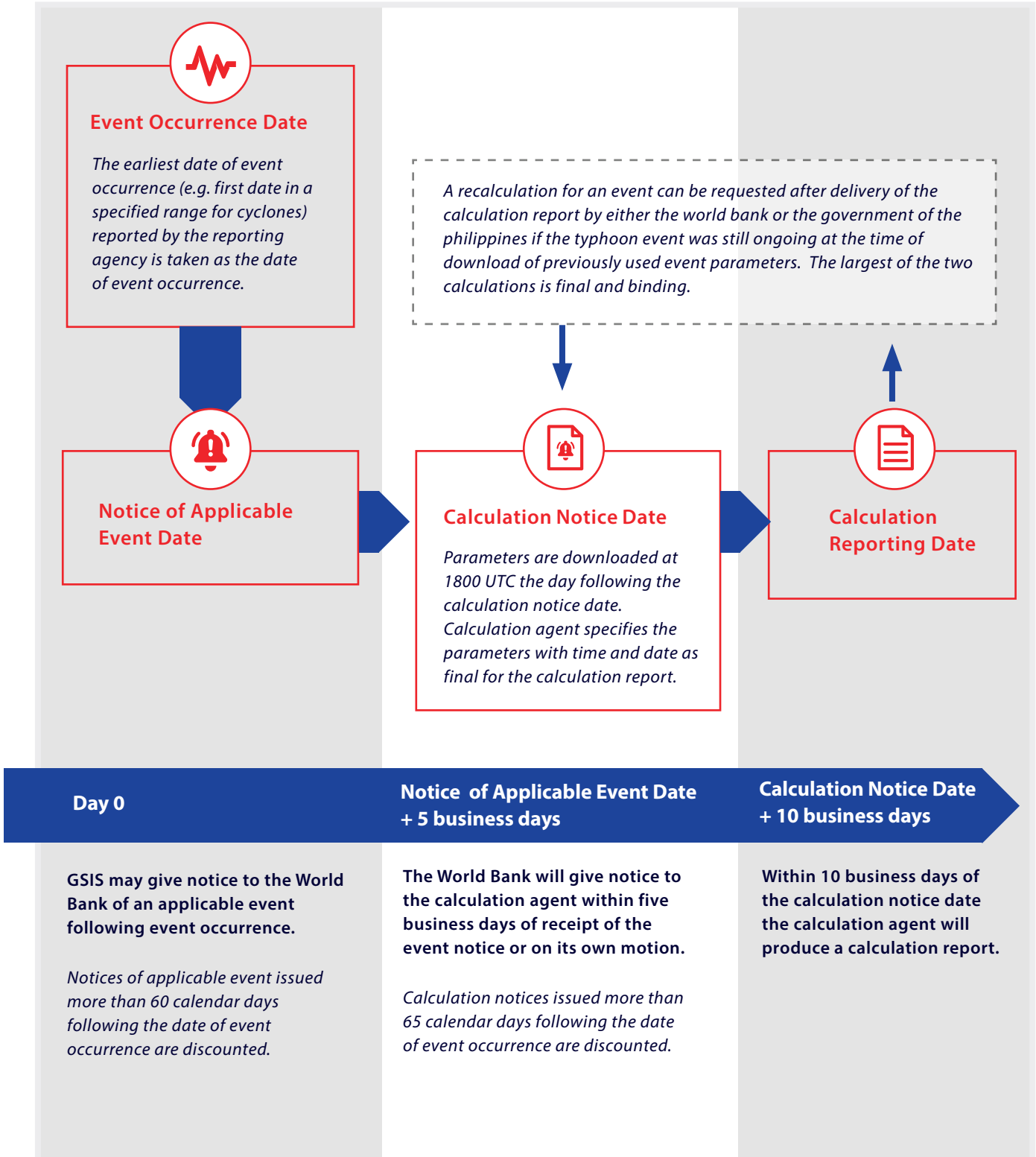
While the World Bank, by contract, was responsible for initiating a calculation in the event of a disaster, the CAA stipulated that both the BTr (as the policyholder) and the GSIS (as the insurer) could request that the World Bank give notice of an event to AIR. Furthermore, the contract built in a safety net that allowed the World Bank to initiate a calculation if neither the BTr nor the GSIS made a calculation request following what the World Bank deemed to be a significant event.

The **escrow agent** is responsible for holding the catastrophe risk model (as software) along with the procedures to perform a calculation should an event occur during the program risk period. This arrangement allows the counterparties to test calculations in the event of a dispute and ensures that the requisite materials are protected in case of a failure on the part of the calculation agent. It also removes any ambiguity around model versions or versions of the procedural document. The calculation agent, AIR, engaged InnovaSafe as the escrow agent.

The post-event loss calculation process for the Philippine program, including the timeline for execution, is illustrated in Figure F.1.

To remove subjectivity in the calculation and thus make disputes over payouts less likely, the hazard parameters used in a post-event calculation (e.g., landfall time or maximum rate of precipitation) need to be downloaded from third-party reporting agencies at a predetermined time and defined as final on that date. In the case of the Philippine product, a mechanism to allow a repeat calculation was built in to allow for meaningful changes in the hazard data after the download for the first calculation.

**FIGURE F.1. POST-EVENT LOSS CALCULATION PROCESS**



Source: AIR Worldwide.

## Legal Documentation

**Reinsuring the program through the World Bank mitigated some of the GSIS's procurement and legal issues.** Under Republic Act (RA) 656, the GOP and LGUs are mandated to insure properties or any insurable interest with the GSIS. The Procurement Reform Act (RA 9184), however, makes it difficult and costly for the GSIS to directly reinsure a business with international reinsurers. A provision under Section 4 of RA 9184 provided the World Bank with an exemption to some of the competitive bidding procedures relevant for the program insured by the GSIS, paving the way to use the World Bank as the reinsurer.

**The Calculation Agency Agreement was used as the template for contract language.** Drafting the legal documentation for the insurance program required coordination across stakeholders to ensure consistent language in all documentation. Using the CAA as a template for contract language ensured consistency. In the event of an inconsistency, the parties agreed to be bound by the determination of the calculation agent.

Table G.1 describes the key legal documents that were part of the program.

**TABLE G.1. KEY PROGRAM DOCUMENTS**

### Insurance contract

The insurance contract describes the insurance policy between the insurer, GSIS, and the policyholder, BTr. It contains details of the insured parameters, the process by which the policyholder notifies the insurer of an event, and the process by which any applicable payouts are made. GSIS took overall responsibility for drafting this document with technical support from the World Bank.

### Reinsurance contract

The reinsurance contract describes the reinsurance policy between the reinsurer, the World Bank, and the insurer, GSIS. It contains details of the reinsured parameters, the process by which the insurer notifies the reinsurer of an event, and the process by which any applicable payouts are made. The World Bank had overall responsibility for drafting this document.

### Swap contracts

(one for each retrocessionaire)

The catastrophe swap terms were confirmed either under the International Swaps and Derivatives Association (ISDA) or via a long-form confirmation. The swap contracts contain details of the reinsured parameters, the process by which the reinsurer notifies the retrocessionaire of an event, and the process by which any applicable payouts are made. The World Bank took overall responsibility for drafting of these documents, with feedback from the market counterparties.

### Escrow Agency Agreement

The Escrow Agency Agreement contains the terms under which the escrow agent will hold the escrow materials—in this case the catastrophe risk models and procedures required to undertake a calculation. The document also defines terms of access to the escrow materials. The escrow agent will typically provide a template agreement for contribution and review by the calculation agent and the program counterparties (on a limited number of terms). The Escrow Agency Agreement was drafted collaboratively by the calculation agent, AIR, and the World Bank.

### Calculation Agency Agreement

(and associated glossary)

The CAA describes the responsibilities of the calculation agent, sets out the post-event loss calculation models for earthquakes and typhoons, specifies the loss calculation procedures, and where relevant expands on the catastrophe-specific terms in the insurance, reinsurance, and swap agreements. It contains the detailed procedures for executing a calculation after an event; these must be sufficiently specific to allow a replacement calculation agent to undertake the calculation relying exclusively on the instructions contained in the agreement. The CAA was drafted collaboratively by the World Bank and the calculation agent, AIR.

### Joint Memorandum Circular

(an “issuance”)

Issuance No. 2017-1 and Issuance No. 2018-1 between DOF and DBM set out guidelines for implementing, monitoring, and reporting on the use of the DBM insurance premium allocation. The signed JMCs were crucial documents that enabled DBM and BTr to remit the funds for premium payment to GSIS. In addition, as this was the first program of its kind—and no precedent existed to provide guidance on payment flow of parametric insurance premiums, utilization of insurance proceeds, and accounting procedures with respect to the insurance coverage—the signed JMCs provide policy cover to beneficiaries, especially for auditing purposes, to avoid any potential future legal cases.

Source: World Bank.

## Risk Analysis and Due Diligence

International reinsurance or capital market transactions typically require a risk analysis to form the basis of the technical price. The risk analysis for the Philippine parametric program presented key metrics such as expected and probable maximum losses, which were calculated using the probabilistic catastrophe risk model. The risk analysis package included a detailed Microsoft Excel workbook and a summary presented in Microsoft PowerPoint. For cost and efficiency purposes, the risk analysis was first prepared by the World Bank and then validated by the calculation agent, AIR. The risk analysis presented to the market was provided by AIR.

The risk analysis included the following:

- Exceedance probability curves for the underlying risk to be covered (in this case, the emergency costs incurred in individual provinces arising from typhoons and in a defined region of the Philippines arising from typhoons and earthquakes), including both annual aggregate loss and per occurrence loss
- Exceedance probability curves for the insured payouts (i.e., individual province and regional payouts after application of the program terms)
- Expected losses (average annual loss) and associated uncertainty of the insured portfolio of risk calculated on an annual basis
- Historical event scenarios demonstrating the potential impact of historical events and the associated payouts

The catastrophe risk model underpinning the program was a new commercial model (AIR Touchstone Version 4.2.0) developed by one of the main catastrophe model vendors (AIR) as part of a broader model for Southeast Asia. All model components and model losses were validated by AIR using the latest available data and science.

The catastrophe risk model was benchmarked and validated against previous versions of the Philippine catastrophe risk model. The international market also had to build a ground-up understanding of the modeling processes, the input data and assumptions used for the model, and the uncertainties in outputs from the model when deployed for real-time loss estimation.

For the program and use of the model, the following areas were of concern:

- Impact on modeled loss of changes from previous catastrophe risk model version. Changes included an update in the exposure database and the addition of storm surge and other small modeling and methodology changes.
- Impact of historical events based on the post-event loss methodology.
- Mechanics of the post-event loss calculation process, specifically structural decisions involving the effective risk period. It was not clear whether events with a genesis date before the risk period would be covered if the date of impact was within the risk period; it was also not clear whether a related earthquake would be covered if the principal earthquake occurred outside of the risk period. The post-event loss calculation process was discussed extensively by the World Bank, AIR, and GSIS.
- Structural features in the program that allow for an “asymmetry of loss,” given that losses can increase in second and subsequent event reports, but cannot be decreased or repaid back to the market counterparties.



Man working inside a large reinforced steel tube. Philippines. Photo: Nonie Reyes / World Bank

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# Notes

- 1 Kimetrica is a social enterprise that focuses on increasing the effectiveness of social spending. More information is available at <https://kimetrica.com/>.
- 2 In some of the selected provinces, the potential financial losses due to earthquake risk outweighed those due to typhoon risk, but typhoons occurred more frequently across the selected provinces. For this reason, there was greater preference for typhoon cover at the individual-province level than for earthquake cover. This was true even for provinces with very low typhoon risk; the experience of Typhoon Pablo in 2012 demonstrated that devastating typhoons can occur even in places like Mindanao, which are historically not prone to typhoons.
- 3 Dollar equivalents are based on the January 2020 exchange rate: US\$1 = ₱50.4
- 4 These were Issuance No. 2017-1 in Year 1 (DOF and DBM 2017) and Issuance No. 2018-1 in Year 2 of the program (DOF and DBM 2018).
- 5 Reinsurers calculate a technical price for risk using a pricing formula. A standard pricing formula used by the industry prices risk based on the AAL and the capital required to write the business. The pricing formula uses assumptions for target return, diversification credit, acquisition costs, direct and indirect expenses, and cost of capital. Each of these assumptions will vary by reinsurer, and without knowing the exact assumptions it is difficult to estimate what the technical price for writing the risk should be. However, the assumptions tend to be within a range, and an estimate of the price within a given range can be calculated. While reinsurers calculate a technical price for underwriting risk, the commercial price will often differ from this for various reasons. For example, a reinsurer may be willing to accept risk for a lower than technical price in a new market or for social and publicity reasons.
- 6 For example, see Dercon and Clarke (2016).
- 7 Since modeled emergency losses and modeled losses of school buildings are both just proxies that provide an indication of relative risk from any given event, the GOP determined that maintaining just one policy was administratively easier.





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