

**Republic of the Philippines  
Bureau of the Treasury  
Government Service Insurance System**

**Data Collection Survey to Improve  
the Public Insurance System,  
including the Introduction of Disaster  
Risk-based Insurance Premium**

**Final Report**

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**Sompo Risk Management Inc.**

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## Table of Abbreviations

ABC	Approved Budget for Contract
ADB	Asian Development Bank
APEC	Asia Pacific Economic Cooperation
ARD	Asset Registry Division
ASEAN	Association of South-East Asian Nations
BFE	Base Flood Elevation
BIR	Bureau of Internal Revenue
BOT	Build, Operate, Transfer
BTr	Bureau of the Treasury
CAT-DDO	Catastrophe-Deferred Drawdown Option
CEA	California Earthquake Authority
CECR	Civil Engineering Completed Risks
COA	Commission on Audit
COVID-19	Coronavirus Disease 2019
CRESTA	Catastrophe Risk Evaluation and Standardizing Target Accumulations
DBCC	Development Budget Coordination Committee
DBM	Department of Budget and Management
DENR	Department of Environment and Natural Resources
DepEd	Department of Education
DICT	Department of Information and Communications Technology
DILG	Department of the Interior and Local Government
DOF	Department of Finance
DOST	Department of Science and Technology
DOTr	Department of Transportation
DPL	Development Policy Loan
DPWH	Department of Public Works and Highway
DREAM	Disaster Risk and Exposure Assessment for Mitigation Program
DRF	Disaster Risk Financing
DRFI	Disaster Risk Financing and Insurance
DRM DPL-CAT DDO	Disaster Risk Management Development Policy Loan with a Catastrophe-Deferred Drawdown Option
DRRM	Disaster Risk Reduction and Management
DSWD	Department of Social Welfare and Development
EQC	Earthquake Commission
ERM	Enterprise Risk Management
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GeoRisk Philippines / GeoRisk PH	Geospatial Information Management & Analysis Project for Hazards & Risk Assessment in the Philippines
GIIS	General Insurance Information System
GOCC	Government-Owned and Controlled Corporation
GPPB	Government Procurement Policy Board

GSIS	Government Service Insurance System
IAC	Inter-Agency Committee
IAR	Industrial All Risk policy
IBRD	International Bank for Reconstruction and Development
IC	Insurance Commission
ICP	Insurance Core Principles
IPF	Investment Project Financing
MGI	Method Guidelines and Instructions
MISS	Management Information System Services
MRT	Metro Rail Transit System
NARS	National Asset Registry System
Nat Re	National Reinsurance Corporation of the Philippines
NDRRM	National Disaster Risk Reduction and Management
NDRRMC	National Disaster Risk Reduction and Management Council
NDRRM Fund	National Disaster Risk Reduction and Management Fund
NDRRMP	National Disaster Risk Reduction and Management Plan
NEDA	National Economic and Development Authority
NFIP	National Flood Insurance Program
NIA	National Irrigation Administration
NIIP	National Indemnity Insurance Program
OASIS LMF	Oasis Loss Modeling Framework
OCD	Office of Civil Defense
ORSA	Own Risk and Solvency Assessment
OSVP	Office of Senior Vice President
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PBA	Philippines Building Act
PBL	Policy Based Lending
PCDIP	Philippine City Disaster Insurance Pool
PCIF	Philippine Catastrophe Insurance Facility
PCRM	Philippines Catastrophe Risk Model
PGAMP	Philippines Government Asset Management Policy
PGM	President and General Manager
PHIVOLCS	Philippine Institute of Volcanology and Seismology
PIDS	Philippine Institute of Development Studies
PIRA	Philippine Insurers and Reinsurers Association
PML	Probable Maximum Loss
PPP	Public Private Partnership
PSA	Philippine Statistics Authority
PSALM	Power Sector Assets and Liabilities Management Corp.
QCBS	Quality- and Cost- Based Selection
QRF	Quick Response Fund
RA	Republic Act
RBC	Risk-Based Capital

SATREPS	Science and Technology Research Partnership for Sustainable Development
SEADRIF	Southeast Asia Disaster Risk Insurance Facility
SECURE	Stand-by Emergency Credit for Urgent Recovery
SEPO	Senate Economic Planning Office
STC	Steering Committee
SVP	Senior Vice President
TA	Technical Assistance
TWG AM	Technical Working Group on Asset Management
UP	University of the Philippines
VP	Vice President
WB	The World Bank

# **Executive summary**

## **Background**

The Philippine government's plans to implement comprehensive disaster risk management are laid down in the National Disaster Risk Reduction and Management Plan (NDRRMP 2011-2028). Securing of funds for disaster recovery is one of the outcome items in addition to various hard and soft disaster risk reduction measures in the NDRRMP. In order to secure funds for disaster recovery, the Department of Finance (DOF) has formulated a disaster risk financing and insurance strategy and has created a scheme for transferring financial burden risk in the event of a disaster. While this scheme does cover some of improvements to the public insurance system, the following issues still need to be addressed in order for the insurance system to provide sufficient cost required for recovery: (1) the assets are not insured despite having an compulsorily insurance scheme (no insurance, no coverage), (2) the sum insured does not meet the amount required to recover the damaged assets (underinsurance), and (3) premiums are not set according to disaster risk of the assets, which means that there is no incentive to invest in disaster mitigation.

JICA conducted the "Information Collection and Confirmation Survey on the Utilization of Non-life Insurance for Public Infrastructure Resilience against Disasters in Metro Manila" (hereinafter referred to as the "Previous Survey") in 2016 in response to a request from the Government Service Insurance System (GSIS) for assistance in improving the above issues surrounding public insurance. The Previous Survey proposed that (1) to improve the current insurance scheme in order to increase incentive for asset owner to purchase insurance, and (2) develop a replacement cost appraisal system. Also the Previous Survey in its development risk-based premium rate calculation tool for Metropolitan Manila (Metro Manila) confirmed that (3) the introduction of risk-based premiums could serve as an incentive for prior investment.

## **Objectives**

The objectives of this Survey are to collect and analyze the necessary information to establish a proposal for improving the public insurance system.

- (1) Improve the GSIS's public insurance program and underwriting and procurement capabilities, including risk-based premium setting
- (2) Introduce a risk assessment-based public insurance premium rate calculation system for setting risk-based premiums
- (3) Introduce a system for estimating the replacement cost of public assets

## **Current disaster finance efforts**

The DOF has taken various measures to secure the necessary funds for disaster response, including the signing of emergency disaster loan facilities (i.e., disaster stand-by loans), launching a parametric disaster insurance program for local governments as a post-disaster emergency response fund (for two years starting in 2017), and issuing a cat bond through the World Bank (WB).

With respect to public insurance, the Administrative Order (AO 2017- No. 04) has established an Inter Agency Committee to study the appropriate insurance coverage and actions to structure an insurance program for the key assets with procuring reinsurance underway.

These initiatives are still ongoing. A public procurement procedure was launched at the end of 2019 with the aim of structuring schools and roads and bridges as a single public insurance program for reinsurance procurement, but was suspended because the requirements for the procurement procedure was not able to meet standards of the international insurance market. Currently, some changes have been made to both the content of the insurance program and the rules governing procurement. The GSIS plans to restart the reinsurance bidding.

The WB continues to provide cooperation and support on "Strengthening Institutional Capacity for Disaster Risk Management", "Strengthening Investment Planning and Regulations for Disaster Risk Reduction", and "Strengthening Policies and Institutions for Disaster Risk Reduction" through development policy loans, in addition to providing various technical assistance, such as local government insurance and cat bonds. The WB has provided technical assistance to the formulation of seismic retrofit plans for public schools in Metro Manila. Recently, the WB is assisting the Department of Public Works and Highway (DPWH) in its project to seismically retrofit 425 public schools and medical facilities in Metro Manila, which are particularly vulnerable to earthquakes, through a financing plan that includes the retrofitting costs. The Asian Development Bank has also provided support in its proposal to establish an insurance pool for disaster risks in a number of cities, and is working towards its implementation.

In terms of natural disaster risk assessment tools required for the expansion of parametric insurance and flood insurance, natural disaster loss assessment models have been developed by major loss modeling companies and through open platforms, in line with the disaster risk management initiatives in the NDRRMP, and the development of new insurance programs by donors. There has also been progress in the expansion of disaster hazard maps and disaster risk information platform led by the Philippine government's technical agencies, and GeoRisk Philippines, which provides visualization of natural disaster risks across the Philippines, is now launched and available to public.

Neighboring countries such as Indonesia and Vietnam have begun to establish mechanisms

to provide public assets with natural disasters coverage. In the Philippines, development of various risk financing schemes based on disaster risk financing strategies and insuring natural disaster risk are being made through the existing public insurance system.

### **Gather additional information on the GSIS's public insurance operations and natural disaster insurance programs**

This Survey gathered information on the GSIS's underwriting structure, internal policies and guidelines, accumulation control, documents for reinsurance ceding and issues revolving reinsurance procurement. Although the GSIS is a Government-Owned and Controlled Corporation (GOCC) and is not subject to the supervision and regulation of the Insurance Commission (IC), the GSIS has maintained good financial position with capitalization well above the IC's regulatory level.

To facilitate discussion on the introduction of the risk-based premium, this Survey reviewed and summarized the GSIS's premium assigning process and risk classifications methods. For natural disasters (typhoons, floods, and earthquakes), while the premium rates for typhoons and floods, which are often accompanied by typhoons, reflect the level of risk from the hazard to some extent, the rates hardly reflect the vulnerability of the asset that is subjected to the hazard. In the case of floods, which are heavily influenced by location of the insured asset, the premium rate does not take into account the number of floors or occupancy of the building, which can affect its location and loss ratio. For earthquakes, the premium rates only accounts for the number of floors and influences of building structure and year of construction, which affect the extent of damage, are not factored into the premium rates. In order to mitigate the increasing number of weather-related disasters, it would be more effective to assess not only the risk from the hazard but also the vulnerability of assets that are exposed to the hazard, i.e., to assess the hazard and the vulnerability of asset separately, in order to visualize the level of risk and encourage investment in disaster prevention.

With regard to the procurement for the reinsurance within the GSIS, the three large- scale programs opened for competitive bidding in 2020 were unsuccessful because there were no participating bidder. GSIS indicated that there were many reasons behind the unsuccessful biddings. These reasons include market hardening due to the spread of the coronavirus, difficulties in providing underwriting information on schedule, and premiums demanded by the insurance market exceeding its budget. With the introduction of public insurance program for key assets led by the BTr and when procuring reinsurance from the insurance market, the ability for the GSIS to provide risk information and adequate sum insured of the asset is very important to the reinsurer. It is also important for the GSIS to be able to quantitatively assess risk and loss to determine an appropriate bidding budget.



## **Development plan for the Risk-based Premium Rate Calculation System**

The objectives of introducing the risk-based premium rate is to amend the GSIS's current natural disaster premium rates in public insurance programs, which is based on regional-zoning, to further reflect the risk exposure to promote greater awareness of natural disaster risks among government agencies and local governments who are responsible for asset management, and to create disaster prevention incentives by linking risk reduction to lower premium rates in the insurance policies.

The risk of loss to the policyholder is defined by the probability of occurrence of the loss event and the impact of the loss when it occurs, and the insurance premium is determined on the basis of the expected loss over a certain period of time. If the loss risk of policyholders were uniform, the premium rate for each policyholder would be the same, but in reality, the expected loss for each policyholder differs because the location of the insured facility and the vulnerability of the facility to the hazards differ, thus the base rate for each asset would be different.

In practice, the premium rate may not always be directly tied to the size of the risk, but insurance schemes reflect disaster risk into premium rates by establishing hazard categories according to disaster risk, as well as factors that lead to the strength or vulnerability of the facility against the hazard (building construction, construction year, renovation, occupancy, and vulnerability of the building to flooding, etc.). Natural disaster insurance policies in various countries often use risk-based premium rates and assigns premiums according to an established set of risk categories. As an example, the U.S. National Flood Insurance Program (Risk Rating 2.0) has developed new premium rates that uses the risk-based approach incorporates assessment of various flood hazards at a location and account for vulnerability of insured assets.

The issues identified in the current risk classification utilized by the GSIS's natural disaster insurance are: (1) for natural hazards, risk is classified by regions, but this classification does not adequately represent the intensity of the hazards; (2) for facilities, risk classification for typhoons and floods does not incorporate strength and vulnerability of facilities against the hazard. In the case of earthquake, only the number of stories in a building is reflected in the risk classification. As a result, the existing premium rate is not considered to be risk-based. This Survey proposes to further subdivide existing risk classifications into risk-based categories and assign premium rates to each of the categories to adequately reflect natural disaster risks in premium rates. Reflecting the disaster risk and the strength of the facility in the natural disaster insurance premium rate using risk categories will promote "awareness of disaster risk," which is the objective of risk-based insurance premiums, and "incentivize disaster prevention actions".

The Philippines, following the NDRRM, has made various efforts to assess and visualize natural disaster risks. From this came the development of risk assessment tools such as GeoRisk

Philippines, an integrated disaster hazard map and risk assessment system, a loss assessment model for natural disaster risk by a commercial modeling company, and a flood model from the University of the Philippines. Using these tools, this Survey has identified data and sources that can be utilized to develop the proposed premium calculation system based on risk categories that account for both hazard risk and facility vulnerability (Table 4-3, p77).

The GSIS has branch offices all over the country and underwrites insurance based on a set of common rules. Instead of developing a completely new premium rate calculation procedure, it will be more feasible to revise the current premium rate table to reflect risk-based premiums. Therefore, the Survey has included the following items in the proposed Risk-based Premium Calculation System Development Plan and system deployment procedure.

- Risk-based premium rates based on disaster hazard and facility vulnerability subcategories
- Analyze the adequacy and deviation of the rate classifications of the current premium rates using the loss assessment model. Reflect the findings to into the classification indicators and subcategories, and revise the risk-based premium table (Figure 4-4, p78).
- Provide rationale for the difference between the current premium rate and the proposed rate for each risk subcategory.
- Ensure that introduction of risk-based premium rates will have limited impact to the GSIS's current underwriting processes, which is followed by its sales branch offices across the Philippines.
- Provide the premium rate calculation system with a function that automatically selects the appropriate risk subcategory based on the revised insurance application form and established manual.

The GSIS can modify its premium rates by revising its underwriting guidelines, but if the change is substantial, then the revised premium will have to be proposed as resolution and addressed by the GSIS Board of Directors. The procedures for transitioning to the risk-based premiums including the resolution are summarized in Figure 5-1 (p83).

According to the GSIS Insurance Division, although there is widespread consensus on the necessity of risk-based premium rates, it is expected that concerns will be raised about whether the actual practice will be able to keep up with its designed application. In order to firmly establish the concept of risk-based premium rates and underwriting methods, the trainings will be provided to promote better understanding of the system and facilitate the transition process.

### **Development plan for the Replacement Cost Appraisal System**

In order for insurance to cover the cost required to restore an asset after a loss, the sum insured must be equal to the replacement cost. The GSIS's current public insurance underwriting procedures does not include a verification process to check whether or not the

sum insured in the application is reasonably to represent the replacement cost of the covered asset. Furthermore, the insured does not provided information to confirm and compare these values. For this reason, this Survey proposes a development plan (draft) for a Replacement Cost Appraisal System to assist the GSIS in estimating the replacement value of its insured assets. The proposed system will be able to evaluate the replacement value of the target assets using asset information registered in the National Asset Registry System (NARS), which is being developed by BTr to centralize public asset management.

This Survey collected information on current development of the NARS and the information collected by the system, as well as information on existing replacement cost valuation systems in other countries. This Survey also identified the types of data that would be required the proposed Replacement Cost Appraisal System for the Philippines. A development plan (draft) for the proposed Replacement Cost Appraisal System was established, based on survey finding, with estimated timeline and cost required for developing the proposed system.

The valuation methods for each type of target assets, which includes schools, hospitals, and infrastructures (roads, bridges, airports, etc.) will be based on the type of structure. After considering the available information, including those that can be obtained in the future, the Survey proposes that the valuation of buildings be based on the “new build unit cost method”, in which the asset will be valuated using construction cost per unit area. Similarly, civil engineering structures will be valued based on the construction cost per unit distance. Valuation of special facilities and equipment will be done by referencing cost information from accounting books and third party asset appraisal reports.

The system to be developed will consist of two modules: a "cost database" and a "valuation module". The cost database will be a database that contains information necessary for the estimating the replacement cost. These information include unit construction cost and unit equipment cost for each model type asset, and regional price indices. The valuation module will be a calculation application that contains various calculation formulas linked to information entered into the system.

Since the amount of information that can be utilized as cost data from the asset information accumulated by NARS and other asset registers are limited, data such as unit construction cost, unit equipment cost, and regional indices that are necessary for the cost database will need to be obtained separately from the main NARS project when going forward. The development processes of the Replacement Cost Appraisal System is shown in Figure 6-10 (p114).

### **Introduction of the Disaster Risk Reduction Certification**

In the Previous Study, the risk-based premium rates for public schools in Metro Manila insured by the GSIS were calculated and the reduction in premiums after seismic retrofit were compared with the expected retrofit costs. The results showed that it would take a long time

for the discounted premium to cover the retrofit costs, and that adjustments to premium discounts alone would be insufficient to incentivize disaster prevention actions. To compensate this, the Survey proposes to certify "safer buildings" made through disaster reduction investment for public schools through the DRR Certification Program. This will work as an indicator to facilitate "premium rate adjustment" in the direction of "disaster reduction investment".

In consideration of the time required to carry out the building certification process with DPWH and other relevant agencies, the assessment procedure for the DRR Certification Program proposed in this Survey will be carried out by the GSIS alone. However, the assessment criteria, "certified level of disaster prevention of buildings" such as "the ability to ensure the safety of the people in the building," but will be the same as those established in the Previous Survey. The proposed DRR Certification Program will obtain asset information through not only the NARS, but also from a revised GSIS insurance application form (which includes a disaster preparedness checklist to be filled out by the insured). The assessment will be made using information from the hazard and facility vulnerability indicators from the risk-based premium calculation system, hazard information from Geo Risk Philippines and the simplified check list filled out by the insured.

In addition, the Survey proposes the following mechanisms to be linked to the "DRR Certification Programs" as an incentive to encourage disaster prevention investment through insurance programs. This proposal based on the premises that public insurance challenges on "natural disaster compensation" and "replacement cost-based insurance contracts" have been addressed beforehand.

- (1) Premium discounts linked to DRR Certification Program for buildings
- (2) Endorsement that includes retrofit (enhancement) costs for reducing future reoccurrence of loss within the natural disaster claim payment
- (3) Reduction of the insurance deductible for roof damage
- (4) Endorsement to cover disaster response costs

### **Survey findings and future directions**

This section summarizes the survey findings and proposed future direction for areas (items) that will require technical assistance and cooperation, including issues on uninsurance and partial insurance indicated in the Previous Survey (see Table 8-1, p126).

### **Recommendation and roadmap for improving public insurance**

The support items and roadmap are proposed to improve the public insurance system's role in reducing the financial impact of disasters and encouraging disaster prevention investment

by providing adequate recovery costs and prompt payment of insurance claims (Figure 8-1 · 8-2 · 8-3, p131-132).

**(1) Enhance the role of public insurance by securing post-disaster recovery costs**

① Development of the Replacement Cost Appraisal System

The replacement cost must be adequately valued in order for the insured to receive sufficient insurance payment to restore the asset. This item was proposed to address the issue of partial insurance within the public insurance program. The system development will be carried out according to the proposed development plan.

② Capacity building for GSIS to strengthen insurance operation functions

The GSIS, which manages insurance for public assets, has identified the following areas in insurance operation to be strengthened: accumulation of losses from natural disasters, evaluation methods for reinsurance procurement, and prompt loss assessment and payment for wide-area disasters. This Survey proposed to assist the GSIS by providing a training course in Japan to introduce and share the knowledge and approaches of private insurance companies in Japan, a disaster-prone country.

**(2) Enhance the role of public insurance in encouraging disaster prevention investment**

① Development of a Risk-based Premium Calculation System

Insurance that fully reflects the risks will assist the insured to understand its risk exposure, and disaster prevention investment will lead to reduction of premium. Risk-based premium rates can serve as an incentive for disaster prevention investment. This Survey proposes the development of a risk-based premium rate calculation system that can be operated by the GSIS, which will adequately reflect both the hazard and the vulnerability of the facility.

② Implement pilot trial to DRR Certification Program

As the reduction in Premium is relatively small compared with disaster prevention investment, adjustment of premium alone is difficult to motivate disaster prevention investment. The DRR Certification Program was proposed in the Survey as a mechanism to compensate for this. This program focuses on the safety of facilities from the aspect of life safety during a disaster, and will be implemented by the GSIS. This Survey also proposed changes to insurance contracts for it to be linked with the proposed mechanism.

**Suggestion for the implementation stage**

Based on the results of this survey, the following three points should be kept in mind when moving forward to the support projects.

- Confirm current progress and coordinate with related projects such as the WB-supported NARS development project and city disaster insurance programs supported

by SEADRIF and ADB.

- Information on the proposed risk-based premium and development of the Replacement Cost Appraisal System should not only be shared with the GSIS, but also with DOF, BTr and agencies whose assets are insured by the public insurance program.
- Collaborate with the Philippine government's efforts in disaster prevention and mitigation to facilitate public insurance's role in disaster prevention and mitigation.

# 1 Survey overview

## 1.1 Background

The Philippines is highly prone to natural disasters, and according to the United Nations University's World Risk Report 2020, the country's natural disaster risk is the ninth highest among 181 countries in the world. In addition, according to statistics from the United Nations Office for Disaster Risk Reduction, the annual average amount of direct loss from natural disasters that occurred between 1995 and 2014 has increased to \$1.6 billion, equivalent to 0.6% of Philippine's GDP in 2014. In its National Disaster Risk Reduction and Management Plan (2011-2028), the Philippine government has decided to implement comprehensive disaster risk management, which will focus on both hard and soft disaster risk reduction measures and with the securing of funds for disaster recovery as one of the outcomes. In order to secure funds for disaster recovery, the Philippine government has formulated a disaster risk financing and insurance strategy and is developing a scheme to transfer the financial burden of disaster risk. In this context, the government has been working to improve the public insurance system for public assets. However, the current insurance system does not sufficiently cover costs required to recover from a disaster due to the following issues: (1) the assets are not insured despite having an compulsory insurance scheme (no insurance, no coverage), (2) the sum insured does not meet the amount required to recover the damaged assets (underinsurance), and (3) premiums are not set according to disaster risk of the assets, which means that there is no incentive to invest in disaster mitigation.

In response to a request from the Government Service Insurance System (GSIS), the provider of public asset insurance, JICA conducted the "Data Collection Survey on the Insurance Mechanism for Incentivizing Disaster Resilient Public Infrastructures in Metro Manila" (hereinafter referred to as the "Previous Study") in 2016 to examine measures to improve these issues. The Previous Survey proposed that (1) the current insurance scheme should be improved to make it more effective to the insured, and (2) a replacement cost appraisal system should be developed. Also the Previous Survey in its development of a tool for calculating risk-based premium rates limited to Metropolitan Manila (Metro Manila) confirmed that (3) the introduction of risk-based premiums could serve as an incentive for prior investment. After reviewing the findings of the Previous Survey, GSIS filed a request to JICA on providing technical support to improve GSIS's current insurance scheme ((1) and (3)), which includes the introduction of risk-based premiums.

Meanwhile, as part of its disaster risk financing and insurance strategy, the Philippine government, through the Administrative Order No. 4 of 2017, established an Inter-Agency Committee (IAC) chaired by the Department of Finance (DOF) to ensure insurance coverage of public assets. The IAC decided that the Bureau of the Treasury (BTr) would establish a National Asset Registry System (NARS) to centrally manage information related to public

assets. The BTr, with technical assistance from the World Bank (WB), has begun the development process of NARS, and based on the results of the Previous Survey, requested JICA to provide support on development of the Replacement Cost Appraisal System ((2) above), which is to be used in conjunction with NARS.

## **1.2 Objectives**

The purpose of this Survey is to collect and analyze the necessary information to implement (1), (2), and (3) below, and to propose an implementation plan for improvement of the public insurance system.

- (1) Improve the GSIS's public insurance program and underwriting and procurement capabilities, including risk-based premium setting
- (2) Introduce a risk assessment-based public insurance premium rate calculation system for setting risk-based premiums
- (3) Introduce a system for estimating the replacement cost of public assets

## **1.3 Implementation directions**

### **1.3.1 Points to note in the survey operation**

#### **(1) Establishment of the Steering Committee (STC)**

A steering committee formed by relevant ministries and agencies will be set up to establish a framework to discuss and share the survey directions and results. The members of the steering committee will be decided in consultation with the Philippine government and JICA.

#### **(2) Position of this Survey in the disaster risk financing and insurance strategy**

In the Philippines, the Disaster Risk Financing and Insurance Strategy (DRFI Strategy) is established by the DOF and then implemented by the BTr and other implementing agencies. In the course of this Survey, the proposed plan and schemes will be formulated in line with Philippines' most recent strategy and policies.

#### **(3) Selected public assets**

The NARS established by the BTr included strategically important assets such as schools, medical facilities, and infrastructure (roads, bridges, railroads, airports, etc.) in the Asset Registry and is in the process of collecting information for asset management. These key assets were also identified comprehensively and adequately. This Survey will focus on obtaining an overall picture of the public insurance lines and programs provided by GSIS and concentrating on schools, medical facilities, and infrastructure type assets for the detailed study.



#### **(4) Public insurance product lines provided by GSIS and those covered by this Survey**

GSIS provides a wide range of non-life insurance products, including property insurance, construction insurance, assembly insurance, machinery insurance, civil engineering structure insurance, liability insurance, marine insurance, and various types of warranties on ships and aircraft, construction equipment. Since one of the objectives of this Survey is to provide means to estimate the replacement cost of public assets, the Survey will focus on property insurance and civil engineering structure insurance.

#### **(5) Transition to risk-based premium rates**

With regard to the transition to risk-based premiums, this Survey will propose a realistic transition plan, including transitional measures, based on the following aspects. The transition plan is intended to cover Metro Manila, where the Risk-based Premium Rate Calculation System was developed, and scope will be finalized based on discussions with GSIS.

- Financial status of GSIS (premiums, claims, reinsurance ceding schemes, etc.)
- Scenarios on future trends in coverage of public assets
- Premium pricing that is economically acceptable to the insured
- Consideration of internal budgets and external funds that could be used for insurance fund

The transition plan in line with Philippines' current context will be drawn up after gathering information and exchanging views with the DOF, which is in charge of formulating policies on disaster risk financing, and the insured agencies (owner of the public assets).

#### **(6) Risk-based Premium Rate Calculation System**

The Risk-based Premium Rate Calculation Tool for Metro Manila proposed in the Previous Survey is based on the use of Geographic Information System (GIS) and consists of 3 different modules: natural disaster hazard module, vulnerability module, and financial module. The system proposed in this Survey will cover the entire Philippines and will utilize the data and schemes adopted in the Previous Survey to the fullest extent possible. Attempts to quantitatively assess natural disaster risks have been made by the Department of Science and Technology (DOST) and JICA's Science and Technology Research Partnership for Sustainable Development (SATREPS) in the "Project for Development of a Hybrid Water-Related Disaster Risk Assessment Technology for Sustainable Local Economic Development Policy under Climate Change in the Republic of the Philippines (HyDEPP)" (2020-2025), as well as by the WB and University of the Philippines (UP). In identifying available data, this Survey will coordinate with relevant organizations after gathering information on the progress of related projects, and maximize the use of available data and existing systems.

## **(7) Replacement Cost Appraisal System**

The proposed specifications of the Replacement Cost Appraisal System will be reviewed to allow integration with NARS. In reviewing the specifications, consultations will be held with BTr, agency in charge of NARS, WB, provider of technical assistance to NARS, and other relevant organizations. The Survey will propose a system development plan and roadmap in consideration of the development plan and specifications of NARS.

## **(8) Review of incentives for disaster risk reduction and insurance coverage**

The Previous Survey confirmed that the introduction of risk-based premiums can serve as an incentive for disaster reduction, as prior investment in disaster reduction leads to reduced premiums. On the other hand, the Previous Survey also found that the introduction of risk-based premiums alone would not adequately provide incentives, since the current premium are small and it would take several decades for some public assets to recover the cost of disaster reduction investments such as seismic retrofitting through reduced premiums. To make up for this, the "Disaster Risk Reduction (DRR) Certification Program" was proposed as a complementary mechanism.

The "DRR Certification Program" establishes a set of assessment items for disaster prevention for each type of hazard (earthquake, flood, typhoon, etc.) from structural, non-structural, and other preparedness aspects, and specifies the assessment criteria for each item. It is envisioned that a standard set of assessment criteria will allow visualization of public assets with disaster prevention mitigation efforts, and reduce premiums for certified public assets, thereby raising awareness of disaster prevention among asset owners and acting as an incentive for disaster risk reduction.

In the Previous Survey, the "DRR Certification Program" was established and proposed after explaining its concept to various relevant organizations. The objective of this Survey is to design a specific system by utilizing the knowledge of Japan, a country with well-established disaster prevention programs, after consultation and coordination with relevant organizations.

### **1.3.2 Actions for each survey operation**

#### **(1) Updating information in DRFI by the Philippine government**

This survey will update development status of disaster risk financing in the Philippines with ongoing activities by the Philippines government beyond the description stated in the reports of the Previous Survey report and the "Data Collection Survey on the Climate Change and Disaster Risk Financing. The main sources are:

- Gather information from reports of Philippine Institutes for Development Studies (PIDS), Senate Economic Planning Office (SEPO), Asia Pacific Economic Cooperation

(APEC), Asian Development Bank (ADB), WB, etc. Gathering information from reports of APEC (Asia Pacific Economic Cooperation), ADB (Asian Development Bank), WB, etc.

- Gather information by holding meetings with relevant organizations, including Philippine government agencies and donors (WB, ADB).

**(2) GSIS public insurance program (underwriting method, management, organization and capacity, procurement method)**

In addition to reconfirming GSIS's insurance lines for public assets, this Survey will also cover the Civil Engineering Completed Risks (CECR), which was not included in the Previous Survey. The information to be collected include insurance contract, underwriting criteria, underwriting records, method of determining premiums and sum insured, compensation methods, as well as GSIS regulations, manuals, and actual operations related to these items.

With regard to the National Indemnity Insurance Program (NIIP), an insurance program under Presidential Decree No. 4 of 2017, which BTr and GSIS are jointly working on, the Survey will obtain the bid documents (not disclosed to the public) and review the insured value, replacement cost and program details.

The items to be confirmed and assessed in relation to GSIS underwriting, accumulation control and insurance procurement and its confirmation methods are as follows

Table 1-1 1Confirmation items for underwriting and accumulation control and insurance procurement, and confirmation methods

Confirmation category	Items to be confirmed and assessed	Confirmation method
Underwriting	<ul style="list-style-type: none"> <li>• Underwriting process</li> <li>• Underwriting criteria</li> <li>• Calculation of premium rates</li> <li>• Items required for insurance application</li> <li>• Terms and Conditions</li> <li>• Provisions on underinsurance</li> </ul>	Documentation <ul style="list-style-type: none"> <li>• Underwriting Manual</li> <li>• Process</li> <li>• Approval authority</li> <li>• Terms and conditions of insurance for the applicable product</li> </ul> Interview <ul style="list-style-type: none"> <li>• Interviews with insurance sector practitioners</li> </ul>
Accumulation control	<ul style="list-style-type: none"> <li>• Accumulation risk assessment criteria for natural disaster coverage</li> <li>• Valuation method for accumulation value</li> <li>• Tools</li> <li>• Section in charge</li> </ul>	Interviews with GSIS will be conducted along with to confirmation of available documents.
Insurance procurement	Procurement method <ul style="list-style-type: none"> <li>• Retention contract</li> <li>• Public procurement (reinsurance) contracts</li> <li>• Excess Liability Compensation Contract</li> <li>• Procurement of special cases</li> <li>• Procedures and flow for each method</li> <li>• Issues</li> <li>• Corresponding resources (information updated from the Previous Survey)</li> </ul>	<ul style="list-style-type: none"> <li>• Documents and published data</li> <li>• GSIS regulations on reinsurance procurement and public procurement</li> <li>• Interviews with insurance sector practitioners</li> </ul>
General operation issues	Gather basic information from GSIS financial statements and the Commission on Audit's (COA) annual audit report on GSIS.	

### (3) Study on the development of a risk-based premium scheme.

In recent years, the commercialization of Philippine flood and typhoon models by several U.S. commercial loss modelers have been made, and various government sponsored institutions including Philippine Reinsurance Company under the International Climate Change Initiative, the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), DOST, the University of the Philippines (UP), and the DREAM Project<sup>1</sup> and various government research institutions have contributed to the development of flood and typhoon loss assessment models in the Philippines. In addition to the efforts of SATREPS, the current status of flood and typhoon loss assessment models should be fully understood to determine the appropriate use of such models.

The GSIS is not under the supervision of the Insurance Commission (IC), which oversees the insurance system of the Philippines, and is not required to comply with IC regulations in determining premium rates. In preparing the development plan for this item, the Survey will

<sup>1</sup> Disaster Risk and Exposure Assessment for Mitigation Program (DREAM)

identify the relevant regulations and bylaws of the GSIS. Facilities in municipalities that are vulnerable to disaster risks will have higher premium rates, while such municipalities are also expected to have lower capacity to bear insurance premiums. Therefore, the transition to risk-based premium rates will require consideration of measures to support vulnerable municipalities.

#### **(4) Development plan for the Replacement Cost Appraisal System**

The development of NARS by the BTr began with the support from the WB in 2018 and the initial phase of the system is currently under operation. In addition, to improve the operation of public insurance under Republic Act (RA, Republic Act) 656, a Circular (COA Circular No. 2018- 002<sup>2</sup> , dated May 31, 2018) was issued by the Commission on Audit (COA) to relevant agencies and municipalities to require submission of public asset information to GSIS. After grasping the current status of recent progresses relating to the collection of public asset information, this Survey will propose a development plan for the Replacement Cost Appraisal System that is in line with local initiatives.

It is a principle in insurance that the insured is responsible to state (provide) the insurance value (in this case, replacement cost) to GSIS at the time of the insurance application. In the case of private insurance companies, they are free to refuse to underwrite if the replacement value, i.e., the sum insured, is notably inadequate; however GSIS underwrites insurance under RA 656, which requires compulsory insurance, and therefore cannot refuse to underwrite the insurance even if the replacement cost is notably inadequate.

#### **(5) Review of incentives for disaster mitigation and insurance coverage**

The premium for property insurance is determined based on the expected loss value which is calculated by multiplying the "extent and frequency of the disaster hazard" with the "strength and vulnerability of the target facility". The premium rates can be regarded as an indicator that lists disaster risks based on the strength of the facility at a particular area or location. While property insurance is intended to compensate for losses caused by damage to facilities, ensuring the safety of occupants inside the facility is also an important responsibility and a major concern for facility owners and managers.

The concept of the DRR Certification Program is to replace the "risk of damage to facilities" by the "risk of loss of lives of people in the facilities" in order to encourage facility managers to invest in disaster prevention in advance. In addition to the "risk of loss of life," this Survey will also consider including in the DRR Certification as an indicator on whether or not a facility can be used as an "evacuation shelter" in the event of a typhoon. "Based on the incentives

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<sup>2</sup> "Guidelines prescribing the submission of the Property Inventory Form as a basis for the assessment of general insurance coverage over all insurable" "Guidelines prescribing the submission of the Property Inventory Form as a basis for the assessment of general insurance coverage over all insurable assets, properties and interests of the government with the General Insurance Fund of the Government Service Insurance System".

proposed in the Previous Survey, these proposals will be reviewed again in consultation with relevant organizations to see if they can be implemented in practice, and a draft program design will be formulated.

### 1.4 Survey schedule

The original survey schedule submitted at the time of contract was to submit the inception report in September 2020, hold a kick-off meeting in October 2020, submit the draft final report in December 2020, and submit the final report in February 2021. The project proceeded as planned until the kick-off in October 2020, but it took some time to sign the non-disclosure agreement (NDA) between GSIS, JICA and the Survey Team to receive information from GSIS, and the NDA was signed in May 2021. As a result, the schedule was changed and the finalized survey schedule is as follows.

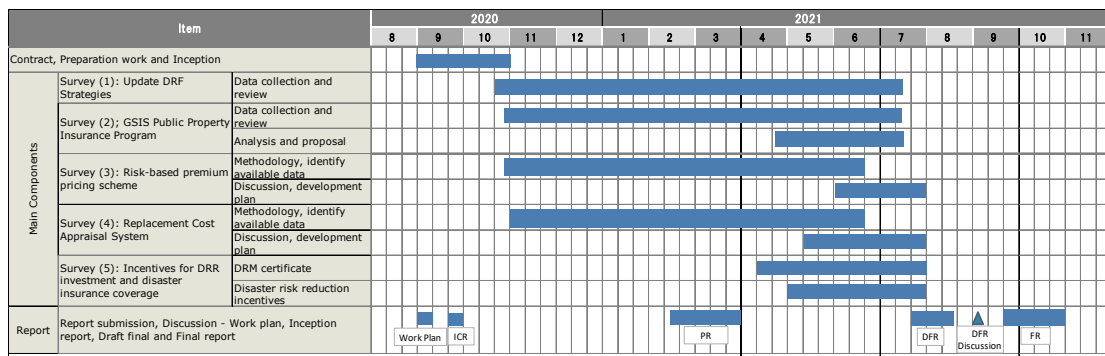


Figure 1-1 Survey schedule

## 2 Overview of disaster risk financing and insurance in the Philippines and the positioning of this Survey

### 2.1 Philippine's policies, strategies, and measures on disaster risk financing and insurance

Risk financing is a response to risk, in which parties consciously act to set aside funds to offset fluctuations in cash flows that occur when risks materialize.

Table 2-1 Risk Response (Risk Control and Risk Financing)

Risk Response	Method	Details
Risk control	Avoidance	Measures to stop the risky activity itself and avoid the expected risk.
	Prevention Reduction	A conscious act or decision not to act in order to reduce the frequency and/or magnitude of losses, or to make losses more predictable.
Risk finance	Transfer	In risk management, a risk financing method that transfers financial responsibility for losses and changes in cash flow to others.
	Retention	A method of risk financing in which profits and losses are retained within the organization in risk management.

Disaster risk financing is complementary to risk control, which is the other part of the disaster risk response. It is a way to financially prepare for risks that cannot be prevented in advance due to physical or financial limitations, and includes methods such as transfer and retention.

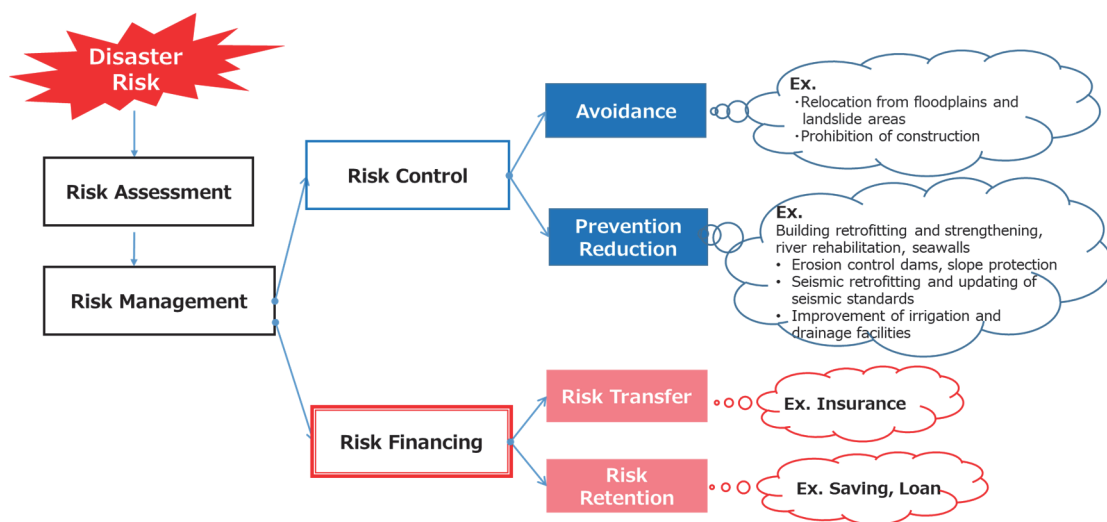


Figure 2-1 Overview of risk management

Insurance is one method of risk transfer. In exchange for a premium, the insured receives insurance payment in the event of a pre-agreed loss. By using the law of large numbers and spreading the risk, insurance is possible to reduce the excessive financial impact in case of an emergency.

Indemnity type insurance is a standard form of insurance used in the Philippines, but with the support of the WB/ADB, a parametric type insurance is also being designed. A brief description for each type is as follows.

✓ Indemnity Insurance:

Insurance payment is made based on the actual damage up to the sum insured stated in the insurance contract.

The sum insured is the agreed amount on the insurance contract, and should be equal to the appraised value of the property, mainly either on the basis of replacement cost or cash value with depreciation.

✓ Parametric Insurance:

An insurance scheme in which an agreed amount of insurance payment is paid out when measurable parameters (e.g., catastrophic hazard indices, loss amounts based on valuation models) meets predetermined conditions. While the indicator should be closely correlated with actual losses, the insurer does not pay for the actual damage itself. A pre-agreed insurance payment is made once the agreed condition is met. Since the insurer can pay the insurance payment without loss adjustment process at the field level as required in the indemnity type insurance, the payment can be made more quickly.

Although the Philippine government has been actively pursuing policies related to disaster risk financing, there are still many issues that need to be addressed. These issues are as follows and are being addressed on an ongoing basis. This chapter summarizes the institutional framework, policies, and current efforts related to disaster risk financing in the Philippines, and clarifies the position of this Survey within Philippines' disaster risk financing framework.

### **2.1.1 Republic Act 656: "Property Insurance Law"**

Enacted in 1951, Republic Act 656 (RA 656) provides for the establishment of a Property Insurance Fund for public assets and stipulates its institutional framework and management.

This law requires every government, except a municipal government below first class, to insure its properties by the Fund for any damage or loss due to fire, earthquake, storm, or other casualty. Public assets include not only buildings and structures, but also contents inside the buildings, as well as ships, vehicles, machinery and equipment owned by each government agency, and storage in leased buildings.

The Fund has been established at GSIS, which has been appointed to administer and manage the Fund. GSIS is also empowered to arrange for reinsurance in the global market and the financial management of the Fund.

RA656 is the Philippine government's general framework for disaster risk financing for public assets, but the following issues have been pointed out, and the current status of each issue was confirmed in the Previous Survey.



- Uninsurance

Despite being required to purchase insurance, many public assets are not actually insured, or even if they are, they are not covered against the necessary risks such as natural disasters.

- Underinsurance

In order to receive sufficient insurance payment for recovery after a disaster, the insured amount (sum insured) must be equal to the replacement cost<sup>3</sup>. However, there are many public assets whose sum insured does not meet the replacement cost.

- Issues with the scheme, such as the premiums not fully reflecting the risks

There are several other issues in the scheme, such as inappropriate premium rates (premiums do not fully reflect the risks) and having uniform deductibles.

As one of the responses to these issues, GSIS has prepared a draft amendment to RA 656, which was resolved by the Board of Directors and approved for submission to the National Assembly (GSIS Resolution No. 2020-08<sup>4</sup>, dated January 28, 2020). The main contents of the proposed amendments are as follows:

- Expansion of agencies eligible for compulsory insurance (projects implemented under BOT<sup>5</sup> or PPP<sup>6</sup>)
- Authority of GSIS (expansion of types of insurance underwritten, handling of foreign currencies, etc.)
- GSIS shall have custody of statistical data for determination of risk and premium rates
- Require all government agencies to submit public asset data to GSIS
- Government agency's duty to include premiums of public assets in their annual appropriations
- Inclusion of penal provisions

To date, the above amendment has not been legislated. The GSIS indicated that they have yet to receive feedback from congress and is uncertain about whether or not the amendments will be deliberated in the future.

### **2.1.2 Republic Act 10121: “Philippines Disaster Risk Reduction and Management Act”**

Republic Act 10121 (RA 10121) was enacted in 2010 with the following objectives:

- Establish the National Disaster Risk Reduction and Management Council and empower it with policy-making, coordination, integration, supervision, monitoring and evaluation functions
- Establish the Local Disaster Risk Reduction and Management Office

<sup>3</sup> The replacement cost is the cost required to construct or purchase a new equivalent item.

<sup>4</sup> "Approval of the Proposed GSIS Non-life Insurance Law"

<sup>5</sup> Build, Operate, Transfer

<sup>6</sup> Public Private Partnership

- Strengthening Disaster Risk Reduction and Management Systems in the Philippines
- Establish a framework for national disaster risk reduction and management
- Development of National Disaster Risk Reduction and Management Plan
- Appropriation of appropriate funds

This law was formulated based on the Hyogo Framework for Action adopted at the World Conference on Disaster Reduction held in 2005, and has brought about a paradigm shift from a focus on post-disaster response to proactive measures. It established a new framework “Disaster Risk Reduction and Management (DRRM)”, which comprehensively covers everything from prevention and reduction of disaster risks to planning for recovery and reconstruction.

The contents of this law, particularly those pertaining to disaster risk financing and insurance, are as follows:

- ✓ Establishment of the National Disaster Risk Reduction and Management Fund (NDRRMF)<sup>7</sup>: The NDRRM is established to replace the former Calamity Fund. This fund is allocated from the government budget for disaster prevention, response and preparedness. 30% of the budget is to be used as the Quick Response Fund (QRF) for emergency response in the event of a disaster.
- ✓ Establishment of the Local Disaster Risk Reduction and Management Fund (LDRRMF)<sup>8</sup>: The law stipulates that at least 5% of the revenue of each local government shall be budgeted as LDRRMF for disaster risk management, and 30% of the revenue shall be allocated as Disaster Preparedness Fund (QRF) for emergency response in case of a disaster. Monitor and evaluation will be conducted by the LDRRMC to ensure consistency with the local disaster risk reduction and management plan. Note that Article 21 of RA10121 also allows LDRRMF to be used for disaster response preparedness and to purchase disaster insurance.
- ✓ Formulation of the National Disaster Risk Reduction and Management Plan (NDRRMP)<sup>9</sup>: The NDRRMP mandates the formulation of policies for disaster risk reduction, preparedness and recovery, and the formulation of implementation plans to strengthen the capacity of the national and local governments. The policies are to be formulated by the Office of Civil Defense (OCD) within the Department of National Defense (DND) and to be approved by the NDRRMC.
- ✓ Implementation of the Sunset Review: Within five years of the implementation of this law, a congressional oversight committee composed of members of the Senate and House

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<sup>7</sup> National Disaster Risk Reduction and Management Fund

<sup>8</sup> Local Disaster Risk Reduction and Management Fund

<sup>9</sup> National Disaster Risk Deduction and Management Plan

of Representatives is to review the implementation and effectiveness of this law.

Based on this law, the NDRRMP for the period up to 2028 was formulated in 2011. In summary, the NDRRMP has 4 priority areas with 4 long term goals; 14 objectives; 24 outcomes; 56 outputs; and 93 activities. "In the area of prevention and mitigation, the plan identifies "improved access to effective disaster risk financing and insurance" as the desired outcome (Outcome 5).

The NDRRMF established by this law is appropriated annually in the General Appropriations Act, with the most recent appropriations of PHP 15.775B in 2017, PHP 19.6B in 2018, PHP 20B in 2019, PHP 16B in 2020, and PHP 20B in 2021. The Joint Memorandum Circular (DOF- DBM Joint Memorandum Circular No. 2017- 1<sup>10</sup>, dated June 30, 2017), states that the NDRRMF will contribute PHP 1B as premium for parametric insurance on public assets for local governments supported by the WB as described below. The 2017 general budget was appropriated PHP 1B as stated, and in 2018, the appropriated budget of PHP 2B was specified for insurance arrangements for public assets. There was no budgetary provision for insurance until the 2021 budget, in which PHP 2B was designated to insurance procurement for public assets.

In 2015, five years after the enactment of this law, the Sunset Review was initiated as per the timing set forth in this law. At the same time, the need to establish a permanent agency at the ministerial level as a dedicated body for disaster management and resilience improvement was discussed in the wake of the major disaster suffered by Typhoon Yolanda. Subsequently, the need to establish a permanent agency at the ministry level dedicated to disaster prevention was discussed, and the bill to establish the Department of Disaster Resilience was continuously passed by the House of Representatives in September 2020. The results of the Sunset Review have not been made publicly available to date. The status will be updated along with legislation progress the Department of Disaster Resilience.

In 2020, the revised version of the NDRRMP (2020-2030) <sup>11</sup>was released after the Sunset Review. The overall structure of the NDRRMP remains unchanged and is divided into four priority areas: prevention and mitigation, preparedness, response, and recovery. One of the outcomes of Prevention and Mitigation (Outcome 5) is to improve access to effective disaster risk financing and insurance, but the outputs and activities has been revised.

The specific changes made in the revised version is as shown in Table 2-2, where the same purpose is indicated by the same color. The outline of activities to expand and improve access to disaster risk financing remain unchanged, but activities for social protection programs were added (enclosed in red).

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<sup>10</sup> "Guidelines on the Implementation, Monitoring, and Reporting on the Use of PHP 1 Billion Allocation under the National Disaster Risk Reduction Management (DRRM) Fund for Insurance of Government Facilities".

<sup>11</sup> <https://ndrrmc.gov.ph/attachments/article/4147/NDRRMP-Pre-Publication-Copy-v2.pdf>

Table 2-2 Comparison of the current (2011-2028) and revised (2020-2030) versions of the NDRRMP Outcome 5: "Improved access to effective disaster risk financing and insurance".

Original		Revised	
Outputs	Activities	Outputs	Activities
Availability and access to various disaster risk financing and insurance schemes for vulnerable groups and/or communities	1.1 Produce IECs to encourage hazard insurance coverage for government, private infrastructures, and other business establishment	Accessible disaster risk financing strategies	5.1.1 Conduct research and develop new modalities on risk financing
	1.2 Update the directory of available financing windows for LGUs.		5.1.2 Create enabling environment for private sector participation in the development of financing options
	1.3 Promote insurance schemes among production sector, supply sector, local communities and responders		5.1.3 Conduct IEC campaign to encourage hazard insurance coverage in national, local, and household/ individual levels
Mechanisms developed for increased risk financing modalities	2.1 Conduct research and develop new modalities for risk financing schemes		5.1.4 Promote and develop insurance schemes among production sector, supply sector, MSMEs, households, responders, and vulnerable groups
	2.2 Develop an advocacy and risk communication plan to encourage communities to avail of risk financing options		5.1.5 Update the directory of available financing windows for LGUs
		Social Protection Program	5.2.1 Take stock of social protection strategies
			5.2.2 Develop and implement a Social Protection Plan

Also in the area of "prevention and mitigation," "disaster-resilient livelihoods and businesses" has been newly added as an outcome (Outcome 7). One of the activities for Outcome 7 is to "provide diversified sources of financing, and develop credit enhancement mechanisms (e.g., guarantees, insurance) especially for MSMEs". It also stated the need for MSMEs to have access to funds in case of disasters in their business activities.

### 2.1.3 DOF's "Disaster Risk Finance and Insurance Strategy"

The DOF, in line with the NDRRMP and a technical support from donors, developed a Disaster Risk Finance and Insurance Strategy ("DRFI Strategy") in 2015. The strategy is divided into three levels (national, local and individual) and strategic priorities, key steps and initiatives are identified for each level, the details are shown in Figure 2-2.

	STRATEGIC PRIORITIES	KEY STEPS AND INITIATIVES
National Level	Improve the financing of post-disaster emergency response, recovery, and reconstruction needs	(1) Quantifying and clarifying the contingent liabilities faced by GPH
		(2) Acquiring contingent credit lines to protect against moderate disasters
		(3) Using risk transfer to access international private reinsurance and capital markets
Local Level	Provide local governments with funds for post disaster recovery and reconstruction efforts	(1) Developing a catastrophe risk insurance facility for local governments
		(2) Pooling local governments' calamity funds
		(3) Improving insurance of public assets
Individual Level	Empower poor and vulnerable households and owners of small and medium-sized enterprises to quickly restore their livelihoods after a disaster	(1) Broadening private property catastrophe risk insurance and micro-insurance coverage
		(2) Linking disaster risk financing and social protection

Figure 2-2 DRFI Strategy<sup>12</sup>

In line with the above framework, the DOF is continuing each of its initiatives in collaboration with relevant organizations. The current status of specific initiatives is as follows.

### **【National Level】**

#### **(1) Quantify and clarify the contingent liabilities faced by the Philippines**

##### ✓ Develop a risk model.

With the support of WB, a risk model was developed in 2014 for typhoons and earthquakes. It is being used to predict contingent liabilities for disaster risks and to design risk transfer. A similar risk model is also used in issuing parametric insurance and CAT bonds for 25 LGUs, as discussed below.

##### ✓ Risk Analysis

The project is being implemented based on three priorities: understanding the assets owned (both public and private assets), improving risk models, and developing financial and actuarial tools for disaster risk finance and insurance decisions.

#### **(2) Obtaining a contingent line of credit to prepare for a medium-scale disaster**

##### ✓ Development Policy Loan with Deferred Drawdown Option for Disaster Risk (DRM DPL-CAT DDO<sup>13</sup>)

This is a loan program implemented by the WB, and the Philippine government has signed two loan agreements, I (2011, 500M USD) and II (2015, 500M USD). Details are provided in Section 2.3.1.

<sup>12</sup> Created by the study team based on ASEAN Policy Forum on Disaster Risk Financing and Insurance (DRFI) in the Philippines (February, 2017)

<sup>13</sup> Disaster Risk Management Development Policy Loan with a Catastrophe-Deferred Drawdown Option

- ✓ Stand-by Loans for Disaster Recovery (SECURE)<sup>14</sup>:

This is a loan program implemented by JICA, and the Philippine government has signed loan agreements for I (2014, 50B JPY) and II (2020, 50B JPY).

### **(3) Risk transfer through access to international private reinsurance and capital markets**

- ✓ Reinsurance of public assets in international markets:

As mentioned earlier, GSIS underwrites insurance for public assets, but its risks are spread across the foreign insurance market in the form of reinsurance. See Chapter 3

- ✓ Insurance contract with WB utilizing CAT bonds:

In 2019, the Philippine government signed an insurance contract with the WB for coverage of USD 225 M (USD 150 M for earthquakes and USD 75 M for tropical cyclones) and the WB issued a CAT bond to raise the funds. See Section 2.3.1 for details.

- ✓ Structure of the National Insurance Program (NIIP).

The GSIS issued a public bid announcement for reinsurance brokers in November 2019 to organize a national insurance program covering fire and natural disasters (typhoons, floods, earthquakes, volcanic eruptions, and storm surges) for roads, and bridges and schools among other public assets. A bid for a national insurance program covering 17 power facilities owned by the Power Sector Assets and Liabilities Management Corporation (PSALM<sup>15</sup>) was also issued in March 2021.

Both bids were not successful and are being reviewed and prepared for re-bidding, see Section 3.2.4 for details.

- ✓ Participation in the Southeast Asian Disaster Risk Insurance Facility (SEADRIF<sup>16</sup>)

The Philippine government joined SEADRIF in 2019. SEADRIF held a series of webinars from May to November 2020 on the topic of financial protection of public assets, with a focus on risk transfer, and the Philippine government also made a presentation on its policies. See Section 2.3.1 for details on SEADRIF.

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<sup>14</sup> Stand-by Emergency Credit for Urgent Recovery

<sup>15</sup> Power Sector Assets and Liabilities Management Corporation

<sup>16</sup> The Southeast Asia Disaster Risk Insurance Facility (SEADRIF) is a regional facility that aims to improve resilience to natural disaster risks, including through the use of a natural disaster risk insurance pool, with technical assistance from the World Bank. It Originated from the ASEAN+3 Ministers and Central Bank Governors' Meeting and called for ASEAN members, Japan, Singapore, Indonesia, Cambodia, Myanmar, and Laos to sign a Memorandum of Understanding to establish the facility in December 2018.

## **【Local Level】**

### **(1) Developing a Disaster Risk Insurance Facility for local governments**

- ✓ Formation of a parametric insurance program covering 25 LGUs<sup>17</sup>.

The Government of the Philippines arranged a parametric insurance coverage for 25 LGUs in the Philippines against earthquake and typhoon disasters with the support of the WB. The coverage limit was USD 206M at the start of July 2017 and increased to USD 389M at the time of renewal in December 2018. It has not been renewed since 2019. See Section 2.3.1 for details.2.3.1

- ✓ Formation of parametric insurance pool for cities (in planning).

The Philippine government, with the support of the Asian Development Bank (ADB), is planning to establish a parametric insurance pool for cities to cover natural disasters. See Section 2.3.2 for details.

### **(2) Develop disaster funds for local governments**

- ✓ Local Disaster Risk Reduction and Management Fund: As mentioned above, this fund was established under RA 10121 and is monitored and evaluated by the NDRRMC.

### **(3) Improve public insurance**

As previously mentioned, public assets owned by all government agencies except for local governments below the first level must be insured with public asset insurance, but there are various issues such as the uninsured public assets, underinsured policies, and the premium rates not fully reflecting the risks.

In 2016, the Commission on Audit (COA) issued a memorandum (Memorandum No. 2016-024, dated December 14, 2016) requiring national government agencies and local governments whose assets are subject to compulsory insurance coverage to be in compliance with RA 656 and GSIS to report the status of insurance coverage to COA auditors. Following this, the COA issued a Circular (COA Circular No. 2018- 002<sup>18</sup>, dated May 31, 2018) requesting national government agencies and local governments to submit public asset information to GSIS in a prescribed format.

GSIS has received submissions from a total of 223 agencies, including 165 in 2019, 34 in 2020, and 24 in 2021.

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<sup>17</sup> 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

<sup>18</sup> Guidelines prescribing the submission of the Property Inventory Form as a basis for the assessment of general insurance coverage over all insurable Guidelines prescribing the submission of the Property Inventory Form as a basis for the assessment of general insurance coverage over all insurable assets, properties and interests of the government with the General Insurance Fund of the Government Service Insurance System

On the other hand, the information submitted is limited, and GSIS does not have a system to manage asset information, thus has not been able to fully utilize these information.

GSIS has been conducting an educational campaign called "Insurance Caravan," in which the sales staff in charge of this campaign travels around the country to promote understanding of the public insurance for assets insured.

In addition, through the issuance of the Administrative Order, described in Section 2.1.4 has led to various measures and continuous efforts to promote insurance coverage. The BTr has established a National Asset Registry System (NARS), and GSIS, who has not been able to fully utilize the asset information submitted under the COA, intends to develop the necessary asset information using NARS. Expand coverage of natural disaster insurance and microinsurance for private assets. The background and current status of the establishment of the NARS will be discussed in Section 2.1.4

### **【Individual Level】**

#### **(1) Expand coverage of natural disaster insurance and microinsurance for private assets**

- ✓ Establishment of a catastrophe insurance facility for SMEs and households (PCIF<sup>19</sup>) (in planning)

The Insurance Commissioner (IC), the Philippine Insurers and Reinsurers Association (PIRA) and the National Reinsurance Corporation of the Philippines (Nat Re) signed a Memorandum of Understanding (MOU) in 2020 to collaborate on the establishment of a reinsurance facility (PCIF) to cede natural disaster risks underwritten by non-life insurers. In the past, property insurers had no choice but to cede risks overseas. By making it possible for property insurers to cede risks to a domestic reinsurance pool, the PCIF aims to expand the capacity available, stabilize premiums, and thereby increase the penetration of insurance for SMEs and private individuals.

- ✓ This project is still in its early stages and the program and other details have not yet been finalized, but monthly meetings have been held with the participation of IC, Nat Re, and PIRA, and discussions are underway. The members include WB, international insurance brokers and PIRA member insurers.

#### **(2) Linking disaster risk financing and social protection**

Although there are currently no concrete initiatives in place, since the revised NDRRMP clearly states that social protection programs will be addressed, collaboration

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<sup>19</sup> Philippine Catastrophe Insurance Facility



towards substantial progress likely in the future.

The following chart summarizes specific initiatives and supporting donors from the national to the individual level.

	KEY STEPS AND INITIATIVES	PROJECTS	Support
National Level	(1) Quantifying and clarifying the contingent liabilities faced by GPH	✓ Philippines Catastrophe Risk Model ✓ Risk Analytics	←WB
	(2) Acquiring contingent credit lines to protect against moderate disasters	✓ DPL by WB (I, II, III) ✓ SECURE by JICA (I, II)	←WB ←JICA
	(3) Using risk transfer to access international private reinsurance and capital markets	✓ Ceding to international market for the public asset insurance ✓ Insurance contracts with the World Bank using the issuance of CAT bonds ✓ National Indemnity Insurance Program (TBD) ✓ Participation for SEADRIF	←WB ←WB ←WB
Local Level	(1) Developing a catastrophe risk insurance facility for local governments	✓ Parametric Insurance for 25 provinces (Ended) ✓ Parametric Insurance for cities (TBD)	←WB ←ADB
	(2) Pooling local governments' calamity funds	✓ Local Disaster Risk Reduction and Management Fund	
	(3) Improving insurance of public assets	✓ Auditing by COA ✓ Issuance of Administrative Order No. 04 in 2017 ✓ Data Collection Survey for public insurance	←WB · JICA ←JICA
Individual Level	(1) Broadening private property catastrophe risk insurance and micro-insurance coverage	✓ Establishment of a catastrophe insurance facility for businesses and households	
	(2) Linking disaster risk financing and social protection	✘Social protection programs specified in revised NDRRMP	

Figure 2-3 Specific DRFI Strategy Initiatives and Supporting Donors

#### 2.1.4 Administrative Order 2017- No. 04

Issued in 2017, this Administrative Order<sup>20</sup> established Inter-Agency Committee (IAC) and various necessary policies, rules and regulations to ensure that public assets are insured as per RA656.

This Administrative Order required the IAC to report the results of its review to the President in November 2018, one year following its issuance.

The following recommendations are made by the IAC following a year of discussion.

- Priority should be given to important public assets: schools, infrastructure, and medical facilities.
- A comprehensive public asset register should be maintained under BTr.

In response to the above recommendations, the term of this Administrative Order was extended for one year (until November 2019) and was amended to include the following

- Maintain a centralized and comprehensive public asset register under the BTr.
- BTr should develop operational policies and standards for the maintenance of the public asset register.

<sup>20</sup> The members of the Inter-Agency Committee are DOF (Chair), Office of the Executive Secretary (Co-Chair), Department of Budget and Management (DBM), IC, and GSIS. The DOF will provide technical and administrative support through the BTr.

- In order to collect data on the priority assets, the agencies that owns the priority assets<sup>21</sup> shall be added to the IAC. The added agencies shall work with the IAC to provide the necessary information for the development of the public asset register.
- Extend the IAC for one year to November 2019 for continuation of these policies.

Subsequently, by a resolution on the DBCC<sup>22</sup> issued in 2019 (DBCC Resolution No. 2019-4, dated June 21, 2019), the role of the IAC was transferred to the DBCC TWG-AM<sup>23</sup>, which is the inter-agency working group composed of the DBM, DOF, NEDA and the Office of the President. The direction of the TWG-AM was issued through another resolution from the DBCC in 2020 (DBCC Resolution No. 2020-18, dated July 7, 2020) to be as follows: (1) to formulate a PGAMP<sup>24</sup>, which is to be issued within the third quarter of 2020, and (2) to provide guidelines on the establishment of an ad hoc working group on asset management (WG-AM) in each agency to implement of the PGAMP.

The Joint Memorandum Circular<sup>25</sup> (DOF-DBM-NEDA Joint Memorandum Circular No. 2020- 1, dated September 24, 2020) issued the PGAMP as mandated by the aforementioned resolution (DBCC Resolution No. 2020-18, dated July 7, 2020) and developed guidelines for the establishment of the ad hoc TWG-AM for implementing the PGAMP. It should be noted that although DBM<sup>26</sup> is designated as the lead agency for PGAMP, BTr is designated as responsible party to develop and manage NARS, the designated main platform for managing public assets. It also states that each agency is to establish a public asset management policy and specify the budget required for the acquisition, repair, and deposition of public assets. It also stipulates that the government will continue to improve the policy by conducting an impact assessment, first after two years of implementation and then on a five year interval thereafter.

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<sup>21</sup> Department of Education (DepEd), Department of Health (DOH), Department of Public Works and Highways (DPWH), Department of Social and Welfare Development (DSWD), National Irrigation Administration (NIA), Department of Transportation Department of Social and Welfare Development (DSWD), National Irrigation Administration (NIA), and Department of Transportation (DOT).

<sup>22</sup> Development Budget Coordination Committee

<sup>23</sup> Technical Working Group on Asset Management

<sup>24</sup> Philippines Government Asset Management Policy

<sup>25</sup> "Implementation of a Philippine Government Asset Management Policy (PGAMP)"

<sup>26</sup> Department of Budget and Management

## 2.2 Agencies involved in disaster risk financing and insurance

### 2.2.1 BTr

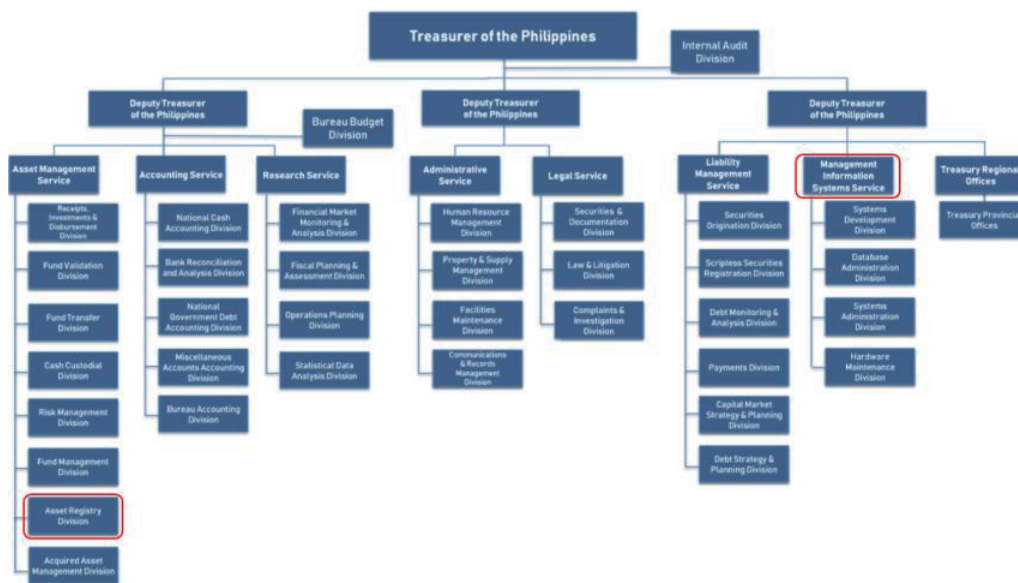


Figure 2-4 BTr Organization Chart<sup>27</sup>

As shown in the organizational chart above, the major Services of the BTr are the Asset Management Service, Legal and General Affairs Service, and Liability Management Service. BTr is involved in disaster risk financing as part of its asset management operations. The development of the NARS as per the Administrative Order mentioned above is mainly managed by the Asset Registry Division within the Asset Management Service, with the Management Information Systems Service providing system support.

<sup>27</sup> Source: [https://www.treasury.gov.ph/?page\\_id=134](https://www.treasury.gov.ph/?page_id=134)

### 2.2.2 GSIS

GSIS has four committees under the Board of Trustee, which are divided into four offices (Office of the Executive Vice President Office): Support Service, Research, Innovation and Strategic Advisory, Financial Sector, and Core Business Sector.

The scope of this Survey, property and civil engineering insurance for public assets, is handled by the Insurance Group, which belongs to the Core Business Sector and is responsible for underwriting, sales, and claim process of insurance.

Details of the organization are described in Chapter 3.

### 2.2.3 DOF

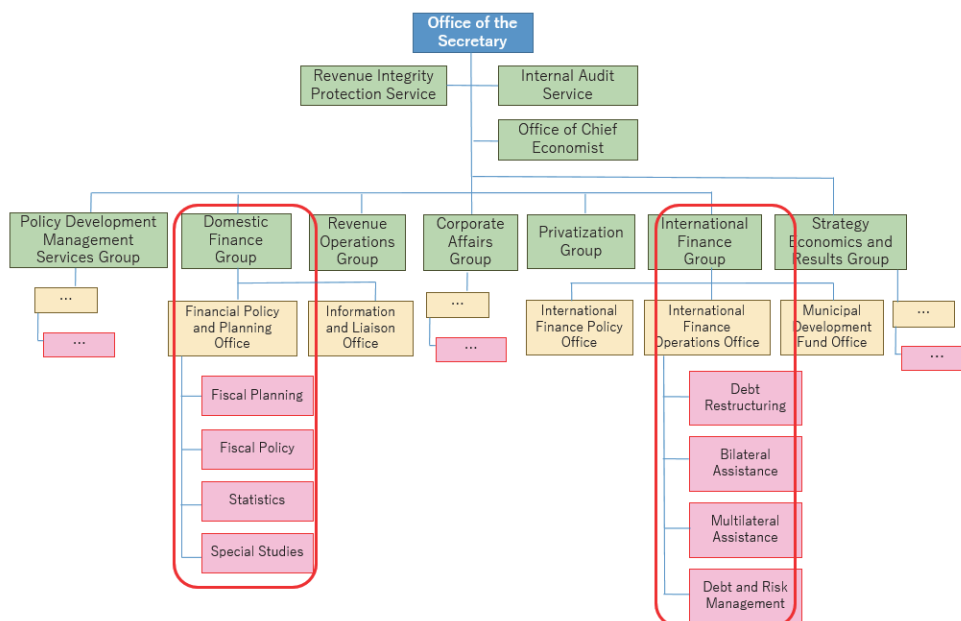


Figure 2-5 DOF Organization Chart<sup>28</sup>

The DOF is in charge of developing disaster risk financing policies as part of the mandate on formulating and institutionalizing financial policies. The Financial Policy and Planning Office of the Domestic Finance Group is in charge of formulating the DFRI strategy and other policies, as well as coordinating with relevant agencies on the above-mentioned initiatives. The International Finance Group is in charge of donor support for disaster risk financing, and coordinates with implementing agencies and to provide support from a financial perspective.

<sup>28</sup> Created by the study team based on <https://www.dof.gov.ph/about/structure-leadership/>

## 2.2.4 OCD

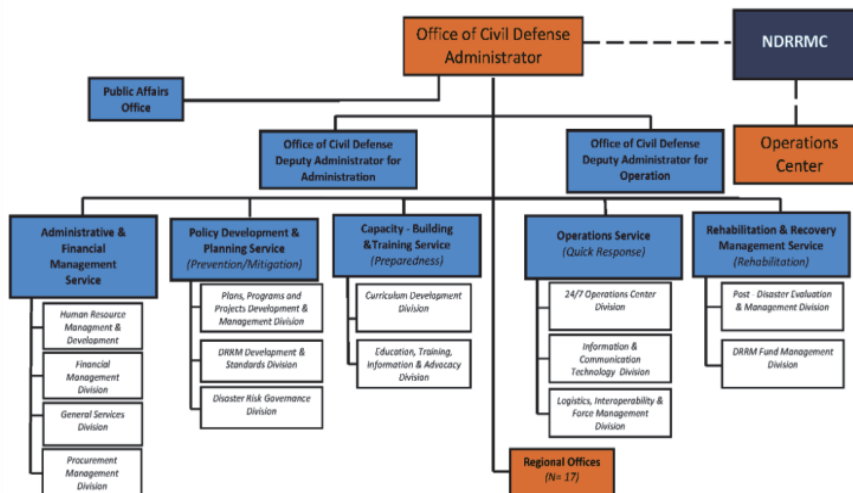


Figure 2-6 OCD Organization Chart<sup>29</sup>

The Office of Civil Defense (OCD) is an agency under the Department of National Defense (DND) and operates as the secretariat for the formulation and implementation of the NDRRMP under RA 10121. The OCD also identifies and assesses disaster risks, in addition to monitoring and providing training on disaster risk reduction efforts. In formulating and revising the NDRRMP, it has been planning and collaborating with the BTr and GSIS in consultation in sections related to disaster risk financing.

## 2.3 Program by other donors

### 2.3.1 World Bank (WB)

The WB supports disaster risk financing in the Philippines by utilizing various financial schemes. In particular, the WB has been involved in the formulation of policies through the use of many Development Policy Loan (DPL) schemes, and provides technical assistance linked to the implementation of each policy.

#### ✓ Development Policy Loan (DPL)

The DPLs provided to the Philippine government by the WB in recent years are as listed as follows.

<sup>29</sup> Source: <https://www.ocd.gov.ph/index.php/about-ocd/organizational-structure>

Table 2-3 List of DPLs from the WB


Project Title	Loan Agreement	Closed	Loan Amount
Disaster Risk Management Development Policy Loan with CAT DDO (DRM DPL- CAT DDO)	2012	2014	500M USD
Second Disaster Risk Management Development Policy Loan with CAT DDO (DRM DPL- CAT DDO II)	2016	2020	500M USD
Third Disaster Risk Management Development Policy Loan (DRM DPL III)	2020	2022 (Scheduled)	500M USD
Improving Fiscal Management	2019	2020	450M USD
Promoting Competitiveness and Enhancing Resilience to Natural Disasters Sub-program 1	2019	2021	400M USD
Promoting Competitiveness and Enhancing Resilience to Natural Disasters Sub-program 2	2021	2022 (Scheduled)	600M USD

- DRM DPL I - III

The DRM DPL I and II, signed in 2012 and 2016 respectively, are accompanied by a deferred drawdown option (CAT-DDO) and are subject to a scheme in which the loan is triggered by a national disaster declaration.

The DPL I is composed of 3 Action Areas, each of which has a total of 6 Key Output Indicators targeted for 2014. The WB has launched technical assistance programs for the implementation of each policy and also provided support for Action Area "Better manage the Government's fiscal exposure to natural hazard impacts". The DFRI Strategy in Section 2.1.3 was established as a result of the DPL I and continues to serve as the main framework of the policy.

Table 2-4 Policy Matrix of DRM DPL I<sup>30</sup>

Action Areas	Key Output Indicator	Target Date
Strengthen the institutional capacity for disaster risk management efforts	DILG supports the establishment of functional local DRRM units or offices. <b>【Baseline: 4 provinces. Target: 14 provinces.】</b>	2014
	NDRRMC develops a monitoring system to track disaster-related financing and guidelines on the use of LGU Local Disaster Risk Reduction and Management Funds (LDRRMF) are issued. <b>【Baseline: No financial tracking system is in place and new guidelines to LGUs on the use of the LDRRMFs have not been issued.】</b>	
	NDRRMC has rolled out training programs for national and regional government authorities to conduct post-disaster needs assessments and emergency preparedness drills.	
Mainstream disaster risk reduction into development planning	Provinces have mainstreamed climate change adaptation and disaster risk reduction measures into their Provincial Development and Physical Framework Plans (PDPFP). <b>【Baseline: 1 province. Target: At least 30 provinces.】</b>	2014
	Disaster risk reduction measures are mainstreamed into at least three sectors: health, transport, and social development. <b>HEALTH:</b> DOH expands coverage of its Safe Hospitals Program, in accordance with WHO guidelines, by conducting audits of health facilities in Metro Manila. <b>【Baseline: 25 health facilities. Target: At least 100 health facilities.】</b> <b>TRANSPORT:</b> The Department of Public Works and Highways (DPWH) retrofits and/or reconstructs bridges in Metro Manila, based on the results of structural audits. <b>【Baseline: 0 bridges. Target: 10 bridges.】</b> <b>SOCIAL DEVELOPMENT:</b> Government community development and social protection programs are enhanced to better manage disaster impacts on communities and vulnerable households. <b>【Baseline: 0 Target: 1,000 communities receive DRR training under 4Ps and KALAHI-CIDSS; 4 Field Offices are covered by a community-based post-disaster response window.】</b>	
	Better manage the Government's fiscal exposure to natural hazard impacts	
	Department of Finance has prepared its catastrophe risk financing strategy.  <b>DRFI Strategy</b>	

<sup>30</sup> Created by the study team based on WB HP <https://documents1.worldbank.org/curated/en/692101468288006974/pdf/609500REPLACEMENT0isclosed020110080230.pdf>

The DPL II, as shown below, is consists of 2 Pillars, each composed of 5 Result Indicators targeted for 2018. The WB has again launched technical assistance programs for the implementation of each policy, and the Philippine government, in relation to disaster finance portion relating to this Survey, was able to achieve the results, which is indicated in red in the following table.

Parametric insurance for the 25 LGUs in Result Indicator (B1) will be discussed in detail in the later section. The design of the catastrophe insurance for Result Indicator (B3) has been completed, utilizing the new system of the Philippine Building Act<sup>31</sup> (PBA), the revised NBCP developed in Result Indicator (A2), and introducing premium incentives based on the PBA. Although it was reviewed as a mechanism for natural disaster coverage in the compulsory insurance for public housing loans, it was not approved and has remained unimplemented.

It should be noted that the request for DPL II was drawn by Typhoon (Ompong) in September 2018 and 496M USD was reportedly paid two days after the request, which confirms the promptness of payment using this scheme.

Table 2-5 Policy Matrix of DRM DPL II<sup>32</sup>

	Pillar	Result Indicator	Target Date	
II	A	A1	A methodology for national-level risk-informed planning has been developed and applied by the National Economic and Development Authority in planning and public investment programming. 【Target: Methodology developed and applied in planning and public investment programming】	2018.09
		A2	Disaster risk reduction measures are integrated in revisions to the National Building Code of the Philippines (NBCP) developed by the Department of Public Works and Highways. 【Target: Revisions integrating disaster risk reduction measures are developed for the NBCP】	
		A3	Provincial Commodity Investment Plans (PCIPs) developed using the expanded Vulnerability and Suitability Assessment (eVSA) tool are approved by the Department of Agriculture under the Philippine Rural Development Program (PRDP) and under implementation. 【Target: 80 PCIPs developed and approved; 72 under implementation】	
		A4	Policy framework for post-disaster shelter assistance (through recovery and reconstruction phases) formulated by the member agencies of the Social Development Committee and endorsed to the Social Development Committee – Technical Board. 【Target: Policy framework formulated and endorsed to Social Development Committee – Technical Board】	
		A5	Multi-hazard vulnerability assessments of priority cultural heritage sites completed by the Department of Tourism and assessment methodology adopted in the Philippine Standards for Conservation. 【Target: Vulnerability assessment completed for 5 priority cultural heritage sites and assessment methodology adopted in the Philippine Standards for Conservation】	
	B	B1	Joint catastrophe risk insurance program for Local Government Units (LGUs) developed by the Department of Finance. 【Target: Long term program is developed with 10 LGUs participating】	2018.09
		B2	Number of line agencies that have developed and piloted their Disaster Risk Financing and Insurance (DRFI) strategy. 【Target: 2 agencies have developed and piloted their DRFI strategy】	
		B3	Design of property catastrophe risk insurance pool for homeowners established by the Department of Finance and the Insurance Commission. 【Target: Design established】	
		B4	Program developed and commenced for post-disaster emergency income support by the Department of Budget and Management, Department of Social Welfare and Development and the Department of Finance. 【Target: Program developed and commenced】	
		B5	Catastrophe risk insurance database template updated and adopted by the Insurance Commission. 【Target: Updated template adopted】	

The DPL III was signed in 2020 without the deferred drawdown option (CAT-DDO). As shown in the following, overall there is no clear definition of result items or target dates, only an outline of the current situation and support targeted for 2022 are provided

<sup>31</sup> We will continue to check on the current status, but it appears that although a bill has been submitted, it has not been passed.

<sup>32</sup> Created by the study team based on WB website <https://documents1.worldbank.org/curated/en/989761468196182551/pdf/96587-PGD-P155656-R2015-0243-1-Box393264B-OUO-9.pdf>



in the Rationale.

The main focus of the DPL III is on upstream approaches such as planning and budgeting, as well as soft measures such as training, while the areas of public asset management and insurance are focused in the Improving Fiscal Management DPL and Promoting Competitiveness and Enhancing Resilience to Natural Disasters DPL as described in the following section.

Table 2-6 Policy Matrix for DRM MPL III<sup>33</sup>

	Pillar	Rationale
III	A Strengthening the policy and institutional framework for Disaster Risk Reduction	<ul style="list-style-type: none"> <li>• The Directive issued by the Office of the President on July 1, 2019 compels key agencies to share data and use the newly established multi-hazard risk information platform GeoRiskPH for investment planning and policy-making.</li> <li>◆ The adoption and use of GeoRiskPH will support the government to implement policies, programs, and projects through the following results:               <ul style="list-style-type: none"> <li>(i) the use of GeoRiskPH for the prioritization of public infrastructure projects by at least five (5) key government agencies by 2022.;</li> <li>(ii) the EIA process integrates disaster risk reduction and climate change adaptation measures. This is demonstrated through the issuance of EIA Guidelines by the DENR by 2022; and</li> <li>(iii) the integration of climate resilience and disaster risk reduction measures in the Local Disaster Risk Reduction and Management Plans (LDRRMPs) of at least 100 LGUs by 2022</li> </ul> </li> <li>• The DPWH's Department Order issued on July 17, 2019 created the DPWH Earthquake Resiliency-Program Management Office (DPWH ER-PMO) to adopt and implement an integrated approach in addressing earthquake resiliency needs across its various programs. As DPWH implements its earthquake resiliency interventions, it will ensure that the urban upgrading and retrofitting will also make buildings safer to floods and typhoons. It will also aim to improve the urban drainage systems and energy efficiency measures in public buildings and schools. This will also benefit from the GeoRiskPH platform (PA1) to integrate risk reduction and climate resilience measures in the earthquake resiliency program.</li> <li>• For 2018 and 2019, the DPWH has partially developed its multi-year investment plan to strengthen public buildings in Metro Manila and Php 1.5 billion pesos has been allocated from the national budget to implement the program.</li> <li>◆ The implementation of the Earthquake Resilience Program for the GMAA will be measured through the DPWH prioritized multi-year investment plan for seismic risk reduction and retrofitting is developed with annual budget and submitted to Department of Budget and Management for endorsement to Congress for the years 2020 to 2022.</li> </ul>
	B Strengthening the policy and institutional framework for Disaster Recovery	<ul style="list-style-type: none"> <li>• The adoption of the Philippine Disaster Rehabilitation and Recovery Guide in March 20, 2019 by the NDRRMC, was a key step by the Government towards transforming the system for effective post-disaster recovery.</li> <li>◆ The program will support the advancement and implementation of DRM and climate resilience measures within the LGUs through the following:               <ul style="list-style-type: none"> <li>(i) enhancing Local Government Unit (LGU) capacity in disaster local rehabilitation and recovery planning through the formulation of local disaster rehabilitation and recovery programs in at least 100 LGUs through extended hands on trainings. After the trainings, the LGUs are expected to formulate their draft Local Rehabilitation and Recovery programs; and</li> <li>(ii) development of Local Disaster Risk Finance (DRF) strategies to finance post-disaster recovery in at least 100 LGUs through extended hands on trainings. After the trainings, the LGUs are expected to formulate their draft Local DRF strategies.</li> </ul> </li> <li>• The DSWD Memorandum Circular adopting the Guidelines for the implementation of the Emergency Cash Transfer Program in disaster affected areas was issued on August 30, 2019.</li> <li>◆ The program will support DSWD to implement the following results:               <ul style="list-style-type: none"> <li>(i) implementation of the ECT Program in disaster affected areas. This will be implemented nationwide and triggered based on DSWD's assessment criteria set in the ECT Program Guidelines. For its implementation the target will be that the ECT program guidelines/manual is adopted by all DSWD Regional offices and implemented in disaster affected areas from 2021 onwards; and</li> <li>(ii) preparation and issuance of the revised NCCDP-DROM guidelines for post-disaster recovery by 2022 and its dissemination in all disaster-prone areas identified by Government. The target is also for the guidelines to be used by communities in all disaster-affected areas under state of calamity.</li> </ul> </li> </ul>

In addition, the WB is currently in the process of developing CAT DDO IV.

The WB is also considering working on collecting and integrating natural disaster data related to climate change with GeoRisk Philippines, which is to be used by national and local government agencies for risk analysis and forming investment policies, and climate change adaptation program with the Department of Agriculture (DOA) and the Department of Environment and Natural Resources (DENR). The Philippine government is requesting that the program be delivered around October 2021.

- Improving Fiscal Management (DPL)

The DPL is designed to strengthen financial management and consists of 3 Pillars, each with Result items targeted at the end of 2019. Within it, the target for Pillar “strengthening financial risk management of public assets” was set to having at least 5

<sup>33</sup>Created by the study team based on WB website <https://documents1.worldbank.org/curated/en/698141581652060822/pdf/Appraisal-Program-Information-Documents-PID-Philippines-Third-Disaster-Risk-Management-Development-Policy-Loan-P171440.pdf>



or more agencies (DepEd<sup>34</sup> · DOH<sup>35</sup> · DPWH<sup>36</sup> · NIA<sup>37</sup> · DSWD<sup>38</sup>) register public asset data to the public asset register and to insure their public assets. The WB has launched technical assistance for the development of the public asset register, and a report providing design proposals and global examples on development of the public asset register was submitted in April 2019<sup>39</sup>.

Table 2-7 Policy Matrix for Improving Fiscal Management DPL<sup>40</sup>

	Pillar	Prior action	Results	Target Date
Improving Fiscal Management	Strengthening Tax Policy	# 1	~Omitted~	2019
		# 2		
	Enhancing Public Financial Management and Budget Planning	# 3		
		# 4		
	Strengthening Fiscal Risk Management of Public Assets	# 5		

- Promoting Competitiveness and Enhancing Resilience to Natural Disasters DPL

This DPL consists of three sub-programs, with triggers for moving on to sub-programs 2 and 3 are set in sub-program 1, and as of now, financing has been implemented up to sub-program 2. In addition, a baseline (2018) and numerical targets by 2022 have been set through Sub-Programs 1-3.

Sub-Program 1 consists of three major objectives: "enhancing competitiveness," "improving financial stability," and "strengthening financial resilience to natural disasters and climate change". Items related to disaster risk management are included in the third objective.

Sub-Program 2, which was recently signed in December 2020, has been restructured into two objectives: "strengthening competitiveness" and "strengthening resilience". "Strengthening resilience" encompasses the financial stability and disaster risk management objectives set in Sub-Program 1.

<sup>34</sup> Department of Education

<sup>35</sup> Department of Health

<sup>36</sup> Department of Public Works and Highways

<sup>37</sup> National Irrigation Administration

<sup>38</sup> Department of Social Welfare and Development

<sup>39</sup> Public Asset Registry- Design for the Philippines and global good practice and technology trends

<sup>40</sup> Created by the study team based on WB website  
<https://documents1.worldbank.org/curated/en/642661552960858126/pdf/PHILIPPINES-PAD-02222019-636885432300165526.pdf>

The contents related to disaster risk financing are extracted and summarized in the following table.

Table 2-8 Policy Matrix for Promoting Competitiveness and Enhancing Resilience to Natural Disasters DPL<sup>41</sup>

	Sub-program 1			Sub-Program II			Result Indicator	Target Date
	Pillar		Prior Action	Trigger for DPL II	Pillar	Prior Action		
Promoting Competitiveness and Enhancing Resilience to Natural Disasters	Promoting Competitiveness	No.1~4	~Omitted~		Promoting Competitiveness	~Omitted~		~ Omitted ~
	Enhancing fiscal sustainability	No.5~6	~Omitted~			~Omitted~		
		No7	Through DBCC resolution No. 2019-4, the government has established a standing body to formulate and recommend public asset management policies.	The government has issued public asset management policies and guidelines.		Through JMC No. 2020-01, the government has adopted an asset management policy to improve financial risk management derived from natural disasters and climate change.	The government has adopted a web-based National Asset Registry System at the Bureau of the Treasury (BT).	<ul style="list-style-type: none"> <li>◆Share of public assets included in the asset registry for 5 key agencies (in percent) (Baseline 2018: 0; target 2022: more than 60)</li> <li>◆No of agencies using the asset registry (Baseline 2018: 0; target 2022: more than 5)</li> </ul>
	Strengthening financial resilience to natural disasters and climate change	No8	Through Insurance Commission Circulars No. 2018-57 and No. 2017-56, the government has strengthened regulatory and supervisory capacity of the Insurance Commission to ensure a sustainable insurance and reinsurance market.	The government has issued policies to improve catastrophe risk insurance.	Enhancing Resilience	Deleted —Included in financial DPL		Deleted —Included in financial DPL
	No9	The government has implemented its risk layering strategy by setting up a combination of financial instruments to efficiently meet funding needs of disasters of different frequencies and severities.	The government has institutionalized the Disaster Risk Financing (DRF) strategy through a recurrent budget allocation.		As evidenced by GAAs 2019 and 2020, and the JMC jointly issued by GSIS, DBM and DOF, the government has established the indemnity insurance of public assets, thereby implementing a key pillar of the government disaster risk financing strategy.	The government has adopted regulations to link pre-arranged financing directly to pre-arranged funding channels for rapid response.	Number of pre-arranged or improved financial mechanisms for disaster response in place (Baseline 2018: 2; target 2022: more than 4)	

For the public asset ledger in No. 07 (above table), the Prior Action states that when Sub-Program 1 was triggered, the TWG-AM was established to develop the Public Asset Management Policy (PGAMP) as described in Section 2.1.4 Sub-Program 2 was triggered by the development and adoption of PGAMP, and Sub-Program 3 was triggered by the fact that the public asset register being developed by BTr will be web-based and adopted as an official government tool.

The WB is also working with GeoRisk Philippines<sup>42</sup> to ensure that the data is utilized by public asset register for risk management. Result indicators has been established in which at least 60% of asset information from key agencies should be inputted into the public asset register and the register should be used by at least 5 agencies by 2022. The WB has been providing ongoing support, and for this DPL, it launched the Advisory Services and Analytics (ASA) in 2019-2020 to help strengthen the system and formulate public asset management policies, including introducing New Zealand's overseas case studies.

As for No. 09 in the table above, the National Insurance Program (NIIP) in the second quarter of 2020, as described in Section 2.1.3 [National Level] (3), the NIIP published for reinsurance procurement by GSIS in 2019 but the bidding process was unsuccessful.

<sup>41</sup> Created by the study team based on WB website <https://documents1.worldbank.org/curated/en/370011608433259133/pdf/Philippines-Promoting-Competitiveness-and-Enhancing-Resilience-to-Natural-Disasters-Sub-Program-2-Development-Policy-Loan.pdf>

<sup>42</sup> Geospatial Information Management & Analysis Project for Hazards & Risk Assessment in the Philippines

The WB also provided support through the ASA on the design and launch of the NIIP and continues to provide support for the re-bidding process.

As for the numerical targets, the two emergency funding mechanisms, NDRRMP and LDRRMP, were added in the baseline of Sub-Program 1. At the time of Sub-Program 2, emergency cash transfer and CAT bonds were also added to the DPL and these two items have already been achieved (see below for details).

✓ Parametric insurance origination covering 25 LGUs

As described in Section 2.1.3 on DPL, for the Result Indicator B1 of the DRM DPL with CAT DDO II, the WB provided support for the design and development of catastrophic insurance for rural areas and LGUs. The design was based on the loss assessment model developed through the DFRI Strategy. The WB also provided support for development of the model. The scheme is depicted in the table below, where the insurance contracts are made between GSIS and BTr, and each province is covered under the insurance umbrella through BTr. In addition, the insurance is ceded by GSIS to the overseas market through WB (IBRD)<sup>43</sup>.

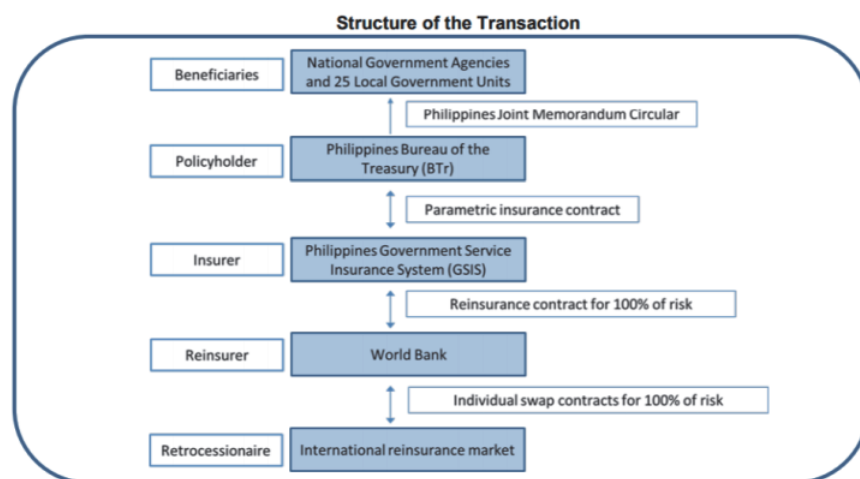


Figure 2-7 Parametric insurance scheme covering 25 LGUs<sup>44</sup>

Note that during Typhoon Vinta in 2017, a payment of 1.6M USD was made to the province of Davao. This is reportedly four times the amount of insurance premiums paid by the province of Davao.

This program was not renewed following 2019. According to the WB, after the completion of the pilot period and evaluation, the Philippine government has requested that the national government, rather than individual LGUs, to centralize the management of insurance, and has

<sup>43</sup> International Bank for Reconstruction and Development

<sup>44</sup> Source: <https://documents1.worldbank.org/curated/en/799241548872273775/Insuring-the-Philippines-against-Natural-Disasters-Case-Study.pdf>

decided to utilize the CAT bond described below to arrange for disaster coverage.

✓ Structuring insurance with the WB by utilizing CAT bonds

In 2019, the WB issued a CAT bond after signing an insurance contract with the Philippine government. When the CAT bond was issued, funds were raised from 24 investors. This is the first state-sponsored CAT bond issuance in Asia.

This scheme uses the estimated loss of the province in a disaster from a loss model as a threshold, and insurance payment will be paid to the national government when a corresponding event occurs. The specific scheme and conditions are as follows.

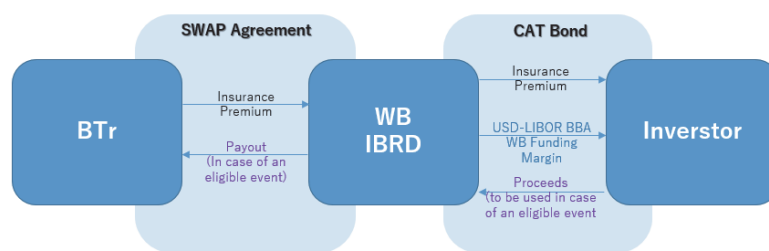


Figure 2-8 Insurance scheme with WB utilizing CAT bonds<sup>45</sup>

Table 2-9 Terms and conditions of insurance with WB utilizing CAT bonds

Insurance period	3 years	
Sum insured	Earthquake 75M USD	Tropical Cyclone 150M USD
Insurance premium	Earthquake 5.5	Tropical cyclone 5.65
Trigger Type	Model Loss (Estimated loss from the loss model is used as the threshold value and trigger for insurance payment)	

✓ SEADRIF

SEADRIF, as mentioned earlier, is an insurance facility that aims to improve the financial resilience of the ASEAN<sup>46</sup> region to natural disaster risks, and various insurance programs and related projects will be implemented under the facility.

SEADRIF is in the form of a trust, and a trust company (SEADRIF Trust) has been established in Singapore. The Japanese government (Ministry of Finance) signed a Memorandum of Understanding (MoU) for the establishment of the trust in December 2018, together with Singapore, Indonesia, Cambodia, Myanmar, and Laos, and became the first trustee of the SEADRIF Trust in July 2019, together with Singapore. Under the SEADRIF Trust, SEADRIF Insurance Company was established with the financial support of the partners to provide disaster risk financing and insurance products.

<sup>45</sup> Created by the study team based on WB website:  
<https://thedocs.worldbank.org/en/doc/752771575392782540-0340022019/original/casestudyPhilippinesCATbondfinal12.3.2019.pdf>

<sup>46</sup> Association of South-East Asian Nations

The WB has been providing technical assistance, and in September 2020, an Investment Project Financing (IPF) named "Southeast Asia Disaster Risk Insurance Facility (SEADRIF): Strengthening Financial Resilience in Southeast Asia" was approved to support the capital, establishment, and operation of the SEADRIF management company and trust company.

The summary of the PIF is as follows.

Table 2-10 Summary of IPF for SEADRIF<sup>47</sup>

Case name	Southeast Asia Disaster Risk Insurance Facility (SEADRIF): Strengthening Financial Resilience in Southeast Asia	
Borrower	SEADRIF Trust /SEADRIF Insurance Company	
Implementing Organization	SEADRIF Trust ((1) (3)) SEADRIF Insurance Company (hereafter (2))	
Business Description	Component	Loan amount
	(1) Capital of SEADRIF Insurance Company	10M USD
	(2) Establishment and operation of SEADRIF Insurance Company	1.2M USD
	(3) Establishment and operation of SEADRIF Trust/Sub-Trust, and Project preparation, implementation, monitoring, and evaluation	0.8M USD

In addition, flood insurance for low-income countries, the first insurance product under the SEADRIF framework was launched for Laos and Myanmar.<sup>48</sup> This is a hybrid insurance product with a three-year policy term starting on February 1, 2021, and is composed of a parametric section (Section A) and a finite section (Section B). Section A is based on SEADRIF's flood model and pays out according to three categories based on the scale of disaster: small, medium and severe events, with the number of victims as an indicator; Section B pays out funds needed for reconstruction, with limits set on an annual basis.

As for the next phase of support, financial or technical services to SEADRIF members are being considered, and the results are expected within six months<sup>49</sup>.

<sup>47</sup> Created by the study team based on WB website.  
<https://documents1.worldbank.org/curated/en/772221601306153071/pdf/Project-Information-Documents-Southeast-Asia-Disaster-Risk-Insurance-Facility-SEADRIF-Strengthening-Financial-Resilience-in-Southeast-Asia-P170913.pdf>

<sup>48</sup> The provision of insurance has been suspended following the political change on February 1, 2021.

<sup>49</sup> At the time of the interview in July 2021

### 2.3.2 Asian Development Bank (ADB)

#### ✓ Policy Based Lending

In September 2020, the Asian Development Bank (ADB) signed a loan agreement with the Philippine government for the Disaster Resilience Improvement Program (DRIP) <sup>50</sup>using the Policy-Based Lending (PBL) scheme. The summary is as follows.

Table 2-11 Summary of the Disaster Resilience Improvement Program

Program name	Date signed	Loan completion	Loan amount
Disaster Resilience Improvement Program	2020.9.15	Nov. 2023	500M USD

One of the features of this program is that the use and allocation of the loan amount is decided in advance.

Table 2-12 Use and Allocation of Disaster Resilience Improvement Program Loans

Item	Sub-item	Amount
(1) Finance	Insurance and contractual reservations	150M USD
(2) Public health	Disease management of infectious diseases	150M USD
(3) Public management	Local government	100M USD
	Administration	100M USD

The policy matrix consists of 3 Reform Areas: “Policies and institutional arrangements for disaster risk management and health-related emergencies, including social protection”, “Resilience of national government assets and LGUs to disaster and climate risks”, and “Disaster risk financing”. Based on the theme of each Reform Area, 12 targets to be achieved by 2023 have been set.

The Reform Area "Policies and institutional arrangements for disaster risk management and health-related emergencies, including social protection " targets the review of budgetary measures and expenditures to reflect the recent climate change and the spread of COVID-19, the revision of the NDRRMP to improve disaster response, and the strengthening of COVID-19 response. Regarding the revised NDRRMP, the 2020-2030 version was released last year.

"Resilience of national government assets and LGUs to disaster and climate risks " mainly aims to use more precise assessment parameters on disaster risk management to strengthen diversification and capacity building of organizations, but does not specifically address public assets.

For Disaster risk financing”, the goal is to implement GSIS parametric insurance for cities. This will be discussed in detail in the following section.

<sup>50</sup> Reference: <https://www.adb.org/sites/default/files/project-documents/54022/54022-001-rrp-en.pdf>

The policy matrix with a summary of items relevant to disaster risk financing is as follows.

Table 2-13 Policy Matrix for the Disaster Resilience Improvement Program

Reform Area	Prior Action	Targets	Target Date
	~Omitted~		
Policy and institutional arrangements for disaster risk management and health-related emergencies, including social protection	To improve disaster resilience policymaking and coordination at the national level, the government submitted a bill to Congress to establish the Department of Disaster Resilience, which (i) merges the functions of the NDRRMC and OCD to develop policies and implement disaster risk reduction and management programs, and (ii) addresses the concerns and needs of segments with special needs or vulnerabilities such as women, children, the elderly, persons with disabilities, and indigenous peoples, with respect to disaster resilience and disaster management. (OCD/NDRRMC) To establish climate- and disaster-resilient communities and to support equitable and sustainable development, DENR: (i) implemented the CCAM-DRR Roadmap 2018–2022 by establishing guidelines for the Risk Resiliency Program to create climate- and disaster-resilient communities within 17 climate vulnerable provinces and 4 major urban centers; and (ii) allocated ₱37.5 million from 2020–2022 to create opportunities for women's enterprises and empowerment in priority landscapes and provinces. (DENR Cabinet Cluster on CCAM-DRR)	To enable enhanced and gender-responsive disaster preparedness, the government will update the NDRRMP, 2011–2028. The government will also update (i) the CCAM-DRR Roadmap 2018–2022 to reflect revisions to the NDRRMP and (ii) the National Climate Change Action Plan to increase the resilience of healthcare systems to cope better during pandemics. (OCD/NDRRMC, DENR Cabinet Cluster on CCAM-DRR)	2023.09
Resilience of national government assets and LGUs to disaster and climate risks	~Omitted~		
Disaster risk financing	To provide an additional source of disaster risk financing and quicker local economic recovery, GSIS approved the establishment of a voluntary city-level parametric disaster insurance scheme for earthquake and typhoon cover, using a parametric trigger structure, with scope to include an additional flood risk model. (GSIS)  To broaden the scope of existing disaster risk financing, the government included additional hazard coverage of volcanic eruption and storm surge under the GSIS indemnity insurance policy, which is also aligned with GSIS's client-focused gender and development mandate to facilitate extensive information dissemination and dialogue to address gender issues. (GSIS)	To improve fiscal resilience of local governments and narrow the funding gap between available resources and post-disaster response costs for severe events, the GSIS will (i) implement a city-level parametric disaster insurance scheme covering earthquake and typhoons, with a view to recruit up to 20 cities per year between 2021 and 2023, and (ii) build the capacities of LGU beneficiaries to address gender and social inclusion issues in the use of insurance proceeds. (GSIS)	

✓ Parametric insurance for cities

As one of the goals in the Policy-Based Lending scheme, ADB has been supporting the establishment of parametric insurance for cities for some time, and is also forming a project loan named the “Philippine City Disaster Insurance Pool Project (PCDIP)”.

Technical Assistance (TA) has been provided for the basic design of this scheme and the Concept Note was completed in June 2018. Currently, activities are underway within the previously mentioned DRIP to launch pilot operations based on this scheme to promote understanding of the insurance mechanism and payment procedures to each city. In addition, recruiting of natural disaster modeling companies for premium rate calculation and consultants to support capacity building in each city has begun, with the aim of launching the pilot in either the third or fourth quarter of this year.

As for the PCDIP, after the pilot operation, the project will proceed to the next process if the pilot is able to demonstrate the usefulness and necessity of the scheme are confirmed and when the Philippine government were to request for the loan.

According to the Concept Note, published in 2018, a loan of 110M USD has been planned. The scheme is as follows, but is planned to start from first tier cities and triggers are set based on ground acceleration and the disaster scale at the barangay (impact area) level rather than using model loss basis. While this loan is expected to be used as funds for the capital of the insurance pool, the premiums will be paid by each city. The scheme will finalize after correcting the issues found in the pilot operation.



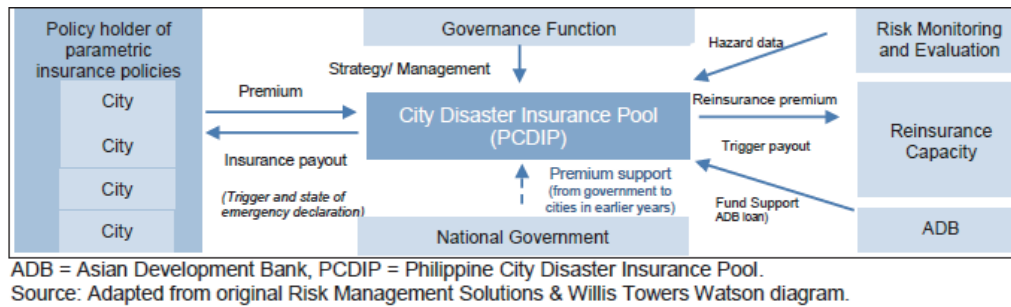


Figure 2-9 Proposed Pool Design for the Parametric Insurance for Cities<sup>51</sup>

## 2.4 Position of this Survey within Philippine’s in disaster risk finance framework and insurance

The policies of the Philippine government and the activities of JICA and other donors related to disaster risk financing and insurance described in this chapter are summarized in the Appendix.

In the Philippines, the position of disaster risk financing in disaster risk management policy has been defined in the NDRRMP, and the major policy for disaster risk financing is clarified in the DFRI Strategy. In order to implement the DFRI Strategy, a wide range of measures are being implemented, including the development of risk analysis tools and making insurance arrangements. These measures would require technical knowledge and participation of organizations specialized in these fields, as well as collaboration from a large number of well-capitalized partners, including the private sector.

The WB provides systematic support from upstream to downstream, from development planning and policy formulation through development policy lending (DPL) to technical assistance for the fulfillment of each measure. Furthermore, by taking a central role in developing financial schemes through the WB's network, the WB has been able to establish various financial schemes including insurance. The ADB also show a similar trend in providing financial products through policy-based lending (PBL) in recent years in the ADB.

While steady progress has been observed in the arrangements for new financial schemes and the development of tools, the current existing public insurance program has not been able to address the issues raised on its scheme and operation despite that policies have been implemented to promote insurance coverage. In addition, for underinsurance, which is one of the issues in the public insurance system, it would be efficient to estimate the replacement cost using existing asset information, but this was not covered in the scope of NARS’ development plan that BTr is currently implementing with the support of the WB. This Survey will cover areas such as these that have yet to be address. As for the improvement of existing schemes, it is necessary to analyze the current situation and examine policies after confirming the actual status of counterparts in detail. For development of the Replacement Cost Appraisal System, it

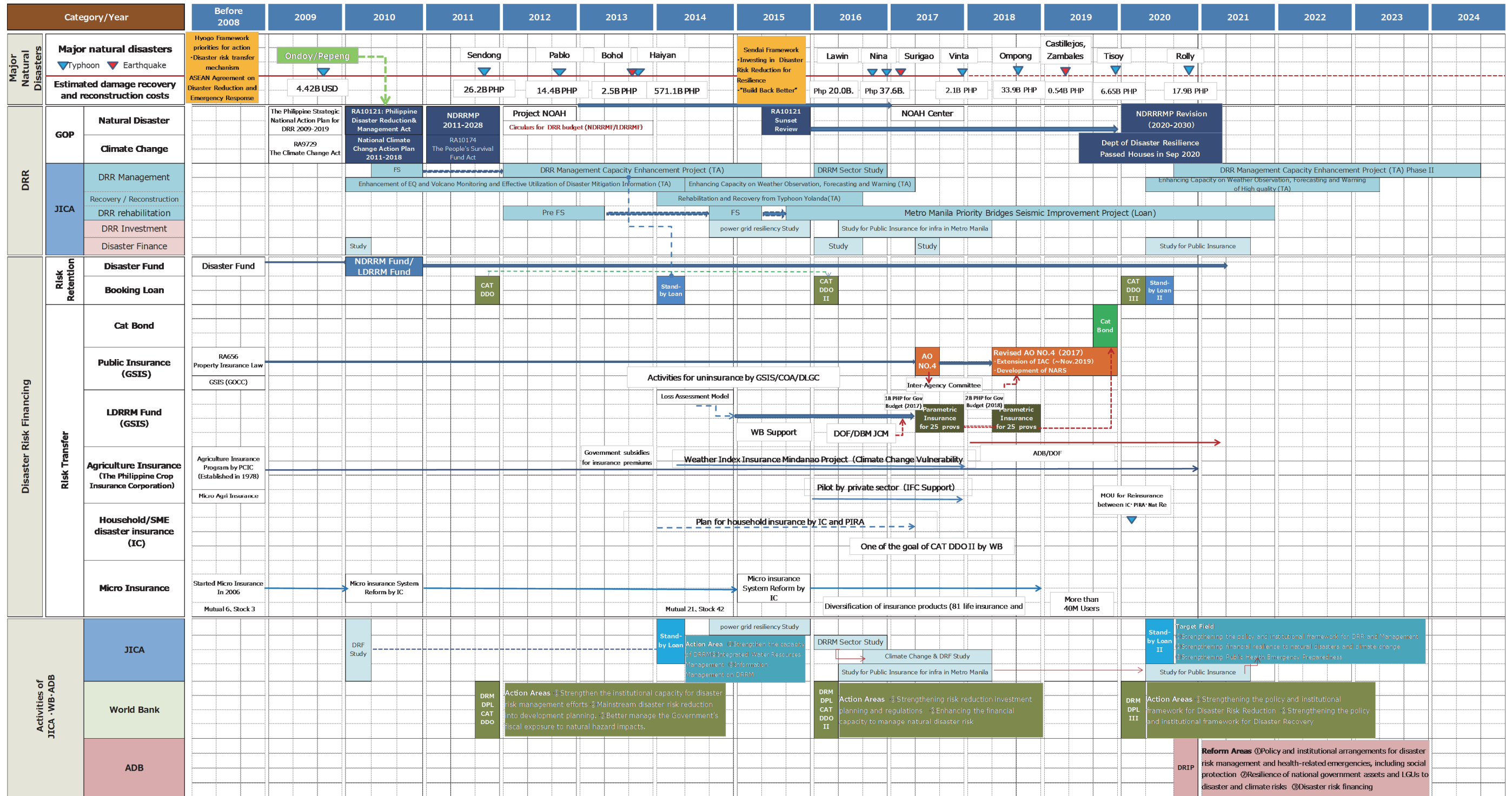
<sup>51</sup> Source: <https://www.adb.org/sites/default/files/project-documents/51312/51312-001-cp-en.pdf>



is necessary to fully understand NARS's system outline and development progress, to consider integrating the two systems. This Survey will develop a roadmap for improving the public insurance system by analyzing the current situation and through a close coordination with counterparts and relevant organizations.

Appendix

Progress of the Climate Change and Disaster Risk Financing Sector in the Philippines



### **3 Overview of GSIS's public insurance program, underwriting, accumulation management and insurance procurement**

#### **3.1 Overview of GSIS's public insurance program**

##### **3.1.1 Establishment and service overview**

The GSIS is a social insurance agency established by the Commonwealth Act No. 186 dated on of November 14, 1936, as amended by Republic Act No. 8291 dated on June 24, 1997, to administer social insurance for public employees. The GSIS provides pension benefit services such as retirement, survivorship, and disability benefits mainly to public employees, as well as lending services such as consolidation loans, emergency loans, and pension loans to participants and beneficiaries. It also provides and administers life insurance, workers' compensation insurance, unemployment insurance, funeral expense insurance, and workers' compensation programs that provide benefits to pensioners.

In addition to these social insurance operations, the agency operates and manages non-life insurance for public assets of the national and local governments and arranges reinsurance in accordance to the RA 656. In addition to property insurance against fire and natural disasters, GSIS's line of insurance service also includes motor vehicle insurance, construction insurance, erection insurance, electric equipment insurance, machinery insurance, boiler insurance, civil engineering completed risks insurance, marine insurance (cargo insurance and hull insurance), aviation insurance, and other catastrophe insurance (bankers blanket bond, general liability insurance, directors and officers liability insurance, and General liability insurance for banks, general liability insurance, directors and officers liability insurance, destruction and disappearance and dishonesty, fidelity guarantee, art insurance, theft insurance, movable comprehensive insurance, and accident insurance).

##### **3.1.2 Organization structure**

The GSIS is governed under Republic Act No. 8291 by a Board of Trustees composed of nine members, including the President and General Manager (PGM). The PGM and the eight members are appointed by the President of the Philippines. The Executive Vice President, under the PGM and the Trustee, operates as the head of each office, and the offices are divided into 4 sectors: Support Service, Research, Innovation and Strategic Advisory (including internal audit and risk management), Financial Sector, and Core Business Sector (Business Affairs).

The non-life insurance service is handled by the Insurance Group led by the Senior Vice President (SVP) and the Vice President (VP). The organizational structure of the Insurance Group consists of the Office of the Senior Vice President (OSVP) and the Office of the Vice President (OVP), with the Reinsurance department and Insurance Support Staff under the

OSVP. The OVP oversees the Marketing, Underwriting, and Claims departments under the OSVP, and each department has its designated head.

Other than the Insurance Group, the divisions related to the non-life insurance services of public insurance are the IT Services Group of the Support Services Sector Office and the Risk Management Office of the Research, Innovation and Strategic Advisory Office. The IT Services Group is in charge of IT systems for the entire GSIS, including the Insurance Group, and is responsible for the establishment and operation of GIIS,<sup>52</sup> an underwriting management system for the Insurance Group. The Risk Management Office is in charge of risk management for the entire GSIS as a social insurance agency. In relation to the non-life insurance sector, the Risk Management Office monitors and evaluates the amount of reinsurance ceded to reinsurance companies for reinsurance procurement, but it does not conduct accumulation management of natural disaster risks or portfolio analysis. Instead, it monitors the cumulative amount of reinsurance ceded by each reinsurance company and the creditworthiness of the reinsurance companies internally.

### **3.1.3 Financial status, including all GSIS services**

The GSIS is divided into two main sections: social insurance services for public employees and non-life insurance for public assets, each of which is managed by an independent fund. The combined total income and expenses is as follows<sup>53</sup>. Total income is about 332 B PHP in 2019, while recurring expenses, including are about 231.8 B PHP, resulting in recurring income of about 100.2 B PHP and net income of about 167.5B PHP. As a result, its return on assets, a management indicator, is 7.6%<sup>54</sup>, and its return on ordinary revenues is 30.2%.

### **3.1.4 Financial status of GSIS's non-life insurance services**

#### **(1) Necessity of maintaining financial solvency of non-life insurance**

In the non-life insurance business, insurance premiums based on estimated loss are received in advance to payout claims in the event of disasters and accidents based on insurance contracts, thus there exists an uncertainty that the scale and frequency of the event may exceed the expectations. In order to avoid bankruptcy in the unlikely event of an accident occurring with a frequency or intensity that exceeds the amount that has been accumulated, the solvency of the company must be sufficiently secured, taking into account risks beyond normal expectations.

From the viewpoint of protecting the insured and due to the unique characteristics of the non-life insurance business, insurance companies are overseen by supervisory and regulatory

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<sup>52</sup> General Insurance Information System

<sup>53</sup> Source: <https://www.gsis.gov.ph/downloads/transparency/2019-GSIS-Annual-Report.pdf?csrt=7402629105473472268>

<sup>54</sup> The return on assets for all industries of all sizes in Japan in FY2018 was 4.7%.

agencies to ensure that the insurance companies have sufficient solvency and that their organizations maintain financial soundness (solvency regulation). Internationally, insurance companies and insurance groups should be supervised to implement Enterprise Risk Management (ERM) and Own Risk and Solvency Assessment (ORSA) according to the Insurance Core Principles (ICP) adopted in October 2011 by the International Association of Insurance Supervisors (IAIS).

## **(2) Laws and regulations for maintaining financial solvency in the Philippines' insurance industry**

Section 200 of Republic Act No. 10607 (the "Insurance Code", as amended (2013)) requires private insurance companies operating in the Philippines to maintain solvency at all times, and the Insurance Commission (IC) established the Risk-Based Capital Framework 2 (RBC 2) as a supervisory standard in its Circular (IC Circular Letter No. 2016-68<sup>55</sup>, dated December 28<sup>th</sup>, 2016). RBC 2 is a method of measuring the minimum amount of capital appropriate to support overall business activities by taking into account the size of the organization and its potential risks, limiting the amount of risk the organization can retain, and requiring more capital for organizations with a higher risk.

The calculation formula is as follows.

$$\text{Risk Based Capital Ratio} = \frac{\text{Total Available Capital}}{\text{RBC Requirement}}$$

The Total Available Capital is the sum of capital, deposits, reserves, fixed assets, and estimates, minus intangible assets. The RBC Requirement is calculated using a predetermined formula with credit risk, insurance risk, market risk, operational risk, and catastrophe risk as factors. Private insurance companies are required to submit the necessary information in accordance with this regulation at the prescribed timing.

The most recent supervisory indicators<sup>56</sup> are as listed follows

**Table 3-1 RBC Supervision Indicators**

RBC Ratio (Y)	Events	Details of supervisory measures
100% and above	—	No regulatory action needed.
$75\% \leq Y < 100$	Trend Test	Submit linear extrapolation of the RBC ratio for the next period. (If below 75%, move to the Company Action)
$50\% \leq Y < 75$	Company Action.	Submit RBC improvement plan and financial projections and implement the plan accordingly
$25\% \leq Y < 50$	Regulatory Action	IC authorized to issue Corrective Orders
$Y < 25\%$ .	Authorized and Mandatory Control	IC authorized and required to take control of the company

<sup>55</sup> "Amended Risk- Based Capital (RBC2) Framework"

<sup>56</sup> May 2020-. Due to the impact of Covid-19, specific relaxation of supervision standards has been made through a notification (IC Circular Letter No. 2020-103, dated October 30, 2020).

### (3) Financial soundness of GSIS

GSIS is a Government-Owned and Controlled Corporation (GOCC) and is not subject to the supervision and regulation of the Insurance Commission (IC). On the other hand, GSIS is under the supervision of the COA, and submits financial statements and is audited for financial soundness at specified frequencies, thus GSIS does comply with the IC regulation and submit the RBC ratio to the COA.

GSIS's RBC ratio for 2019 is 483%, and given that the minimum statutory ratio that is not subject to supervisory action under the IC is 100%, the non-life insurance service under GSIS is currently well capitalized for the retained risks and the agency's financial condition is well maintained.

## 3.2 Operations on insurance underwriting, reinsurance procurement and accumulation management

### 3.2.1 Role of each Group

As mentioned in Section 3.1.2, the Insurance Group, which is in charge of non-life insurance services for public assets, is divided into five units based on operation: Marketing, Underwriting, Claims, Reinsurance, and Insurance Support Staff.

This Survey focus on operation of the Underwriting Department. Operation details of the Underwriting Department and its interactions with other units are summarized in Figure 3-1.

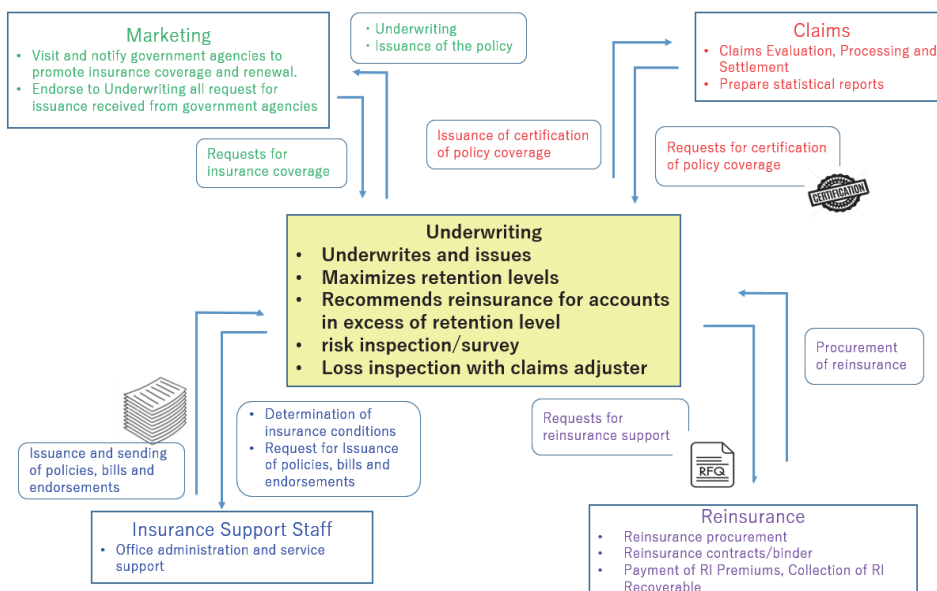


Figure 3-1 Operations within the Insurance Group<sup>57</sup>

<sup>57</sup> Created by the study team based on the materials provided by GSIS

The main characteristic of the Underwriting Department is that the scope of operation is very broad, it not only underwrites insurance, but also conducts loss inspection post accidents.

### **3.2.2 Workflow**

The Insurance Group operates in accordance to the “Manual of the Operations (MOOs),” which defines in detail the workflow from the receipt of an insurance underwriting request through the Marketing Department to the determination of underwriting conditions and procedures to the issuance of the policy (The Manual is under revision as referred in 3.2.3 (1)). The manual is divided into different sections according to types of insurance contracts, such as new, renewal, reinsurance ceding, and clearly identifies the position of the staff member in charge of each process and the authority needed at each stage.

In addition, each work is carried out using the General Insurance Information System (GIIS), an integrated system that covers various insurance processes such as policy issuance, underwriting, reinsurance, premium payment, and other accounting procedures. The manual even specifies at what stage and by which personnel the GIIS system is to be entered and processed.

The contents of work are systematized and maintained in manuals so that staff in various positions engaged in work at each stage can clearly understand their roles and carry out their work efficiently.

### **3.2.3 Methodology**

#### **(1) Underwriting**

In the underwriting process, underwriting rules are laid out in the "Policies and Procedural Guidelines (PPGs)” and the “Manual of Operations (MOOs),” and underwriters are to follow these guidelines in their work. The MOOs also contains information such as risk assessment methods and procedure framework for applicable policies and provisions. The main items included in the MOOs are as follows and the revision of the MOOs is currently awaiting for approval.

- Workflow
- Necessary Information and documents for underwriting
- Factors to determine the premium rate
- Limit amount of underwriting at each authority level
- How to use the system (GIIS, etc.)

The factors that determine premium rates (location, structure, etc.) are defined in the MGI, but the tariff is not provided in this document.

On the other hand, individual rules that are not included in the above mention items are announced through either the Underwriting Bulletin (UB) or the Office Order (OO). A total of seventy (70) UB and two (2) OO has been issued as of September 2021. The amended premium rates are announced through the UB, and the announcement that premium rates for civil engineering completed risk insurance are to be based on the rates for construction insurance in the GSIS Underwriting Bulletin No. 17-10<sup>58</sup> (dated August 30, 2017). However, this is not clearly defined as a rule for civil engineering structural insurance, and is applied tentatively.

## **(2) Reinsurance procurement**

As previously mentioned, insurance is one of the methods of risk transfer to reduce excessive financial impact by diversifying risks and compensating for accidents by insuring a large number of risks with various characteristics such as location and structure. Insurance companies themselves, who underwrite insurance, manage their own risks by arranging reinsurance for large risks, etc., in order to keep the amount of risk<sup>59</sup> constant and ensure stable operation.

The GSIS has set a limit of 2B PHP per policy through an internal resolution to control its exposure. In addition, Article 221 of the RA 10607, the amended Insurance Code (2013), states that no insurance company shall retain any risk that exceeds 20% of the insured asset's net worth. The GSIS uses both facultative and treaty reinsurance schemes to transfer its risk externally.

### **① Facultative reinsurance**

In accordance with the above guideline, GSIS procures facultative reinsurance for large-scale properties (airports, ports, railroads, electric power, hospitals, municipal buildings, etc.) of 2B PHP or more, after determining the conditions for each individual contract.

### **② Treaty reinsurance**

To prepare for large-scale accumulation risks that cannot be covered by ① above, GSIS arranges special reinsurance contracts in which the contents and conditions to be reinsured are agreed upon in advance and in-force policies that meet the conditions are automatically reinsured.

The contract conditions in the current treaty reinsurance (1 year term) for 2021 was revised as no change has been made since 2011 and due to having a good loss ratio. The differences of contract conditions between terms prior to 2020 and 2021 is as shown below.

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<sup>58</sup> "Advisory on the Issuance of Contractor's All-Risk Insurance (CARI)"

<sup>59</sup> The amount of risk here refers to the amount of insurance liability (the amount of insurance or the limit of liability minus the deductible).



Table 3-2 Treaty reinsurance program prior to 2020 and for 2021<sup>60</sup>

Term	1 <sup>st</sup> (PHP)	2 <sup>nd</sup> (PHP)	3 <sup>rd</sup> (PHP)	4 <sup>th</sup> (PHP)
~2020	200M xs 200M	600M xs 400M	1,000M xs 1,000M	4,000M xs 2,000M
2021~	1,000M xs 1,000M	4,800M xs 2,000M	-	-

GSIS complies with Government Procurement Reform Act of Republic Act No. 9184 for reinsurance procurement.

In addition, there are internal guidelines on the conditions for participating in reinsurance bidding, which include the confirmation of licenses and approvals from the regulatory authorities, minimum credit rating requirement, and submission of financial statements to confirm financial soundness. By GSIS Resolution No. 2020-01, dated January 20, 2020<sup>61</sup>, minimum credit rating requirement was relaxed from AM Best “B+” to allow for local bidders of reinsurance contracts to participate in the bidding process without rating, provided that the requirement on capitalization, profitability and claims payment are met. Also, the requirement includes S&P Credit Rating “A” as an option for qualifying foreign retrocessionaires in the bidding of reinsurance contract.

### (3) Accumulation management

Since accidents such as fire accidents and damage to individual facilities do not occur simultaneously, the retained risk can be constant and the financial impact can be stabilized by arranging facultative reinsurance for individual policies with high risk or when the amount of risk is large. On the other hand, natural disasters affect a certain area and can cause loss to multiple insurance contracts at the same time (accumulation loss). Therefore, risk management, including reinsurance arrangements, is made possible by monitoring of risks of accumulated loss of the policies.

GSIS manages earthquakes and floods by dividing them into nine zones based on CRESTA<sup>62</sup> and calculating the total amount of retained risk = accumulation risk as the sum of all policies held in each zone. These are automatically calculated by a system called Oracle Discoverer. There are areas that fall outside of the nine zones, and these policies are verified manually using GIIS.

## 3.2.4 Proposed programs and their current status

### (1) National Indemnity Insurance Program (roads, bridges, and schools)

<sup>60</sup> Created by the study team based on GSIS website  
[https://www.gsis.gov.ph/downloads/reinsurance/2019/20191026-GI-BDS-XOL\\_GSIS.pdf?csrt=16185171175938009379](https://www.gsis.gov.ph/downloads/reinsurance/2019/20191026-GI-BDS-XOL_GSIS.pdf?csrt=16185171175938009379)  
[https://www.gsis.gov.ph/downloads/reinsurance/2021/20210129-GI-BDS-2021\\_XOL\\_Treaty.pdf?csrt=16185171175938009379](https://www.gsis.gov.ph/downloads/reinsurance/2021/20210129-GI-BDS-2021_XOL_Treaty.pdf?csrt=16185171175938009379)

<sup>61</sup> <https://www.gsis.gov.ph/downloads/ppg-br/2020/20200529-BR-1-2020.pdf?csrt=4094191881327695574>

<sup>62</sup> A regional classification defined by the zoning system defined by CRESTA (Catastrophe Risk Evaluating and Standardizing Target Accumulations), a joint initiative of reinsurance companies.

The GSIS issued a public bidding for reinsurance brokers in November 2019 to structure a national insurance program for fire and natural disasters (typhoons, floods, earthquakes, volcanic eruptions, and storm surges) for roads and bridges located in 25 provinces and schools located in Metro Manila and 32 provinces, among other public assets.

A detailed description of the roads, bridges, and schools to be covered is distributed to prospective bidders (purchasers of bidding documents). Details on information in these bidding documents are summarized as follows:

- Roads (over 30,000 in total)  
Classification (Primary, Secondary, Tertiary), total length, number of lanes, type of pavement (asphalt, concrete, etc.), year of last surfacing, year of construction, most recent/pavement/slab thickness, road condition rating, terrain, location
- Bridges (over 3,000 in total)
- Length, width, year of construction, type of bridge (concrete, steel, wooden, etc.), and information on connected roads (classification and name), condition assessment, location
- Schools (over 60,000 in total)  
Number of buildings, number of floors, number of classrooms, structure, location

However, this bidding was unsuccessful failed due to the lack of bidders. The main reasons for this were that the bidder did not accept the request to submit the performance guarantee, and the request for the Bureau of Internal Revenue's (BIR) seal of approval on the financial statements was not practical. Since both of these provisions were based on the Government Procurement Reform Act (Republic Act No. 9184), the draft bidding documents for the program were submitted for consideration by the Government Procurement Policy Board (GPPB) after the bid failed. The request to relax the bidding conditions was approved under the authority of this board, and the Errors and Omissions (E&O) Insurance<sup>63</sup> was put in place of the Performance Guarantee to remove the BIR stamp from the financial statements to be submitted.

This program will be restructured to include only schools for rebid as soon as the budget is approved. Roads and bridges will be excluded because detailed information for these assets were not available.

## **(2) National Indemnity Insurance Program (Utility companies)**

The program is a national insurance program for 17 power facilities owned by the Power Sector Assets and Liabilities Management Corp. (PSALM), for which bids were publicly

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<sup>63</sup>The E&O Insurance is a form of professional liability insurance that covers financial loss to a third party caused by inadequate work or negligent actions.

announced in March 2021. In addition to fire and natural disasters, the program also provides coverage for electrical and machinery breakdown and business interruption. GSIS insured these power facilities with an agreed limit of liability and did not for arrange reinsurance. However, PSALM requested to increase the coverage up to the sum insured, so this program was structured and bid.

But the bid was unsuccessful, and one of the factors was the lack of underwriting information on the maintenance status.

### **3.2.5 Proposed actions for insurance underwriting, reinsurance procurement and accumulation management**

#### **(1) Review of methods for risk accumulation management, and reflect changes to reinsurance procurement policies**

The GSIS mentioned that one of the issues that needs to be addressed in the future is reinsurance procurement. The GSIS pointed out the reasons for the unsuccessful procurement included hardening of the insurance market due to the spread of the coronavirus, the difficulty in providing underwriting information on schedule, and the fact that the market demand for premiums exceeded the budget.

Reinsurance is the diversification of the risks underwritten, and in order to make appropriate arrangements, it is necessary to determine the method and amount of reinsurance based on an appropriate understanding of the risks underwritten. In particular, it is difficult to grasp the accumulation risk of natural disasters, and GSIS currently calculates the total accumulation risk as the total sum insured of all the policies in each CRESTA zones. While it is certain that the actual amount of loss will not be greater than the total sum insured in all cases, it is highly unlikely that all the underwritten policies in each region will sustain total loss in any single disaster. Overestimating the risks underwritten will lead to excessive reinsurance premiums and decreases the capacity to insure.

Currently, major Japanese insurance companies use loss assessment models to calculate the maximum loss expected in the event of a major disaster, establish retention criteria, and formulate reinsurance ceding policies. Loss assessment models are also used for risk assessment and insurance design of individual insurance programs.

The GSIS indicated that the lack of loss assessment models prevents them from fully understanding the risks underwritten quantitatively, and the lack of technical expertise to arrange reinsurance is one of the factors for the unsuccessful reinsurance procurement.

As described in Section 3.1.4, the current financial soundness of GSIS is well maintained, and it can be said that the GSIS has sufficient capital for the risks underwritten, but whether or not this will remain true for the situation from the perspective of the capacity to withstand huge

risks in case of emergency was not examined. As the Philippine government is promoting insurance for public assets through its political measures and based on RA 656, it will be necessary for the GSIS review its accumulation management and methodology as it secures and expands its underwriting capacity. Furthermore, it will be necessary to formulate procurement policies and diversify risks appropriately for reinsurance based on trends in the reinsurance market.

## **(2) Enhancing the quality of risk survey for reinsurance contracts**

As mentioned earlier, the GSIS indicated that there is a need for to enhance their technical expertise in reinsurance procurement. One of the important area for improvement is its risk survey. In the risk survey, the current status of the facility, disaster prevention management, causes of past accidents, and implementation of measures to prevent recurrence are confirmed. The information collected are used for risk assessment and improvement recommendation are provided for each type of disaster to be covered by insurance. It is a standard procedure to include the risk survey report along with the loss scenario and the assessment of the maximum loss amount based on the risk survey in the bidding documents for reinsurance procurement. Conducting risk surveys to accurately identify risks and report the risk status to reinsurers will allow reinsurance to be procured under better conditions for large-scale properties. Furthermore, one of the functions of an insurance company is to raise the level of disaster prevention in facilities by proposing risk mitigation measures to policyholders based on the actual risk situation.

At the GSIS, risk surveys are conducted by a team of engineers belonging to the Underwriting Department, but their main focus is on fire and explosion surveys. As the engineering team increases their knowledge of natural disaster risks and risk mitigation measures, the GSIS will be able to broaden its scope of survey and improve the quality of the information it provides when procuring reinsurance. This will have a positive impact on the terms and conditions of reinsurance procurement and reinsurance contracts. Improving the quality of risk survey will also improving the knowledge and techniques of risk assessment and risk control, which contributes to the improvement of insurance underwriting techniques.

## **(3) Introducing various insurance underwriting schemes**

As described in Section3.2.3, the underwriting methods and procedures are defined in various guidelines, such as "Policies and Procedural Guidelines (PPGs)" and "Manual of Operations (MOOs)," and "Underwriting Bulletins (UB)" and "Office Orders (OOs)" that are issued based on needs. However, the insurance underwriting details such as setting of payment limit and deductible amount and adjustment of insurance premium (discount /increase) have not been laid out in these documents. The GSIS does not necessarily need to adjust the underwriting conditions of property insurance for public assets, as it is a compulsory insurance and therefore cannot turn down insurance applications based on RA 656. In addition, the loss

ratio is currently very low, at 8% for fire insurance (as of the end of January-May 2021), thus there has been no discussions on changing the current insurance scheme.

On the other hand, in terms of (1) strengthening accumulation management, the use of various insurance underwriting schemes in the future will lead to the expansion of risk control and underwriting methods. In addition, the expansion of insurance schemes will help meet the needs of the insured and enhance the significance of public insurance.

Therefore, the review of various underwriting schemes will strengthen GSIS's insurance management function and improve the role of insurance in the long-term.

### **3.3 Characteristics and challenges of GSIS public insurance programs from the perspective of natural disaster coverage**

Only a few countries, such as Mexico, New Zealand, Colombia, and Australia, have an established governmental insurance agency for the purpose of insuring public assets. There are various ways to secure the cost of restoring public assets damaged by disasters, such as through government and local government budgets, funds, and property insurance from private insurance companies, and it is said that there is no standard method. In this context, the Philippines has long had laws and regulations on insurance of public assets. The Philippine government has established a compulsory public insurance program in which all government agencies, municipalities, except those below a certain size, and government-owned companies are required to have their insurable assets and interests be insured by the GSIS' public insurance program and for the GSIS to manage the public insurance fund. The public insurance program has the following characteristics and challenges related to the risk-based premium rates, which will be described in the next chapters. The risk-based premium rate will be determined in consideration of these factors.

#### **(Characteristics)**

- GSIS public asset insurance covers a wide range of facilities owned by or in the interest of national and local governments, including airports, ports, railroads, hospitals, power plants and grids, roads and bridges, water and sewage infrastructure, as well as government buildings.
- Since it is a compulsory public insurance program, the GSIS is obligated to underwrite the insurance when the facility manager submits the insurance application form, regardless of the condition of the facility. Even if the GSIS determines that the risk of damage is high, it cannot take the usual actions taken in private insurance, such as proposing higher premium according to the risk or refusing to underwrite the insurance.
- The amount of asset information required by the insurance application form is very limited and is insufficient for risk assessment.

### **(Challenges)**

- Although public insurance is compulsory, the requirements for coverage to be applied are not specified in the law. Therefore, many facilities applies only for fire coverage as a base coverage but not natural disaster coverage.
- In the case of schools, railroads, and airport buildings covered by the Previous Survey, many insurance contracts are in underinsured, where the sum insured is less than the replacement cost, and therefore, in the event of a disaster, the insurance loss payable will not be sufficient to cover replacement costs due to the penalty being proportional to the amount of underinsurance.

### **3.4 Current methodology for determining insurance premium rates**

GSIS is a government non-life insurance agency that provides non-life insurance to government agencies and municipalities with capital from the Public Insurance Fund (GIF) as defined in RA 656. GSIS underwrites insurance contracts by either Type 1: "retention" the risk or Type 2: transferring the risk to the external insurance markets. GSIS underwrites insurance contracts in accordance with the 1997 premium rate tariffs developed by the Insurance Commission of the Government (IC), and uses the IC tariffs and in-house rates for each coverage item. On the other hand, in Type 2, transferring risks to external parties, the GSIS procures reinsurance mainly through competitive bidding under the public procurement procedure according to regulation. Most of the insurance clauses that uses Type 2 are IAR (Industrial All Risk). In this case, rather than using a rate for each coverage item, the GSIS provides a maximum acceptable amount (maximum budget) to the bidders, and the insurance company with the lowest bid will be awarded for the reinsurance contract.

		GSIS - Procurement of insurance					
		Type (1) Retention (without reinsurance)			Type (2) Reinsurance (*)		
Occupancy use of insured facility		Retention	Policy	Premium rate	Reinsurance	Policy	Premium rate
Office	Office building	Mostly	Standard fire	IC tariff	Some	IAR	Competitive bid with "ABC"
	A special use and occupancy such as city hall, museum, banks...	-	-	IC tariff	Subject to expected single loss	IAR	
School		All	Standard fire	IC tariff	Some	IAR	
Hospital / Healthcare facilities		Mostly	Standard fire	IC tariff	Some	IAR	
Road - other than NIIP			Completed engineering structure	GSIS tariff	The initial bid in 2020 failed.		
Bridge - other than NIIP				GSIS tariff			
Airport	Terminal bldg / runway				All	IAR (Industrial all risk policy) and general liability, other insurance	Competitive bid with "ABC"
Rail road	Station, rail track, elevated railroad, train, rail yard				All		
Harbor	Pier, facility, warehouse				Most		
Power generation	Hydraulic / thermal power generation, transmission and distribution,				Most		
Irrigation					Unknown		
Water and wastewater					Unknown		
Waste treatment facility							
Flood control							
Pump station							
NIIP	School, road and bridge						A broker bid w/QCBS is underway.

Type (2): GSIS retains about 10% of the sum insured.

ABC: Approved budget for the contract  
 QCBS: Quality- and Cost- Based Selection

Type (1) Tariff base

Risk based premium scheme considering probability of damage of the insured facility can be directly reflected into the tariff.

Type (2) Reinsurance (NIIP uses QCBS method)

Premium is subject to the public procurement process. Policy used for reinsurance contract is IAR which does not state premium per peril. Therefore, risk based premium for natural peril may not be straightly influence to the premium offered from reinsurers in the bid.

IAR

The broadest type of the insurance policy that covers each and every loss except for those specifically excluded. Breakdown of premium per peril was not provided.

Figure 3-2 GSIS public insurance contract procurement methods

### 3.4.1 Type 1: Contracts in which the insured risk is “retained”

In the case of Type 1, if the premium rate is risk-based, the insurance contract will have a risk-based premium. On the other hand, in Type 2, the risk level of natural disaster perils is not necessary have a straightforward correlation with the insurance premiums because it depends on the bidders' intentions, competition, and the market. In addition, the premium is quoted together with non-natural disaster risks. Therefore, this Survey will only consider Type 1 contracts, in which risk-based premium rates and premiums are clearly indicated.

### 3.4.2 Type 2: Contracts in which the insured risk is transferred to the external insurance market (reinsurance procurement)

In the case of Type 2, the reinsurance market is responsible for determining premiums, but the GSIS provides an Approved Budget for Contract (ABC) for public bidding. It is important to set an appropriate ABC, because if the ABC is lower than the market expectation, there will be no bidders, and if the ABC is higher than the market expectation, the reinsurance will be procured at a higher premium than required. Currently, the GSIS does not have a quantitative evaluation method for setting the ABCs, instead it sets the ABCs based on the previous year's contracts, the condition of the insured assets, and interviews with brokers and others relevant stakeholder. Since many of the projects for which reinsurance is procured involve contracts that include multiple facilities in different locations and use an all-risk policy, the use of a

natural disaster loss assessment model is considered for evaluating premium rates for natural catastrophe risks. In the past few years, loss assessment models for earthquakes, typhoons and floods have been developed for the Philippines by the commercial modeling companies and through technical cooperation in the development of loss assessment models. Currently, the GSIS has not introduced these models into its underwriting procedures, but has plans to do so in the future. Training and pilot operations on how to use these models and apply them to premium calculation and reinsurance procurement budgets will be useful as part of capacity building. This is described in Chapter 8.

### 3.5 Current natural disaster insurance premium rates<sup>64</sup> and risk classification

#### 3.5.1 Insurance premium rates

The natural disaster coverage provided by GSIS is allied to fire insurance. Fire insurance covers damage to facilities caused by fire or lightning, and premiums are determined by applying IC tariffs based on the occupancy of the facility and its location. Natural disaster coverage by itself cannot be insured. On the other hand, the inclusion of natural disaster coverage is voluntary for the insured and is not compulsory. Natural disaster coverage, other than lightning which is included in ordinary fire, includes typhoon, flood and earthquake. The rates for the allied perils are as shown below<sup>65</sup>.

Table 3-3 Regional zoning and premium rates for typhoon and flood coverage allied to fire insurance

Perils	Regional zones					
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Typhoon	0.025%.	0.025%.	0.040%.	0.075%.	0.125%.	0.150%.
Flood	0.025%.	0.025%.	0.020%.	0.030	0.045%.	0.060%.

Table 3-4 Premium rates for earthquake coverage allied to fire insurance by region and number of stories

Peril	Regional zones	Number of stories						
		Below 2 stories	3 to 4 stories	5 to 8 stories	9 to 12 stories	13 to 16 stories	17 to 20 stories	21 stories or higher
Earthquake	Area 1	0.144%.	0.192%.	0.240%.	0.288	0.336%.	0.384%.	0.432%
	Area 2	0.144%.	0.240%.	0.288	0.336%.	0.384%.	0.432	0.480%.

<sup>64</sup> The current premium rate applied by the GSIS is the premium rate that includes the additional premium portion in addition to the net premiums. On the other hand, since the risk-based premium rate presented in this report covers only net premiums, it is necessary to include additional premiums such as the GSIS's expenses, reinsurance, and agency fees when actually applying the proposed rate as an insurance premium.

<sup>65</sup> Source: GSIS Underwriting Bulletin 12-13 Uniform fire and allied peril premium for home office and branch offices, December 11, 2013



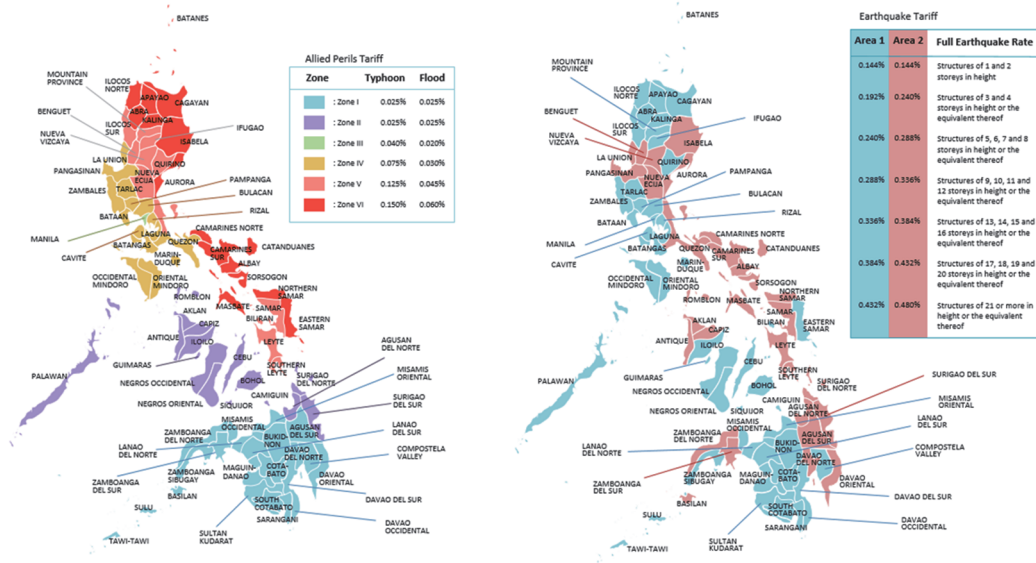


Figure 3-3 Regional distribution of premium rates for typhoon, flood, and earthquake coverage allied to fire insurance

### 3.5.2 Risk classification

In the public insurance policy, natural disaster hazards are divided into two categories for earthquakes. Typhoons and floods are divided into seven regional zones across the country, and over 80 provinces and special cities are divided into five zones based on wind speed distribution, while Metro Manila itself forms a single zone, for a total of seven regional zones, where insurance premium rates are assigned to each zone. Insurance premium rates for typhoons and floods are based on the insured asset's location (assigned zone), and since premium rates are not adjusted by building type, it appears that insurance premium rates are determined solely based on typhoon risk. In terms of earthquake insurance premium rates, the Philippines is divided into two areas, and the rates are determined by the number of stories of the building, but there is no classification by year of construction or type of construction. For buildings with one floor and buildings with two floors are separated into two categories, but the premium rates for these two categories are the same.

In earthquake disasters, buildings with different construction standards have different seismic performance depending on the year of construction. This is also similar for typhoons. It has been shown in Japan that it is reasonable to consider newer buildings to have stronger roofs and other structures that are more resistant to strong winds. With regard to floods, the current rate is based on regional zones (per province), despite knowing that microtopography, such as the location of the building, its relationship with rivers in distance and height, and drainage conditions, has a significant impact on the occurrence of disasters. Also, in terms of the ratio of damage to building value, if the depth of flooding is the same, the damage ratio should be higher for buildings with fewer floors.

The premium rate classification for typhoons and floods is divided into six regional zones,

and while Zone 1 (southern provinces of the Philippines) has typhoon premiums at 0.025% and flood premiums at 0.025%, the eastern provinces of the Philippines, where typhoons makes more frequent landfall or come close to landfall, has typhoon premiums set at 0.150% and flood premiums at 0.060%, a significant increase (6 times) in premium compared to the south. The differences in premium

In the case of typhoons and floods, which often occur in conjunction with typhoons, the existing insurance premium rates do reflect the natural disaster risk to some extent, but the vulnerability of the facility against the hazard is rarely taken into account. In order to mitigate the increasing number of meteorological disasters, it would be effective to reflect the vulnerability of facilities against natural disaster when determining insurance premium rates.

## **4 Development plan for the proposed Risk-based Premium Rate Calculation System**

### **4.1 Objectives of risk-based premiums**

The current natural disaster premium rates for public insurance are generally uniform in terms of facility condition. By changing the premium rate to one that more strongly reflects the disaster risk-based approach, the objective is to promote greater awareness of natural disaster risks among government agencies and local governments responsible for facility management. It also aims to create incentives for disaster reduction by linking risk reduction to lower premium rates in the insurance program.

### **4.2 How risk is reflected into the premium**

#### **4.2.1 Rationale for risks-based premium**

In order to compensate for loss caused by accidents (unforeseen events), insurance is a system whereby a large number of people pay premiums in proportion to their risk, and the policyholder who suffers loss as a result of an accident obtains compensation for the loss in the form of insurance payments. The risk of loss to the policyholder is defined by the probability of occurrence of the loss event and the impact of the loss when it occurs, and the insurance premium is determined on the basis of the expected loss over a certain period of time. If the loss risk of policyholders were uniform, the premium rate for each policyholder would be the same, but in reality, the expected loss for each policyholder differs because the location of the insured facility and the vulnerability of the facility to the hazards differ. In such cases, applying a uniform premium rate would result in a discrepancy between the expected loss and the actual premium paid by each policyholder. In this case, premiums among policyholders can become unfair. Risk-based premiums are tied to the "principle of fairness" among policyholders, which is one of the basic requirements for an insurance system. In addition, if the distribution trend of policyholders is skewed, the overall premiums may become insufficient or excessive, and the balance between premiums and claims may be uneven.

#### **4.2.2 IC's request for developing a natural disaster insurance rate scheme for private companies**

As GSIS is not under the control of the DOF/IC, it is not obliged to follow the IC Circular on premium rates, etc. However, GSIS complies with the IC Natural Catastrophe Insurance Rate Schedule effective in 1997 and manages its public insurance program based on RA656. In April 2021, the IC issued the IC Circular Letter No. 2021-27<sup>66</sup>, dated April 21, 2021, regarding natural catastrophe insurance premium rates. This Circular requires private insurance companies to "determine and comply with appropriate and stable sustainable premium rates

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<sup>66</sup> Strict Implementation of Sustainable Catastrophe Insurance Premium Rates and Establishment of the Philippine Catastrophe Insurance Facility (PCIF)

and rate schemes" and "adopt the new premium rate schemes for insurance contracts to be concluded or renewed on or after April 1, 2022". In connection to this, the Circular also notifies that the ceding from each insurer to the PCIF will start at the same time according to an agreement among IC, PIRA and NatRe.

While the Circular does not require GSIS to comply, it will encourage the renewal of the natural catastrophe insurance rate scheme.

### **4.3 Summary of premium rate classifications for public natural disaster insurance program in Japan and other countries**

#### **4.3.1 Examples of government sponsored earthquake insurance programs**

Although the types of buildings covered by insurance differ, the following table shows the rate categories for earthquake insurance in major countries with public earthquake insurance programs. Some countries, such as New Zealand and Indonesia, have a uniform premium rate, while others, such as the Japan Residential Earthquake Reinsurance and California Earthquake Insurance, have a risk-based system that determines the premium rate based on the location, construction, and construction year of the building. The California Earthquake Insurance System in the U.S. determines premium rates based on more detailed regional zoning than those in Japan and the Philippines.

Table 4-1 Government sponsored earthquake insurance programs

Country/Region	Philippine	Japan	U.S. California	New Zealand	Indonesia	Turkey	
Insurance entity	Government Service Insurance System GSIS	Japan Earthquake Reinsurance (public-private investment)	California Earthquake Authority (CEA)	Earthquake Commission (EQC)	A consortium of all insurance companies	TCIP (Decree Law 587)	
Target facilities	Public assets (mostly office buildings)	Residential homes	Residential homes, household goods	Residential homes and land (Note 2)	Public assets (mostly office buildings)	Residential homes (excluding villages)	
Attachment method (mandatory/optional)	Optional rider to mandatory fire insurance.	Optional rider to voluntary fire insurance	Optional rider to voluntary fire insurance	Compulsory rider to voluntary fire insurance	Compulsory coverage for individual catastrophe insurance.	Compulsory coverage.	
Rate classification	Zones	1 Zone (Note 1)	3 Zones	Location, distance from fault	Single rate	Single rate	5 Zones
	Facility	Number of stories (7 categories)	2 construction categories, seismic level, year constructed	Construction, foundation, number of stories, year constructed, seismic retrofit, roof	Single rate	Single rate	3 construction categories
Premium rates (%) (Note 3)	0.144-0.480	0.074-0.422		0.2	0.10	0.044-0.550	

(Note 1): Although there are two earthquake zones, buildings with two stories or less are classified as a single zone because they have the same rate.

(Note 2): Fixtures and fittings in the home are no longer covered by earthquake insurance (EQC) due to a change made in July 2019, and are subjected to the terms and conditions of the accompanying fire insurance contract. (<https://www.eqc.govt.nz/what-we-do>)

(Note 3): Since there are differences in the scope of coverage, limit of sum insured, deductible, valuation basis of insurance claims, and premium rate adjustment rules depending on the system, the premium rates shown here are approximate values disclosed on the relevant websites.

#### 4.3.2 GIROJ's base rate for Japan's residential earthquake insurance

In the case of non-life insurance, such as automobile insurance and fire insurance, the premium rate is set based on a large volume of statistical data on past insurance claims. On the other hand, in the case of natural disasters such as earthquakes, which occur less frequently compared to previous types of events, and sometimes result in huge disasters, the data on past insurance payments alone is not sufficient for calculating the premium rates. For this reason, General Insurance Rating Organization of Japan (GIROJ), which was established in Japan based on laws and regulations, establishes the base rate for earthquake insurance by establishing predictions on future insurance payments through loss simulations that uses the earthquake occurrence data to create the probabilistic seismic motion prediction maps

published by specialized government agencies<sup>67</sup>. The base rates for earthquake insurance are based on risk categories such as the construction and location of the building. The premium rate is adjusted for construction year and seismic rating by applying discounts, and the GIROJ reviews and updates the risk categories based on interviews with experts, opinions, and discussions.

### 4.3.3 Flood insurance program

In Japan, as well as in the U.K. and Germany, flood damage has traditionally been included in fire insurance contracts for residential buildings. On the other hand, since floods occur repeatedly in the same areas and a single flood can cause extensive damage over multiple properties at the same time, it may be difficult for flood-prone areas to obtain flood coverage through the private insurance market alone. For this reason, as with earthquake insurance, the U.S., the U.K., and France have established government-sponsored flood insurance system.

### 4.3.4 Flood insurance premium rates of private insurance companies in Japan

In Japan, for home fire insurance, GIROJ calculates the "reference loss cost rates" as a guide for the private insurance companies when determining their premium rates. The reference loss cost rates are calculated as follows, based on GIROJ's past statistics on insurance claims and natural disaster models. (Source: GIROJ, "Fire Insurance Reference Loss Cost Rates"<sup>68</sup>)

- GIROJ compiles and analyzes a large volume of data on policies and payments reported by member insurance companies to create a homogenous set of insurance statistics. This is then used to calculate reference loss cost rate for fire insurance through actuarial and other rational methods, in addition to accounting for changes in the social environment.
- However, the occurrence of natural disasters varies greatly from year to year, and for some large-scale natural disasters, the frequency of occurrence is once in tens or hundreds of years. Therefore, the amount of data accumulated to date is not necessarily sufficient to predict future losses from natural disasters and to determine appropriate insurance premiums. For this reason, GIROJ uses simulations to calculate insurance premiums for natural disasters.
- The calculated reference loss cost rate for fire insurance is then submitted to the Commissioner of the Financial Services Agency for examination (conformity assessment) to ensure that the reference loss cost rate conforms to the "three principles of insurance premium rates".
- Member insurance companies may use reference loss cost rates approved by the Commissioner of the Financial Services Agency when developing their insurance premium rates. Conformity of the portion using the reference loss cost rate to the "three

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<sup>67</sup> Standard Earthquake Insurance Premium Rate, General Insurance Rating Organization of Japan, <https://www.giroj.or.jp/ratemaking/earthquake/>

<sup>68</sup> <https://www.giroj.or.jp/ratemaking/fire/>

principles of insurance premium” will be taken account of when each insurance company undergoes examination by the Commissioner of the Financial Services Agency.

For floods, GIROJ uses the "External Flooding Engineering Model," the "Storm Surge Flooding Engineering Model," and the "Statistical Flood Damage Model" to evaluate losses and use them in the reference loss cost rate for fire insurance.

Although the risk of flood is highly dependent on the geographic conditions in which a facility is located, the premiums of home fire insurance products in Japan did not reflect risks associated to the given location. However, in recent years, some insurance companies have begun to providing insurance products that reflect the risk of flooding in a given location, partly due to the frequent occurrence of flood disasters<sup>69</sup>. It has also been reported that GIROJ will begin to establish reference loss costs rate for region-based flood insurance premium rates for floods<sup>70</sup>.

On the other hand, for commercial property insurance, the majority of insurance companies have already introduced premiums based flood risk at the given location. Although the method of calculating insurance premiums differs from company to company, the flood risk of a facility is determined based on the flood and landslide hazard maps from the National Land Information System, digital terrain data, building construction and occupancy classification. The flood risk determined is then used as the basis for the insurance premium rate. Flood loss assessment models are also used to check the adequacy of overall insurance premiums.

#### **4.3.5 Premium rates of the U.S. Federal Flood Insurance Program**

The National Flood Insurance Program (NFIP) was established in 1968 as a federally initiated insurance program to cover property losses caused by flooding. The NFIP is a comprehensive flood insurance program that aims to mitigate damage through risk control in addition to risk-based insurance premiums, by mandating flood damage mitigation measures such as introducing land use regulations, offering insurance premium rate discounts based on the evaluation of local governments' efforts, providing assistance to local residents after flood damage occurs, and utilizing private insurance companies in insurance operations. In the U.S., the Homeowners Insurance is a popularized insurance product for standard residential buildings, but earthquake and flood, where claims payments can be concentrated, are excluded as exemptions to the coverage<sup>71</sup>.

In order for an individual to purchase flood insurance from the NFIP, the municipality where the residential building is located must participate in the program. Flood Insurance Rate Maps (FIRMs), the basis for flood insurance rates, are prepared by the participating municipalities

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<sup>69</sup> [https://www.cas.go.jp/seisaku/kokudo\\_kyoujinka/r2\\_minkan/pdf/023.pdf](https://www.cas.go.jp/seisaku/kokudo_kyoujinka/r2_minkan/pdf/023.pdf)

<sup>70</sup> Nihon Keizai Shimbun, June 8, 2021: <https://www.nikkei.com/article/DGXZQOUB0806V0Y1A600C2000000/?unlock=1>

<sup>71</sup> “Current Status of the U.S. Federal Flood Insurance Program (NFIP),” Sompo Japan Insurance Research Institute Report No. 93, 2010.10

based on the guidelines of the Federal Emergency Management Agency (FEMA). The Flood Insurance Rate Map<sup>72</sup> (FIRM) calculates the Base Flood Elevation (BFE) of a river with a 100-year or 500-year probability by calculating the flood discharge from a hydrological analysis of the basin. The calculated water volume and the topographical conditions of the basin are used to establish the inundation area for a 100-year probability flood. Based on this, flood insurance rate maps are prepared with the land use, flood control projects and development status of the target area taken in to account. The resultant insurance rate maps are then applied to the NFIP. For flood-prone areas, the area is further subdivided into different zones based on flood risk with the flood zone marked on the flood insurance rate maps. Under the NFIP, flood insurance premium rates are determined based on FIRMs and the occupancy of the facility, but there are multiple premium rate structures, including the federally subsidized lower premiums for facilities established before the introduction of FIRMs (before 1974). In addition, participating municipalities are given points for their disaster prevention efforts, which leads to discounted premium rates.

The NFIP is an insurance program established under federal law, and since its establishment in 1968, legislative reform and changes to the program were made in 1973, 1994, 2004, 2012 and 2014 with the goals of strengthening the program. The NFIP has experienced massive losses such as Hurricanes Katrina, Rita, and Wilma in 2005 and Super storm Sandy in 2012, which resulted an increase in accumulated debt due to massive borrowing, discharge of debts, and the expiration, extension, and various revision of laws and regulations.

In terms of insurance premium rates, a number of items has been pointed out indicating that the premium does not sufficiently reflect the flood risks. The items pointed out include having the same basic premium rate for the same type of building across all regions of the U.S. as long as it is within the same FIRM zone, having only two levels of premium rates based on the sum insured, small buildings tend to have higher rates, and not reflecting differences in topographical factors of the regions in the premium<sup>73</sup>.

According to FEMA, over the past 50 years, the NFIP has paid out 96B USD in claims and operating expenses, compared to 60B USD in premium income. In response to this situation, a new premium rate system (Risk Rating 2.0) will take effect in October 2021 for new policies and for renewals from April 2022. This is the first major change in premium rate calculation since the introduction of FIRM in 1974<sup>74</sup>.

While the current premium rate calculation only considers 100-year probability river floods and storm surges as flood hazards, Risk Rating 2.0 evaluates a broader range of flood types and probabilities including tsunamis, coastal erosion floods, and inundation in areas protected by

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<sup>72</sup> As described later in this section, a new premium rate system will be launched in October 2021, and it has been decided that FIRMs will not be used for calculation of premium rates.

<sup>73</sup> "On the Revision of the U.S. Federal Flood Insurance System," Sompo Japan Nipponkoa Research Institute Report 2018.3 Vol.72

<sup>74</sup> NFIP: The current rating structure and risk rating 2.0 2021.6 CRS (Congressional Research Services)



levees. Risk Rating 2.0 also uses multiple flood loss assessment models to determine the premium rate zones. The premium rates also take into account the degree of damage to facilities exposed to floods and its mitigation measures. According to FEMA, compared to the previous FIRMs, Risk Rating 2.0 is to include has the following features. The details of the additions was not analyzed in the Survey<sup>75</sup> (Figure 4-1).

- Reflect flood risk in premiums according to the characteristics of individual facilities
- Reflect a wider range of flood types in premiums
- Utilize actuarial techniques in establishing risk-based premium rates
- Ensure that the premium rates can be more easily understood by insurance agents and policyholders
- Eliminate complexity to make it easier for insurance agents to quote flood insurance

FEMA has an actuarial responsibility to charge adequate insurance premiums and to inform policyholders of flood risks. The introduction of the Risk Rating 2.0 will improve insurance finances through more appropriate premium collection and provide accountability to taxpayers<sup>76</sup>.

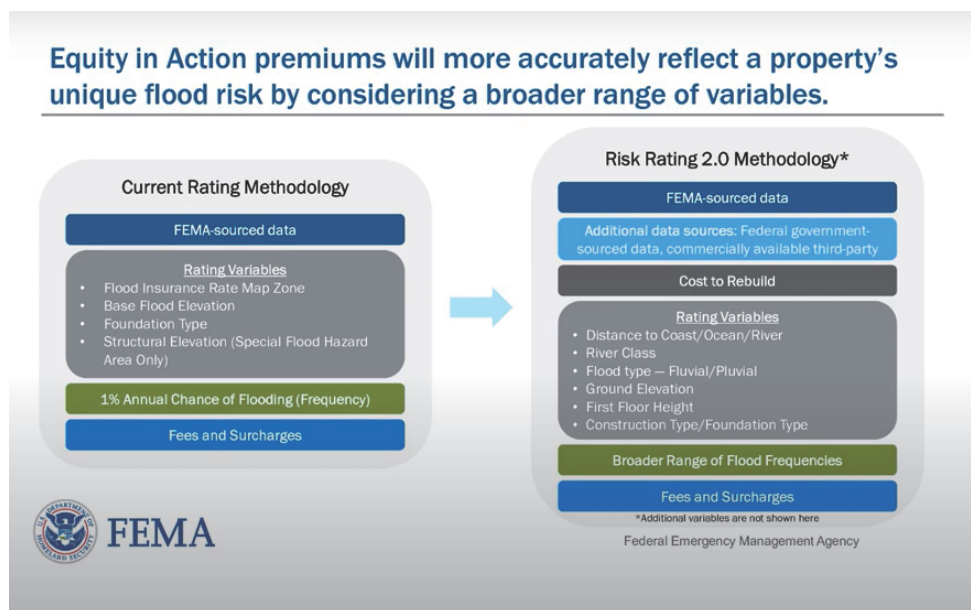


Figure 4-1 Comparison of FEMA NFIP’s premium rate calculation method between the current and new (Risk Rating 2.0)<sup>77</sup>

<sup>75</sup> same as in previous footnote

<sup>76</sup> FEMA Brochure “Risk Rating 2.0 is Equity in Action”

<sup>77</sup> Source: Flood Insurance – FEMA’s Risk Rating 2.0 Program: Equity in Action Webinar (video), <https://www.youtube.com/watch?v=BDyHYOPOCOo>, accessed 2021/7/21

#### 4.4 How risk is reflected in the premium

With the exception of some examples such as Indonesia and New Zealand where a single premium rate is offered, the majority of the natural disaster insurance programs in other countries reflects the risk of the insured property into its premium. In property insurance contracts, the pure premium for an insured facility equals to the expected loss, and the expected loss is the amount of damage expected to occur to the facility over a certain period of time. The existence and extent of damage caused by natural disasters are often determined by "the status of the disaster hazard, such as the intensity and frequency of typhoons, floods, and earthquakes" and "the facility's strength" against the hazard. For this reason, insurance schemes that reflect disaster risk calculate their premium rates by establishing hazard categories according to disaster risk, as well as factors that lead to the strength or vulnerability of the facility against the hazard (building construction, construction year, renovation, occupancy, and vulnerability of the building to flooding, etc.).

The methods of determining insurance premium rates is currently involves damage assessment simulations using natural disaster loss assessment models and/or statistical analysis of data on damage to facilities caused by past disasters. In the natural disaster insurance system that adopts risk-based premium rates, requires the risk classification to correlate with the actual damage, and the classification must be within a practical range in order for it to apply to a large number of insurance contracts.

The current risk classification used by GSIS for natural disaster insurance is as follows: (1) for natural hazards, risk classification is done by regions, but this classification does not adequately represent the intensity of the hazards; (2) for facility classification, the strength and vulnerability of facilities against the hazard is not taken into account for typhoons and floods. In the case of earthquakes, only the number of building stories is taken into account. As a result, the existing premium rate is not considered to be risk-based.

This Survey proposes to further subdivide existing risk classifications into risk-based categories and assign premium rates to each of the categories by referencing the risk categories used in the natural disaster insurance program in Japan and other countries and loss assessments based on natural disaster models, to create an insurance contract that reflects natural disaster risks through premium rates. Reflecting the disaster risk and the strength of the facility in the natural disaster insurance premium rate by establishing risk categories will promote "awareness of disaster risk," which is the objective of risk-based insurance premiums, and "incentivize disaster prevention incentives".

## 4.5 Identify available data

### 4.5.1 Available data

The Philippines has established the National Disaster Risk Reduction and Management Board under RA 10121 and is strengthening disaster risk management under the National Disaster Reduction and Management Plan (NDRRMP) 2011-2028. Based on the NDRRMP, hazard maps for disaster management have been developed, and web-based hazard maps are now available. In 2019, GeoRisk Philippines, a Philippine-wide natural hazard assessment system, was launched through an initiative led by PHIVOLCS, allowing free access to the web-based system, which allows download of hazard assessment reports for any location<sup>78</sup>.

Insurance premium rates should be calculated using rational actuarial methods by creating and analyzing a homogeneous set of insurance statistics from on a large volume of insurance data. However, for natural disasters, there is no sufficiently accumulated data as available for automobile insurance and residential fire insurance. For this reason, premium rates for natural disasters are calculated using simulations such as loss assessment models as well.

The previous study developed a loss assessment model for schools, railroads, and airport buildings in Metro Manila, calculated the annual average loss due to natural disasters, namely the theoretical net insurance pure premiums, for each facility, and surveyed and reviewed the role of public insurance for strengthening public infrastructure. The GSIS public insurance covers all facilities in the country, thus the method of directly calculating the premium rate for each facility from the loss assessment model requires the development of a loss assessment model that covers the entire Philippines and/or the use of commercial models. Although it is possible to expand the Metro Manila loss assessment model to cover the entire Philippines, it would require a great deal of cost and time to update and expand the model, as it would require the purchase or development of a hazard model for hazards applicable to the vast area of the Philippines. In addition, it has already taken almost five years to develop the current system, thus expanding the system will require a lot of cost and time.

In the Philippines, as "part of its disaster risk financing strategy", the DOF has already introduced the Philippines Catastrophe Risk Model (PCRM) with technical assistance from WB. Since then, other commercial modeling companies have developed loss assessment models for typhoons, floods, and earthquakes for the Philippines. The development of Philippine typhoon and flood models built on open source frameworks such as the OASIS LMF (Oasis Loss Modeling Frame Work) is also underway in cooperation with the University of the Philippines DREAM Project, the Philippine Reinsurance Company (NatRe), and the modeling company KatRisk<sup>79</sup>. It is expected the latest findings in the Philippines will also be reflected in these models. These efforts has made quantitative loss assessment models for natural disasters

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<sup>78</sup> Philippine Institute of Volcanology and Seismology

<sup>79</sup> <https://www.katrisk.com>

to become more available in the Philippines over the past few years.

As for the assessment of vulnerability to natural hazards, the University of the Philippines (UP), through its capacity building project on Natural Disaster Risk Analysis in Metro Manila, has developed vulnerability and damage curves for each building type by analyzing the typology of building types and the vulnerability of each type of natural hazard. These are included in the deliverables of the Previous Survey and are available for reuse upon approval from the relevant organizations.

As mentioned above, many efforts are underway in the Philippines for disaster risk assessment and quantitative evaluation of losses from natural disasters, and GIS should be able to use these information and systems available to reflect natural disaster risks into its premiums. The main types of information and systems being considered are as follows.

- GeoRisk Philippines - Hazard Hunter
- PCRM (Philippines Catastrophe Risk Model)
- Natural disaster loss assessment models in the Philippines marketed by Airworldwide and RMS.
- The open source typhoon and flood loss assessment model for the Philippines developed by OASIS LMF/KatRisk.
- Damage assessment for each building type from the GMMRAP Project
- DREAM Project by UP in NOAH
- The "Risk-Based Premium Rate Tool for Metro Manila" developed in the Previous Survey, along with the disaster hazard data and loss assessment for each facility.

#### **4.5.2 GeoRisk Philippines**

The Geospatial Information Management & Analysis Project for Hazards & Risk Assessment in the Philippines (GeoRisk Philippines) is an initiative made by the Department of Science and Technology (DOST) and PHIVOLCS, with the participation of several other government research institutes, to provide hazard maps and natural disaster information on the web/ via application. Under the NDRRMP, hazard maps and information have already been provided on the web, but with the launch of GeoRisk Philippines, the various natural hazards applicable to the Philippines can now be accessed from a single location using common indicators. GeoRisk Philippines<sup>80</sup> is composed of the following four components: HazardHunterPH, which identifies major natural hazards at a given location and automatically generates a hazard assessment report; GeoMapperPH, which allows agencies to register data on natural hazards and affected populations and facilities in the system (GeoMapperPH, which is not available to the public.); GeoAnalyticsPH, a system that provides an analysis of the area, facilities, and population affected by natural hazards in a specified administrative area.

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<sup>80</sup> <https://georisk.gov.ph/>



Figure 4-2 The 4 components of GeoRisk Philippines

GeoRisk Philippines will serve as the central source of information for the Philippine government on natural disaster risks and their assessment, with the objective of encouraging an increase resilience of the Philippines to natural disasters. The target audience is not only the government and local governments, but also real estate developers, property owners and buyers, real estate investors, local residents and communities, etc. GeoRisk Philippines is aimed to be used for various aspects of social activities.

As for the use of GeoRisk Philippines in the insurance industry, the IC has issued a Circular (IC Circular letter No. 2020- 83<sup>81</sup>, dated August 5, 2020) recommending non-life insurance companies to adopt and use the GeoRisk Philippines for risk assessment of insurance products that cover natural disasters. Regarding this, IC has also made the following comments to the newspaper article<sup>82</sup>.

This government initiative can serve the non-life insurance industry in assessing risks for earthquake, flood, and other natural calamity-related insurance products. While not exactly providing catastrophe risk modelling, it would clearly identify risks sufficient to support initial underwriting assessments. "

The premium rate table currently used by GSIS was developed by a committee established under the IC in 1997. While it is not directly comparable to the risk assessment in GeoRisk Philippines, which integrates the latest findings of the Philippine governmental technical agencies, for earthquake, flood, and typhoon hazards, the hazard risk classification of the premium table is not in line with the hazard assessment in GeoRisk Philippines. It would be

<sup>81</sup> "Dissemination of Information on the GeoRisk Philippines Initiative as an Underwriting Tool For Non- Life Insurance Companies"

<sup>82</sup> <https://businessmirror.com.ph/2020/09/01/the-georisk-philippines-initiative/>

reasonable for GSIS, which administers public insurance, to align the evaluation base for natural disaster hazards with that in GeoRisk Philippines when changes its premium rates to a risk-based system.

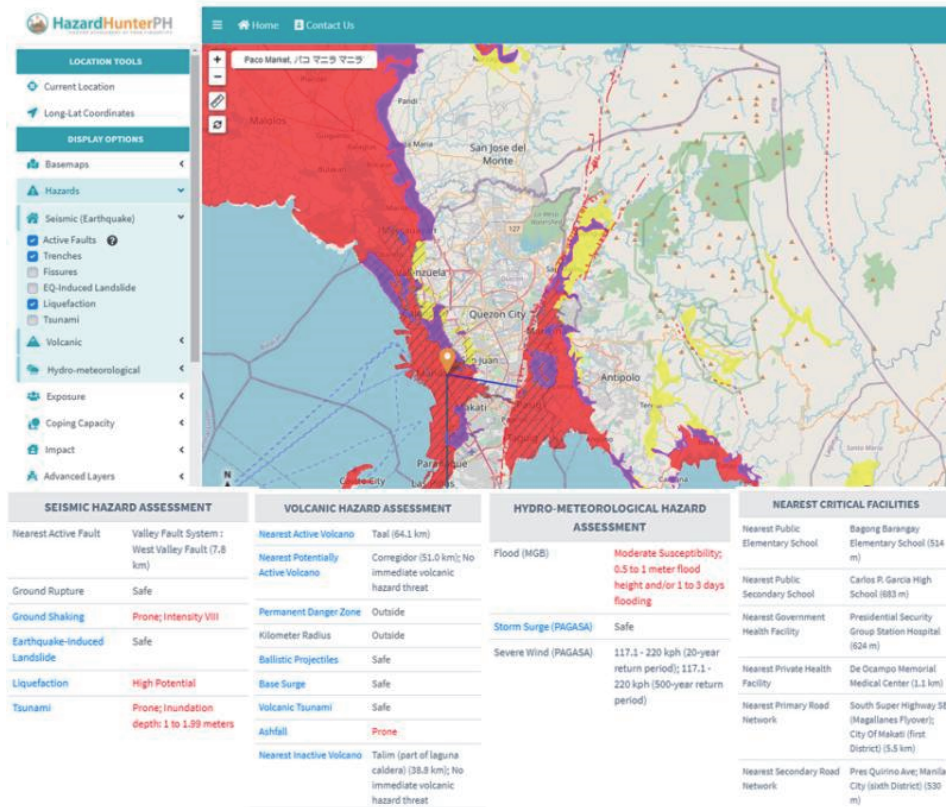


Figure 4-3 GeoRisk Philippines, screenshot of hazard map and assessment result

Table 4-2 Major hazard indicators and exposure information available on GeoRisk Philippines Hazard Hunter

Hazard		Assessment output	Original data
Category	Subcategory		
Earthquake	Ground rupture	Distance to nearest fault (name of fault, distance)	DOST-PHIVOLCS
	Ground shaking	Modified Mercalli Intensity Scale (10 levels)	
	Liquefaction	Risk of liquefaction (3 levels), intensity (4 levels)	
	Landslide	3 levels	
	Tsunami	Inundation area, 7 levels ranging from less than 1m to more than 6m	
Flood	Inundation risk	4 levels, days affected	DENR-MGB
	Inundation depth (m)	0-0.5m, 0.5m-1.0m, 1.0m-2.0m, more than 2.0m	
Wind	Peak gust wind	20 year, 500 year return period	DOST-PAGASA
	Storm surge	Storm surge height (4 levels according to PAGASA)	
Volcano	Nearest active volcano, kilometer radius, permanent danger zone, lahar, lava flow, pyroclastic flow, volcanic tsunami		DOST-PHIVOLCS
Exposure		Information on nearest critical facilities including name, type and distance from specified location	

## 4.6 Proposal on the new Risk-based Premium Rate Calculation System

### 4.6.1 Transitional measures

Since GSIS underwriting is conducted at both the head office and various branch offices, it is operationally difficult to individually and uniformly calculate premium rates using the loss assessment model for a large number of policies. The current GSIS natural disaster premium rate calculation categories can be subcategorized from a risk-based perspective and reflected in the premium rates to create a risk-based premium rate scheme. The adequacy of the current premium rates and their deviation from the risks will be analyzed using the commercial-based loss assessment model used in the insurance market along with the Risk-Based Premium Rate Tool for Metro Manila to develop a risk-based premium rate table. In addition, GSIS's historical loss data will be used as a reference to establish premium rates for each type of risk.

- Risk-based premium rates based on disaster hazard and facility vulnerability subcategories.
- Analyze the adequacy and deviation of the rate classifications of the current premium rates using the loss assessment model. Reflect the findings to into the classification indicators and subcategories, and establish the risk-based premium table.
- Provide rationale for the difference between the current premium rate and the proposed rate for each risk subcategory.
- Ensure that introduction of risk-based premium rates can be made without significant

changes to the GSIS's current underwriting processes, which is followed by its sales branch offices across the Philippines.

- Provide the premium rate calculation system with a function that automatically selects the appropriate risk subcategory based on the revised insurance application form and established manual.

Thus, we believe that it is feasible to update the current GSIS premium rate table to reflect the risk-based approach and to introduce risk-based premiums in a manner that does not significantly change GSIS's current underwriting procedures.

### **Insurance premium rate by subdividing and optimizing risk categories**

Risk analysis will be conducted using a loss assessment model to analyze the adequacy of the current premium rate and its deviation from the risk analysis. At present, we believe that the current premium rate table does not adequately represent the underwriting risk due to the following reasons.

- For typhoons and floods, rates differ in six regional zones, but there are no categories that account for vulnerability of facilities subject to the hazard.
- Factors affecting flood risk include the height of the ground level relative to the surroundings of the facility and the difference in elevation from the river, but these are not reflected in the premium and the premium rate is the same within each regional zone.
- Earthquakes are classified into two regions, and the rate varies depending on the number of floors of the building, but there is no classification based on the construction year (compliant building standard) or construction type, which greatly affects the degree of damage.
- In the 1997 edition of IC tariff, there was a 10-fold difference between Zone 1 (0.015%: Southern Philippines) and Zone 6 (0.150%: Philippine Eastern Coast). In 2013, GSIS issued an internal bulletin (Bulletin No. 12-1383, dated December 11, 2013) revising the rates of Zone 1 and Zone 2 to 0.025%, thus reducing the difference by a factor of six.

With the efforts of the Philippine government and the cooperation of donors and other organizations, a number of natural disaster risk assessment platforms, including GeoRisk Philippines, are now available. After collecting and utilizing these data, risk categories (categories related to disaster hazards and categories related to the vulnerability of facilities to hazards) will be developed according to the GSIS underwriting procedures, and premium rates will be established based on these risk categories.

The risk classification for earthquakes, typhoons, and floods is determined using a certain threshold as the "basic risk classification" according to the main risk of each hazard. For allied hazards, the risk classification for each hazard is determined by adding "risk adjustment"

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<sup>83</sup> "Uniform fire and allied peril premium rate for home offices and branch offices"



according to the condition. As for the vulnerability of facilities to the hazards, the "basic risk classification" is based on indicators that usually affect the strength of facilities, such as building type, occupancy, and construction year. In addition, "risk adjustment" is added for indicators such as roof structure and the condition of non-structural members, which can affect the vulnerability of facilities depending on the type of hazard. The system will use these matrices to calculate premium rates. In addition, the system will be able to evaluate the risk category and premium discount rate based on the status of disaster prevention efforts, including protection of human life, such as disaster prevention activities and disaster response preparations by policyholders.

The system will, to the greatest extent possible, utilize information from the indicators used by the Philippine government, such as GeoRisk Philippines and its sources, and DREAM/NOAH project website, for the data required to assemble the risk categories. The missing data such as vulnerability indicators of the facilities will be supplemented by the use of loss assessment models developed by the private sector and field surveys. Table 4-3 shows the proposed risk categories and data sources. Figure 4-4 shows an image of the premium rate calculation by risk category.

The current coverage for earthquake, wind, and flood allied to fire insurance does not cover disasters that occur in conjunction with earthquakes, such as tsunami, liquefaction and landslide, and heavy rains. Therefore, from the perspective of enhancing natural disaster insurance, the GSIS should consider expanding the scope of coverage and revising the terms and conditions accordingly.

Depending on the results on the adequacy of the current premium rates and deviation from the risk analysis, it is assumed that the total amount of overall premiums will remain unchanged from the current status and the current amount of premium will be reallocated according to the subcategorized risk categories in order to minimize the financial impact on GSIS and the financial burden on the policy holders. This proposal will need to be revised if the findings were to show that the adequacy of the current premium rate and the results of risk analysis to be far from expected.

Table 4-3 Indicators and data sources on hazard risk and facility vulnerability risk for determining premium rates

Hazard	Premium Incorporation method	Hazard risks		Facility-related vulnerability risks		
		Hazard type	Data source	Indicators	Reference	Data source
Earthquake	Basic risk categories	<ul style="list-style-type: none"> <li>probabilistic ground motion</li> <li>Distance from fault</li> <li>Location, region</li> </ul>	<ul style="list-style-type: none"> <li>GeoRisk Philippines</li> <li>PHIVOLCS REM</li> <li>Insurance application form</li> </ul>	<ul style="list-style-type: none"> <li>Construction type</li> <li>Construction year</li> <li>Seismic retrofit</li> </ul>	<ul style="list-style-type: none"> <li>Major building types (GMMA RAP)</li> <li>Seismic standard edition (4 categories: 1974, 1993, 1992, 2021)</li> </ul>	<ul style="list-style-type: none"> <li>UP/GMMA RAP</li> <li>NSCP</li> <li>HAZUS</li> <li>Certificate of Completion for Seismic Retrofit</li> </ul>
	Risk adjustment	<ul style="list-style-type: none"> <li>Landslide</li> <li>Liquefaction</li> <li>Tsunami</li> <li>Volcano</li> </ul>	<ul style="list-style-type: none"> <li>GeoRisk Philippines</li> <li>PHIVOLCS REM</li> </ul>	<ul style="list-style-type: none"> <li>Occupancy</li> <li>Number of floors</li> <li>Regional characteristics</li> <li>Non-structural members</li> </ul>	<ul style="list-style-type: none"> <li>NBC, NSCP occupancy categories</li> </ul>	<ul style="list-style-type: none"> <li>UP/PHIVOLCS</li> <li>HAZUS and loss assessment models</li> <li>Insurance application form</li> <li>Additional survey</li> </ul>
Typhoon	Basic risk categories	<ul style="list-style-type: none"> <li>Wind categories (20-year, 500-year event)</li> <li>Wind speed zone</li> <li>Typhoon frequency</li> <li>Location, region</li> </ul>	<ul style="list-style-type: none"> <li>GeoRisk Philippines</li> <li>PAGASA</li> <li>NSCP</li> <li>NOAA</li> </ul>	<ul style="list-style-type: none"> <li>Construction type</li> <li>Construction year</li> <li>Roof construction</li> <li>Occupancy</li> </ul>	<ul style="list-style-type: none"> <li>Major building types (GMMA RAP)</li> <li>NBC, NSCP occupancy categories</li> <li>Roof shape, roof frame structure</li> </ul>	<ul style="list-style-type: none"> <li>UP/ GMMA RAP</li> <li>NSCP</li> <li>HAZUS</li> </ul>
	Risk adjustment	<ul style="list-style-type: none"> <li>Storm surge</li> <li>Surrounding land use</li> </ul>	<ul style="list-style-type: none"> <li>GeoRisk Philippines</li> <li>PAGASA</li> <li>NAMRIA</li> </ul>	<ul style="list-style-type: none"> <li>Number of floors</li> <li>Roof repair</li> </ul>	<ul style="list-style-type: none"> <li>Repair method (Roof frame, roof securement)</li> </ul>	<ul style="list-style-type: none"> <li>Insurance application form</li> <li>Roof repair records</li> </ul>
Flood	Basic risk categories	<ul style="list-style-type: none"> <li>GeoRisk inundation depth</li> <li>Flood return period</li> <li>Location</li> </ul>	<ul style="list-style-type: none"> <li>GeoRisk Philippines</li> <li>UP LiPAD</li> <li>UP DREAM</li> <li>UP GMMA RAP</li> <li>Loss assessment model</li> </ul>	<ul style="list-style-type: none"> <li>Construction type</li> <li>Occupancy</li> </ul>	<ul style="list-style-type: none"> <li>Major building construction type</li> <li>NBC, NSCP occupancy categories</li> </ul>	<ul style="list-style-type: none"> <li>UP/GMMA RAP</li> <li>HAZUS and loss assessment models</li> <li>Additional survey                             <ul style="list-style-type: none"> <li>Schools: Previous Survey</li> <li>Hospitals: on-site survey</li> <li>Office: UP data</li> <li>Other special facilities</li> </ul> </li> </ul>
	Risk adjustment	<ul style="list-style-type: none"> <li>Distance from river and difference in elevation</li> <li>River levee</li> <li>Microtopography</li> </ul>	<ul style="list-style-type: none"> <li>GeoRisk Philippines</li> <li>LiPAD</li> <li>Insurance application form</li> </ul>	<ul style="list-style-type: none"> <li>Basement</li> <li>Utility located within flood depth</li> <li>Flood resistant system</li> </ul>	<ul style="list-style-type: none"> <li>Priority</li> </ul>	<ul style="list-style-type: none"> <li>Insurance application form</li> </ul>

Note: Vulnerability assessment of facilities to hazards and data that the assessment is based on may be obtained from DPWH, research institutes under DOST and NDRRMC, etc. The possibility of collecting such information from these sources should be considered.

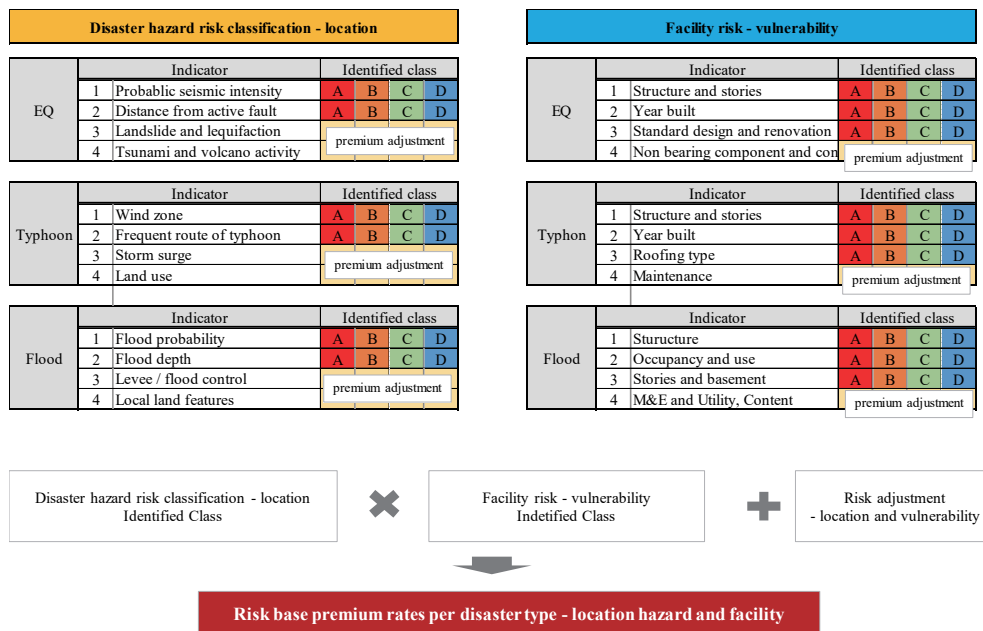


Figure 4-4 Calculation of premium rate using risk categories

#### 4.6.2 Development procedure for the new Risk-based Premium Rate Calculation System

The development phases of the new Risk-based Premium Rate Calculation System is proposed as follows.

(1) Draft an implementation plan

An implementation plan for the new Risk-based Premium Rate Calculation System will be will be drafted according to the proposed development plan. Specific processes are as follows:

- ① Determine the scope of insurance contracts and assets to be covered.
- ② Examine the adequacy of the current premium rate and its deviation from the current disaster risk situation. Specifically, the adequacy and deviation of premium rates from the actual risk condition for each regional category will be examined using the loss assessment model. In addition, the Risk-Based Premium Rate Tool for Metro Manila will be used to examine the necessity of diversifying risks within the regions of an existing category. The results will be used as data for risk subcategories. The findings in this section will be reflected to the implementation plan.
- ③ Re-confirm the feasibility of collecting the necessary data identified above, and reflect in the changes to the implementation plan.
- ④ The implementation plan will also be drafted by utilizing data from NARS system and/or the GSIS insurance contract list. The draft plan will have to be approved by GSIS.

(2) Collect and analyze data

Collect data identified in the development plan (draft), organize the contents, and examine whether and how to reflect the data in the new Risk-based Premium Rate Calculation System. Alternative solutions will be considered for missing data.

(3) Design new risk-based premium rates to fully reflect the risks

① Select of indicators for disaster hazard and facility vulnerability and risk subcategories

The current premium rate categories for natural disaster compensation to the fire insurance will be reviewed and subcategorized into subcategories based on indicators related to the hazard and vulnerability of facilities. The subcategorization by type of coverage will be made in accordance with Table 4-2.

② Calculate of total insurance premiums using the current premium rates

Estimate the total premiums for each type of natural disaster coverage for all facilities on the GSIS list of insured facilities or for a certain number of sampled facilities. A base premium rate (average rate) should also be calculated from the total amount of insurance.

③ Set tentative new risk-based premium rates for natural disaster (earthquake, flood, and typhoon)

Assign tentative risk-based premium rates for natural disaster using the matrix of risk categories (hazard categories and facility vulnerability categories) subdivided in ① and referencing the base premium rate (average rate) calculated in ②. The new risk-based premium rate will be determined after reviewing to the results of the study on the adequacy of the current premium rate conducted in ① and will be finalize after comparing with the total premium.

④ Assign tentative new risk-based premium rates for natural disaster (tsunami, liquefaction, storm surge)

Establish premium rates for tsunamis, liquefaction and storm surge induced by earthquakes, typhoons and floods by referencing the loss assessment model (commercial model) and the Metro Manila loss assessment model developed in the Previous Study.

⑤ Review and adjust the new risk-based premium rates determined in ③ and ④

Compare the total premium calculated using the tentative risk-based premium rates from ③ and ④ with the current total premium calculated in ②. Review the data from (2) and the balance of premium from each region to review the adequacy of the proposed premium rate. The premium rate will be adjusted for consistency with the premium rates assessed by the loss assessment model (commercial model).

⑥ Finalize the proposed new risk-based premium rate table

Compare the current and proposed new premium rates for individual insurance contracts and finalize the risk-based premium rate after sorting out the results and impacts and in consultation with GSIS.

(4) Develop and test of the new Risk-based Premium Rate Calculation System

Whether or not to integrate the new risk-based premium rate system with GSIS's General Insurance Information System (GIIS) for automatic acquisition of input data will be decided after consultation with GSIS. Due to system security consideration of GIIS, its development should be coordinated with the Information Technology Service Group (ITSG), Information Security Office (ISO), and Controller Group. The development of this system will require the project team to enter into a Non-Disclosure Agreement, thus relevant processes should be discussed with the Legal Department. A trial run of the system will also be conducted in this phase.

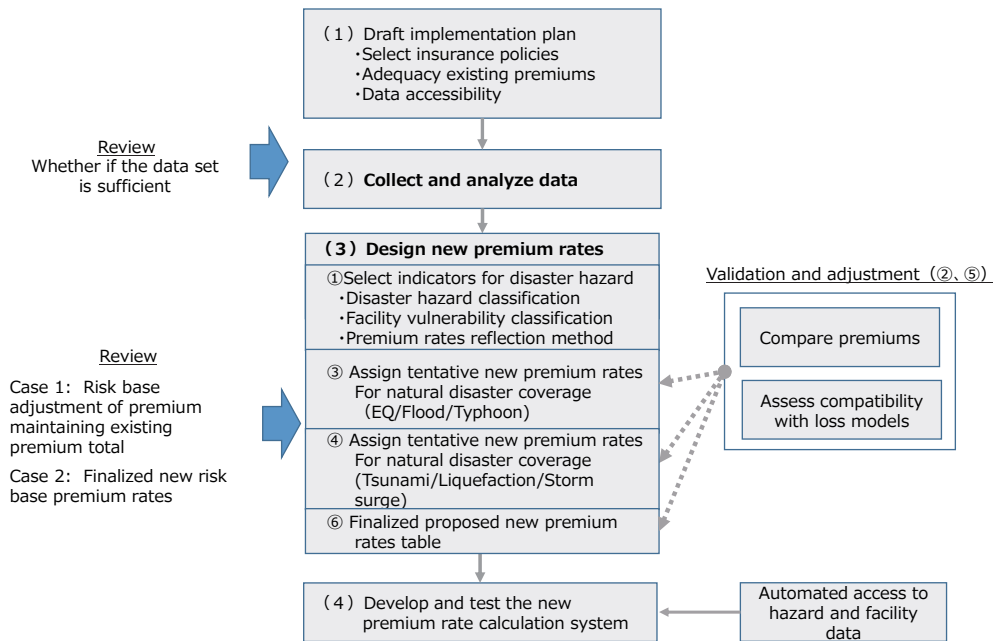


Figure 4-5 Flow of the new Risk-based Premium Rate Calculation System development procedure (1) to (4) correspond to Section 4.6.2

The estimated costs (equipment) required to develop this system are summarized in Table 4-4. Note that the following is only a rough estimate of the model user fee (license fee), as the amount is based on various factors such as the scale of the user's services, the target region, etc.

Table 4-4 New Risk-based Premium Rate Calculation System Development Costs  
(Equipment)

Items	Estimated cost
Loss Assessment Model (Earthquake) user fee	Approximately 2B JPY
Loss Assessment Model (Flood, Typhoon) user fee	Approximately 3B JPY

## **5 Review of transitioning to the new risk-based premiums**

### **5.1 Steps for transitioning to the new risk-based premiums**

The insurance department of GSIS has been established and operated under RA 656 (Public Insurance Law) and the amended Presidential Decree No. 245, and is not subject to the insurance administration rules by the DOF or IC. It is not regulated by the IC in the same way as private insurance companies are. Therefore, GSIS has the discretion to determine and revise premium rates within the scope of its obligations under these laws and regulations, and its internal rules. With regard to natural disaster premium rates, GSIS has made partial changes to the premium rate table for typhoons and floods in December 2013 by issuing an internal notice (GSIS Underwriting Bulletin No. 12-13, dated December 11, 2013).

Within GSIS, underwriting operations are conducted in accordance with the Manual of Operations (MOOs), as described in 3.2. If GSIS were to change its current premium rates to the new risk-based premium rate, the changes to underwriting methods will need to be added to the MGI. Changes to the MOOs will have to be submitted in the form of a resolution. Since this is a significant change, the following approval process will be required.

- Collect and reflect comments from the management
- Obtain approval from risk oversight committee
- Obtain approval from the Board of Trustees
- Issue a Board of Resolution

After the proposed new risk-based insurance premium rate table has been prepared, the adequacy and rationale of the rates and the impact of the results will be discussed with GSIS. Once consensus has been reached within GSIS, the project team will proceed to draft a report required for the above approval process and obtain approval. After receiving the approval, the project team will proceed with the development of the new premium rate calculation system while preparing a system development report by sorting out the results obtained in the development process. This report will then be submitted to go through the above process and the final premium rate will be authorized to be applied in the underwriting.

In addition, a manual for the new rate calculation system will be developed. The concept and design of the new premium rate should be detailed in the manual. The introduction of this new system should be complemented with an introductory training.

The introduction of this system will require actions other than the development of the system and obtaining approval within GSIS. These actions are as follows.

- Prepare a development report: the contents should include:
  - Verification results on the adequacy of the new insurance premium rate and its impacts
  - Basis for calculating the new premium rate, scope of application, and limitations

- Specifications of the new premium rate calculation system and how to update it
- Information sources
- Operational impact and challenges
- Outline of the training program and training results
- Prepare a revised insurance application form to obtain the required data from the insured facility for the new premium rate calculation system
- Develop a new premium rate calculation system manual
- Develop and implement a training program based on the manual(\*)

(\*)Manuals, training materials, and training programs will be developed jointly with the Insurance Group. The technical assistance project plans to provide training to the Insurance Group (about 10 participants) and to support the Insurance Group in deploying this new system to all GSIS offices across the Philippines.

The sequence of actions is shown below.

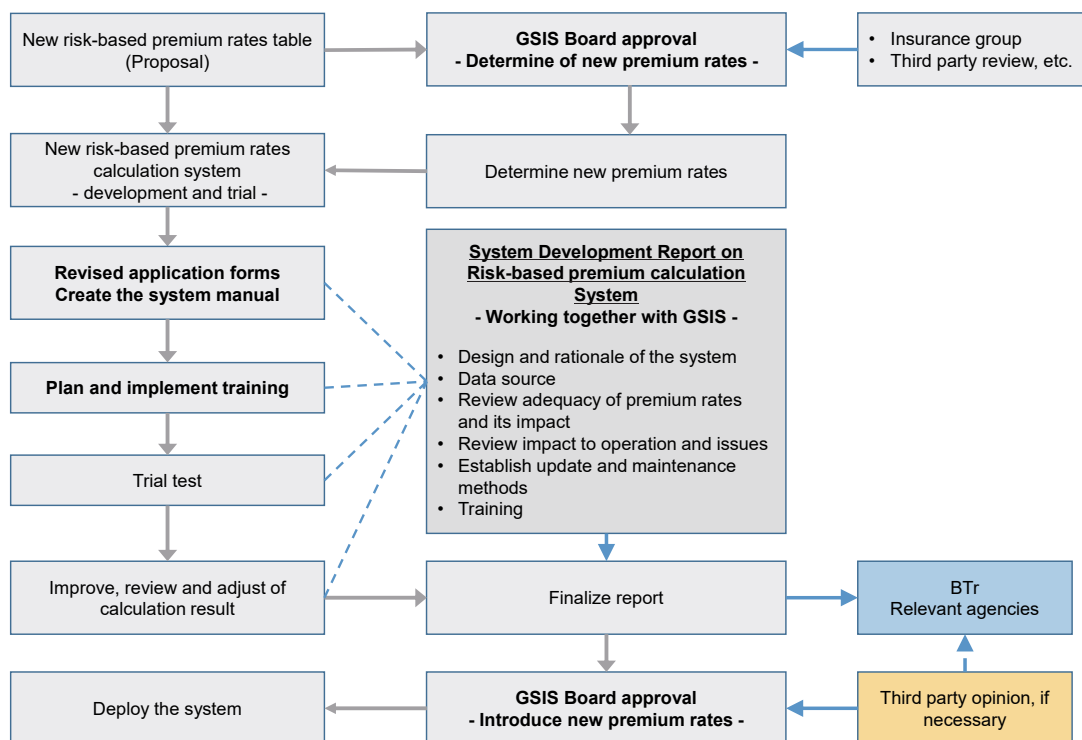


Figure 5-1 Flow introducing the New Risk-based Premium Rate Calculation System (after the proposed rate table has been developed)

## 5.2 Considerations on transitioning to the new risk-based premiums

- **Consideration of concerns about retention in practice**

According to the GSIS insurance department, while a necessity of having a risk based premium is generally agreed at the management level, there are concerns on whether the



actual underwriting practice will be able to keep up with application. This is due to the fact that GSIS has 54 branches, each of which is responsible for underwriting in its own region. When a new system is to be introduced, it will be necessary to ensure that the new concept and underwriting method is fully disseminated to the underwriters in each region so that the operation can be firmly and uniformly established within GSIS.

**【Corresponding actions】**

Having a uniform response across the Philippines is an important matter for GSIS, thus the Risk-based Premium Rate Calculation System shown in 4.6 was developed with this in mind.

By making significant changes to the current premium rate table system, the premium rates will be in line with the hazard risk and the vulnerability of the facilities, in addition, incorporating functions such as the automatic acquisition of data from GeoRisk Philippines and insurance application forms and the automatic selection of risk categories will facilitate uniform operation within GSIS. The Marketing Department is also currently engaged in activities to expand underwriting, known as "Insurance Caravan," and the sales staff in charge of these activities should be fully informed of the risk-based approach and the new premium rates. In order to fully inform and promote understanding of the risk-based approach and the new premium rates among the sales staff, a training manual will be prepared as mentioned above, and a training program will be implemented in consultation with GSIS. For the implementation, in order to follow the GSIS's method and internal rules, the technical assistance project will prepare training materials and programs and provide training to the Insurance Group; the deployment of the system to GSIS's offices across the Philippines is expected to be done by the GSIS.

In terms of the order of implementation, GSIS has indicated that underwriters and sales staff across the Philippines should first be made thoroughly aware of and understand the new system through trainings, etc., and that the practical aspects of the system should be improved before proceeding with the transition procedures as shown in Figure 5-1.

• **Financial considerations for GSIS and the insured**

Currently, GSIS's financial condition is well maintained, as confirmed in 3.1. On the other hand, GSIS's financial condition is expected to change in the future due to the government's current policy on promoting insurance, and it will be necessary to reduce the financial impact from government policy and changes to the premium rates.

There is also talk from the national and local governments, the owner of public assets, that they are unable to promote insurance coverage due to lack of budget availability. Under these circumstances, an overall increase in insurance premiums based on commercial models may lead to a distrust of insurance before it can provide incentives for risk-based disaster

mitigation.

**【Corresponding actions】 :**

As described in Section 0, the total amount of overall premiums may remain unchanged from the current amount, instead the current total amount will be reallocated according to the risk subcategories. This is assumed to minimize the financial impact on GSIS and the financial burden on the insured. If the verification on the adequacy of the current premium rate and the results of the risk analysis do not go as expected, the plan will need to be revised, and the direction will be decided after consultation with the GSIS and other relevant organizations during the phase for verification of the new premium rate scheme in Section 4.6.2. The GSIS have been informed above the above items and agrees to make adjustment as the project moves forward.

• **Considerations for GSIS mandates**

GSIS is the only insurance company that provides non-life insurance to public assets and has extensive powers. On the other hand, COA, as the government's audit agency, conducts an annual audit of GSIS's operations and compliance with laws and regulations, and issues an annual audit report that includes financial statements and their analysis on risk management, observations, and recommendations, which is available on the COA website<sup>84</sup>.

In the 2018 Audit Report, which is currently posted, it is noted in the observation section that the Parametric Natural Catastrophe Insurance for Local Governments, introduced in 2017 and 2018, was designated as an insurance product offered by GSIS, and it pointed out that the amount of claims paid for two years' worth of typhoons and earthquakes was very low (less than 5% of premiums for two years) in comparison to the premiums paid by the government. The issue on the cost-effectiveness of the parametric insurance contract was raised in the report.

It was also pointed out that the procedures for introducing this insurance scheme were inadequate under the law. Aside from the cost effectiveness of insurance, it is important to note that the operation of the GSIS is subject to the COA's surveillance, which includes the development and implementation of risk-based premium rates within the scope of work mandated by RA 656 and related laws and regulations, and the implementation of disaster mitigation promotion schemes and insurance incentives based on risk-based premiums. GSIS did not comment on this, but it is a matter that should be taken into account in this Survey.

**【Corresponding actions】**

Incentive schemes such as DDR certification, proposed based on risk-based premiums,

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<sup>84</sup> As of June 15, 2021, audit reports up to FY2018 audit report have been posted and available for download. <https://www.coa.gov.ph/index.php/gov-t-owned-and-or-controlled-corp-goccs/2018/category/7682-government-service-insurance-system>

will be established in parallel with the development of a risk-based premium rate calculation scheme. The GSIS Underwriting Department has a risk engineering team that provides technical support for risk assessment of facilities, but currently its main task is to survey for risk engineering report to be submitted to the reinsurers in the procurement process. The participation of this engineering team to the incentive schemes will be crucial. As GSIS is keen to strengthen its engineering team, this Survey proposes to also provide training support to enhance its capacity to conduct risk prevention surveys in the field of natural disaster insurance. In addition, these capacity buildings will also facilitate the recognition of the concept that the disaster prevention incentive system is also within the scope of the GSIS mandate on public insurance. The GSIS commented that currently the proposed DRR Certification and other risk reduction incentives are outside the scope of its mandate. Arrangement will be necessary to ensure consistency with the mandate and enhancing current operation capacity before moving forward with the proposed incentives. It will be necessary to make adjustments.

- **How to use the insurance mechanism to motivate disaster reduction measures**

Non-life insurance is a mechanism that compensates for the cost of restoring a facility damaged by a disaster or accident to its condition immediately before the loss, in exchange for an insurance premium. Therefore, in principle, insurance does not cover the additional cost of restoring a facility to become more resilient to disasters, which will be different from its state prior the loss. In reality, however, the strength of the facility against disasters is increased because the repaired areas are restored using new building standards and new materials. As for earthquakes, the strength of old buildings will be increased when they are restored to comply with the new structural standards. New roofs that have been damaged by high winds will be more resistant to high winds as deteriorated joints and roofing materials are replaced.

On the other hand, with respect to flooding, the flood exposure of the site cannot be removed through structural enhancements of the facility. The flood risk itself cannot be significantly reduced without relocation of the facility or raising the asset to a higher elevation, or by implementing local flood control. Under the GSIS's policy, even if a facility is relocated and restored, the cost of restoration equivalent to the loss will be covered. Under the GSIS policy, the cost of restoring a facility to a different location is covered by the insurance, but since the structure of reinforced concrete buildings, which account for most of the public assets, are unlikely to sustain severe damaged in flood disasters that do not involve landslides, restoring the facility at its original location will not reduce the flood risk itself. Some argue that if the cost of repairing damage caused by floods is covered by insurance, policyholders will not be motivated to relocate to a less flood-prone location, and the existence of property insurance may contribute to perpetuation of flood risks.

**【Corresponding actions】**

There are limited actions that policyholders can take on their own to reduce future flood

risks. Reduction of flood risk must be done through reviewing of local flood control and land use plans. In this regard, the U.S. Federal Flood Insurance Program is effective in that it clearly defines the role of local governments, such as reviewing land use plans. However, while the GSIS is an insurance company for public assets, it does not cannot have as such authority to impose this type of role on local governments. Most of the facilities insured by the GSIS are owned by local governments, and many are public service facilities such as schools, hospitals and municipal buildings. The role of insurance is crucial to restoring these facilities quickly after a disaster. As the municipalities have the authority to change land use plans, introduction of the risk-based premium can help the municipalities visualize their risk through their premiums. In addition, the inclusion of past loss history in the adjustment of premium rates will be considered.

From the perspective of making facilities more resilient to disasters during post-disaster recovery, the possibility for GSIS to expand its insurance to provide additional coverage (e.g., strengthening roofs post- disaster) should be considered, while preserving the aforementioned insurance principles. This is described in "7.4 Review of other incentive programs" ②Endorsement for natural disaster risk and ③Reduce insurance deductible for roof damage.

## **6 Proposal for developing a Replacement Cost Appraisal System**

### **6.1 Objectives of a Replacement Cost Appraisal System**

In property insurance, market value, replacement cost, agreed value, etc. are used to determine the insurance value of the insured property. GSIS's insurance contracts use replacement cost as the sum insured and as the basis for assessing insurance claim payments in the event of a loss. The policyholder is to present the replacement cost to GSIS as the sum insured when applying for insurance.

The replacement cost is the cost required to newly build, purchase, or acquire an asset with similar characteristics to the insured asset at the time of loss. Definitions of terms related to replacement cost are provided in Table 6-1. Therefore, an insurance contract using the replacement cost enables the policyholder to restore the property to its original state without incurring additional costs in the event of an insured event, provided that the sum insured is set adequately (excluding deductibles and other out-of-pocket expenses).

On the other hand, in the Previous Survey, there were many cases where, the acquisition cost or the book value after deducting depreciation was used directly as the insured value when signing the insurance contract. In this case, when the loss adjuster assesses the sum insured to be lower than the replacement cost at the time of loss, the insurance payment will be reduced by the average clause in the policy on partial insurance. If the insurance payment is reduced, the amount will not be enough to restore the asset. Partial insurance, such as in this case, will require the policyholders to borne additional cost after the loss and thus reduces the original function of disaster financing, which is to restore public assets. In such a partial insurance situation, the policyholder itself is required to contribute additional costs after the disaster, which reduces the original function of original function of disaster risk financing, namely disaster recovery of public assets, and makes room for improvement.

Private insurance companies are free to make their own decisions on underwriting; therefore, they can refuse to underwrite a policy if they consider the replacement cost, or the sum insured, presented by the applicant to be inadequate. On the other hand, GSIS underwrites insurance contracts under the compulsory insurance system based on RA656, and therefore, cannot turn away applications even if it judges that the replacement cost is inadequate. In addition, the information on assets collected at the time of underwriting is limited and insufficient to assess the adequacy of the sum insured. For this reason, this Study proposes a roadmap for developing a replacement cost appraisal system that supports the estimation of adequate replacement values, and identification of data that is mandatory for developing such system.

Table 6-1 Definition of terms related to replacement cost valuation<sup>85</sup>

Terms	Definitions
Sum insured	The maximum amount of coverage under an insurance contract.
Replacement cost	The amount required to repair or replace a damaged facility using equivalent new material of the same kind. Does not account for depreciation.
Insured value	The appraised value of the facility covered. In GSIS policies this value equals to the replacement cost.
Underinsurance	A policy under which the sum insured is less than the actual value (insured value) of the insured items (buildings, household effects, etc.). The term refers to a policy under which the sum insured of each of the insured facilities is less than the replacement cost.
Appraisal	The task of assessing the insured value of the property to be covered. GSIS policies use the replacement cost as a benchmark for determining the insured value.
Deductible	The portion of the cost of damage borne by the policyholder.
Underwriting (U/W)	The examination, acceptance, or rejection of an insured risk, and classification of that risk in order to charge an appropriate premium (if accepted).
Blanket policy	An insurance policy covering multiple properties in a single or multiple different locations.
Sublimit	One of the clauses in insurance policy, a limitation in an insurance policy on the amount of coverage available to cover a specific type of loss.

## 6.2 Development of NARS and the Position of the Development of the Replacement Cost Appraisal System

The Philippine government's main objectives in developing the National Asset Registry System (NARS) is to collect information on its non-financial assets (public assets) to ensure that they are properly insured and utilize these information for asset management. The details of objectives are as follows.

- (1) Compile a comprehensive list and inventory of the national government non-financial assets
- (2) Acquire and maintain an asset IT/Database System for recording and updating the status of non-financial assets
- (3) For NARS to serve as a general repository of the national government asset information for fiscal and risk management

### 6.2.1 NARS Overview

As mentioned earlier, the asset data to be collected by NARS will be used for property insurance prioritization, risk modeling, asset performance management and etc. To do this, NARS will be composed of 3 modules: Insurance Prioritizing Module, Risk Modeling Module

<sup>85</sup> Source: created by the Survey Team based on the information from websites of Sompo Japan Insurance Inc., Loss Adjusters Association of Japan (LAAJ) and The Institutes

and Asset Lifecycle Module.

The asset data collected by NARS is classified into two categories: Initial Assets and Other Planned Assets, as shown in Figure 6-1. The data to be collected include geographical, financial, legal, insurance and other asset-specific information. These data are collected using an asset-specific Excel form created by BTr, and then compiled and stored into the Online Inventory System, which is currently under development. The Online Inventory System will serve as NARS' asset database, and the data will be analyzed and utilized by NARS. NARS, the system, is still in its development phase, it is planned to be accessible through both a web portal and a mobile application, so that it can be used not only within BTr, but also by other government agencies.

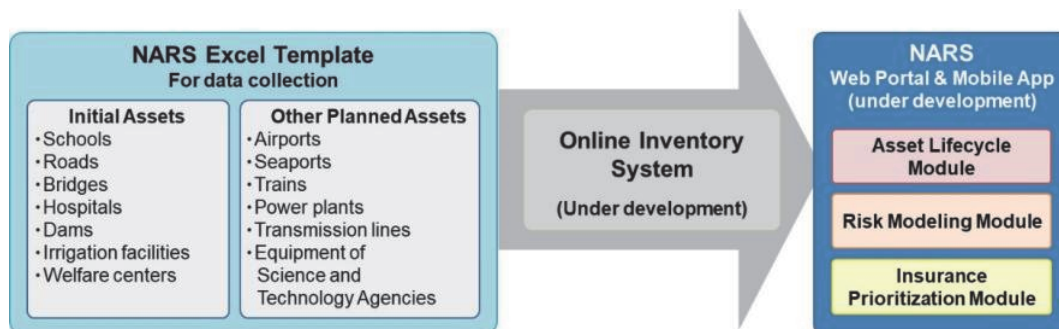


Figure 6-1 Overview of NARS<sup>86</sup>

The replacement cost appraisal system proposed in this Study is to be used as a tool for determining the replacement cost of target assets<sup>87</sup>. The replacement cost generated by this system will be used as a required input for both the Asset Lifecycle Module for asset lifecycle management and the Insurance Prioritization Module for managing insurance procurement.

## 6.2.2 Development process and current status

IAC's role on reviewing and updating policies on public assets has transferred to the Development Budget Coordination Committee Technical Working Group on Asset Management (DBCC TWG AM), established by DBCC Resolution No. 2019-4 (dated June 21, 2019). Thus, going forward the development of the NARS will be made jointly by BTr and DBCC TWG AM.

### (1) Progress in collecting asset information

The Asset Registry Division (ARD) is the unit responsible within BTr for the development of the NARS and for obtaining asset information from the various pilot agencies. As of the end

<sup>86</sup> Source: created by the Survey Team based on information provided by BTr

<sup>87</sup> Target assets refers to the assets covered in the proposed system

of 2019, ARD has obtained asset information on Initial Assets from five pilot agencies, namely DepEd, DOH, DPWH, DSWD, and NIA. ARD is still in the process of collecting asset information and will continue to confirm and update these information.

Currently, the input of asset information into NARS was made by requesting each agencies to fill out and submit the NARS Asset Template in Excel form (an example of input items is shown in Table. NARS will soon be launching its web portal, which will allow agencies to input their asset information directly into the system. In addition, the web portal will allow the upload of multiple sets of asset data from the existing asset ledger, which makes the data collection process much easier.

Table 6-2 NARS' s progress in collecting asset information

Asset type	Assets covered	Progress
Initial Assets	Schools, roads, bridges, hospitals, dam, irrigation facilities, and welfare facilities	As of May 2021, NARS has an asset data count of approximately 530,000 in its system. These include public assets from the 5 pilot agencies (DepEd, DOH, DPWH, DSWD and NIA) and other agencies such as DICT and PSALM <sup>88</sup> . The collected assets include:
Other Planned Assets	Airports, ports, railroads, power plants, transmission towers, and equipment of Science and Technology Agencies	Schools (348,938 buildings), roads (33,119km), bridges (8,337), hospitals (268) and medical facilities (68), irrigation facilities and dams (247), transmission towers (1,580), and power plants (15).

Table 6-3 NARS asset information input items (Template for Building)<sup>89</sup>

Input information		Items
General information		Organization code, facility code, property type, asset name, property number, etc.
Location information		Region, province, municipality, barangay, PSGC/Grgy Code, street, subdivision, building number, latitude/longitude
Legal information		Owner, legal impediments, mode of acquisition, conveyance information, acquisition date
Financial information		Acquisition cost, net book value, accumulated depreciation, asset life, number of years of use, remaining life, sound value, assed value, appraised value, improvements/rehabilitation, replacement value
Insurance information		Sum insurable, insurance details, sum insured, premium
Technical specifications	General technical specifications	Building type, details, date constructed, area per floor, number of floors, total floor area, building footprint area, number of basements, number of mezzanines
	Materials	Walls, mezzanines, roofs, columns, joist/girders
	Mitigation measures	Number of fire extinguishers, number of sprinklers, number of fire hose, flood defense
	Status of use	Administrative office, kitchen/dining, living quarters/dormitory, research/training rooms, regular warehousing, academic classroom, library, conference room/, motor pool, etc.

<sup>88</sup> <https://www.dof.gov.ph/btr-inventories-p1-3-t-non-financial-govt-assets-in-2020/>

<sup>89</sup> Source: created by the Survey Team based on "NARS template 09052020- Per Asset" provided by BTR



## **(2) Development status of the web portal and mobile app**

The development of NARS's web portal is in charged by ARD and BTr's Management Information Systems Service (MISS) Department. The web portal will allow users to enter asset data directly on the web, thus is a successor application the current method of data collection using Excel forms. The web portal is currently under development and system trial run is currently being conducted with selected BTr regional and provincial offices. The web portal will be made available to external agencies after completion of trial runs within BTr.

At the time of this Survey, the functions of the web portal are limited to the input of asset information, but in the future, the system will incorporate functions that allows asset information to be imported directly from existing asset ledgers of relevant agencies and departments. Functions such as lifecycle asset management and integration with the above-mentioned modules are planned to be added in the later development stages according to the system development progress.

Information on the development progress of the mobile app was unavailable, but it is presumed that the mobile app will include the basic functions of the web portal, such as entering and viewing asset information.

## **(3) Development progress of the three modules**

At the current stage, NARS provides only basic functions for collecting asset information. The development plans for the three modules: Asset Lifecycle Module, Risk Modeling Module, and Insurance Priority Module, are still under discussion.

The development plans for the Asset Lifecycle Module and the Risk Modeling Module are being devised by BTr using the technical assistance report<sup>90</sup> from the WB. The development plan will be presented to the DBCC TWG AM for approval.

For the Risk Modeling Module, BTr would like to make use of the CRESTA zones for risk profiling. BTr is currently working with DOST for possible data sharing. CRESTA is an international geographic zoning system developed based on the needs of the reinsurance market on managing large number of facilities and insurance contracts. If facilities are to be underwritten individually, BTr may need to establish a more detailed regional zones or catastrophe hazard-based categories.

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<sup>90</sup> Public Asset Registry- Design for the Philippines and global good practices and technology trends, Contract #718855, Phase II Report, April 29, 2019 by Pricewaterhouse Coopers Pvt. Ltd., commissioned by the World Bank

## 6.3 Methods and approach for estimating replacement cost

In order to estimate the sum insured of an asset, we need to first estimate how much the asset is worth. As mentioned earlier, there are two ways to assess the value of assets in property insurance: using replacement cost or market value. This section will discuss the methods to estimate replacement cost for each type of asset.

### 6.3.1 Buildings

There are two common ways to estimate the replacement value of a building.

#### (1) Index method (acquisition cost method)

The index method uses the actual original construction cost of the building and the year it was built as the bases for estimating its cost.

$$\text{Formula: estimated new build cost} = \text{original construction cost} \\ \times \text{construction cost inflation rate}$$

If the original construction cost is known, then the index method can be used to estimate the building's cost today. However, if the building was purchased as used or if the original construction cost is unknown, then the building cost will be estimated using the following "new build unit cost method".

#### (2) New build unit cost method (square footage method)

The "new build unit cost method" estimates the building cost by multiply the floor area (square meter/square footage) of the building by the construction cost for that particular type of building.

$$\text{Formula: Replacement cost} = \text{Cost of new build} \\ = \text{region-specific construction unit cost} \times \text{total floor area} \\ \times \text{actual (or estimated) cost of ancillary equipment (as adjustments)}$$

Calculation of region specific construction unit cost will require the list of new build unit costs and the regional cost index.

The new build unit cost list is composed a list of model buildings (variations of a particular type of building) and the construction unit cost per unit area for each of the model buildings, which is established using construction cost data and the construction cost index.

The required information for the above two methods and possible information sources are summarized in Table 6-4.

### **6.3.2 Machinery / equipment (movable assets)**

Replacement cost of machinery/equipment (movable assets) can be estimated using the following two methods.

#### **(1) Direct method: obtain transaction price directly**

Obtain the transaction price of equipment from inquiring the manufacturers, trading companies, dealers and relevant organizations. Information required for the inquiry include the equipment model, application, manufacturer's name, model, specifications, etc. that can be obtained from the equipment ledger or fixed asset register.

#### **(2) Indirect method: estimate cost indirectly**

##### **① Estimation using similar products**

This method estimates the cost of the equipment by analyzing recent transaction (or market) price of equipment that are relatively similar in structure, model, specifications, etc.

##### **② Estimation using acquisition cost**

This method uses the original acquisition cost and acquisition year from the fixed asset register as the basis for estimation. The replacement cost is estimated by adjusting the original acquisition cost using the appropriate consumer price index (same process as the index method for buildings).

In Japan the information indices used for this method include the "Corporate Goods Price Index" published by the Bank of Japan and the "Construction Cost Deflator" published by the Ministry of Land, Infrastructure, Transportation and Tourism.

##### **③ Estimation using cost per unit output**

This method estimates the replacement cost using information on the rated output, capacity and other specification of the equipment and multiplying it by the average market price per unit output (or capacity).

The information required to estimate replacement cost using the above methods and ways to obtain these information are summarized in Table 6-5.

Table 6-4 Information required for estimating cost of buildings

Estimation methods	Information required	Collection methods
Index method (Acquisition cost method)	New build cost at the time of building construction	Obtain from fixed asset register. For the Philippines, this information can be obtained from NARS and GSIS's asset register.
	Construction cost inflation rate (Describes the price fluctuation from new build to present (time of appraisal))	The construction cost inflation rate (construction cost multiplier) is established by referring to indices such as the Consumer Price Index, the Producer Price Index, and the Construction Cost Deflator.  For the Philippines, the following indices can be obtained from PSA: Consumer Price Index (CPI) and Inflation Rate, Producer Price Index (PPI), Construction Materials Retail Price Index, Construction Materials Wholesale Price Index, etc.
New build unit cost method (Square footage method)	New build cost of model buildings	Establish construction cost per unit by referencing past data, construction costs and construction cost index.  Data on past new build cost per unit can be calculated from fixed asset registers.  Information on construction cost and construction cost index can be obtained from construction cost books (publications).
	Regional cost index	Compiled by referencing available construction costs and construction cost index.  In Japan, the construction cost indices published by the Construction Research Institute include city-specific index and inter-city disparity index.  For other countries, this information can be found in construction cost books (publications).
	Building area / floor area	Obtain from fixed asset register. For the Philippines, this information can be obtained from NARS and GSIS's asset register.
	Actual cost of building's ancillary equipment	Obtain from fixed asset register. For the Philippines, this information can be obtained from NARS and GSIS's asset register.

Table 6-5 Information required for estimating cost of movable assets

Estimation method	Information required	Collection methods
Direct method	Equipment type, application, manufacturer's name, and specifications	Obtained from fixed asset register.
	Transaction price	Obtain from manufactures, trading companies, distributors, and related organizations through direct inquiries.
Estimation using similar products	Equipment type, application, manufacturer's name, and specifications	Obtained from fixed asset register.
	Price of similar equipment	Obtain from manufactures, trading companies, distributors, and related organizations through direct inquiries.
Estimation using acquisition cost	Transaction price	Obtained from fixed asset register.
	Price fluctuation indices	Construction cost inflation rate is calculated using information indices such as Consumer Price Index and Corporate Goods Price Index For the Philippines, the following information indices are available from PSA: Consumer Price Index (CPI) and Inflation Rate , Producer Price Index (PPI), Construction Materials Retail Price Index , Construction Materials Wholesale Price Index.
Estimation using cost per unit output	Equipment specification (output, work capacity)	Obtained from fixed asset register.
	Average market price per unit output	Obtain price of similar equipment from manufactures, trading companies, distributors, and related organizations through direct inquiries and convert price into average market price per unit output

## 6.4 Identifying available data

From the methods of estimating replacement cost described in the previous section, the data required for cost estimation can be divided into three types: asset information, construction and equipment unit prices, and information indices.

The asset information captures the basic information and characteristics of the target asset. The construction unit price, equipment unit price, and information indices are essential to construct an asset unit price database (cost database). This Survey, we will identify and group the types of data necessary for the construction of the cost database. This section will also give examples of existing data sets such as asset information available to the public and asset registers of relevant agencies, and summarize which of these data can be utilized in estimating the replacement cost.

Table 6-6 Data required for replacement cost appraisal

Data type	Details	Use
Asset information	Information including asset name, occupancy, location, construction, etc.	Basic input information
Construction and equipment unit cost	Data on construction material cost, construction work cost, equipment cost, etc.	Reference for construction work cost
Adjustment indices	Regional Price Index and Inflation Index and similar statistical data.	Appropriately adjust the appraised value

### 6.4.1 Asset information

It is assumed that the basic information of the target assets can be extracted from BTr's NARS, which is currently under development, and asset registers of relevant agencies. Table 6-7 shows the asset registry systems that contains asset information on the target assets and the type of information can be obtained from these systems.

The asset information collected by NARS composes of the following 6 categories: General Information, Location Information, Legal Information, Financial Information, Insurance Information, and Technical Information. Out of the above 6 categories, the information that can be used for estimation of replacement cost are: General Information, Location Information, Financial Information, and Technical Information. Examples of the types of information that can be utilized in replacement cost are listed in Table 6-8.

General Information, Location Information and Technical Information will be used as input information (input data) for estimating replacement cost. The Technical Information can also be used as reference for establishing the model buildings (model types) in the new build unit cost method. Information from third-party appraisal cost and replacement cost from the financial information can be used as a reference when comparing with the replacement cost generated by the proposed system.

As mentioned in Section 2.1.3, "Improving Public Assets Insurance", GSIS also collects asset information from various government agencies and local governments in accordance with COA Circular No. 2018- 002<sup>91</sup> (dated May 31, 2018). This Survey was able to confirm that GSIS has received asset information for its insurance program for hospitals, but further details on the information submitted was not available. However, GSIS has indicated that it may be better to utilize NARS for asset information. The possibility of GSIS using NARS's will need to be confirmed during the development phase of the system.

Although this Survey assumes that the majority of asset information will be provided by NARS, in the event that obtaining information from NARS is difficult, the information can be obtained from the asset-owning agencies. In addition, the asset information can also be collected from the GSIS's insurance application form, once it is revised by adding additional items for input.



Figure 6-2 Operation screen and information available on the DPWH Atlas<sup>92</sup>

<sup>91</sup> Guidelines prescribing the submission of the Property Inventory Form as a basis for the assessment of general insurance coverage over all insurable Guidelines prescribing the submission of the Property Inventory Form as a basis for the assessment of general insurance coverage over all insurable assets, properties and interests of the government with the General Insurance Fund of the Government Service Insurance System

<sup>92</sup> Source: <https://www.dpwh.gov.ph/dpwh/2019%20DPWH%20ATLAS/index.htm>

Table 6-7 Available Asset Registry Systems

Name of system	Managed by (Name of Agency)	Type of Assets	Type of data		
			Asset Information	Construction and Equipment Unit Costs	Adjustment Indices
NARS	BTr	General buildings	○	×	×
		Schools	○	×	×
		Hospitals	○	×	×
		Bridges	○	×	×
		Roads	○	×	×
		Airports	△	×	×
		Railways	△	×	×
DPWH Atlas Bridges	DPWH	Bridges	○	○	○
DPWH Atlas Roads	DPWH	Roads	○	○	○

○= data available, △=data currently not available, but will be collected in the future development phases,

×= data not available

Table 6-8 Available data from NARS<sup>93</sup>

Types of information	Schools	Hospitals	Roads	Bridges
General information	National asset number, asset name, etc.			
Location information	Region, municipality, address, etc.			
Financial information	Acquisition cost, et book value, replacement value, improvements/rehabilitation, etc.			
Technical specification	Classification (Elementary, Secondary, Senior - High), occupancy, year constructed, number of floors, total floor area, construction (materials), mitigation measures, status of use (area in m <sup>2</sup> ), etc.	Classification (Levels 1-3, Special), occupancy, year constructed, number of floors, total floor area, construction (materials), mitigation measures, status of use (area in m <sup>2</sup> ), etc.	Functional classification, total road length, direction flow of traffic (1 way, 2 way), number of lanes, year of construction, pavement, surface, terrain, etc.	General bridge type, construction, year of construction, load limit, carriageway width, terrain crossed, overall width, overall length, deck/pier/abutment material, etc.

#### 6.4.2 Construction unit price and equipment unit price

It is necessary to obtain construction cost unit price (construction cost) data in order to estimate the replacement value. It is assumed that the construction cost of the target assets can be obtained from sources such as relevant agencies or private valuation companies.

Although actual asset data accumulated in NARS was not obtained in this study, it is assumed that the users of the proposed system will be able to extract and use the basic information data of assets (location, construction, floor area, etc.) from NARS. On the other hand, according to BTr, at the current stage, the financial information of the assets submitted to NARS is limited and the adequacy of the replacement cost appraised by third parties cannot

<sup>93</sup> Source: created by the Survey Team based on “NARS template 09052020- Per Asset” provided by BTr



be verified. Therefore, it will be necessary to obtain the construction and equipment costs of the assets from sources other than NARS.

Since DPWH is in charge of public asset construction and repair projects, it should have an internal data on public asset construction costs including equipment and construction work costs. Therefore, if the construction costs of target assets can be obtained from DPWH, the information will be used as construction cost data for the proposed system.

If construction costs are not organized per type of asset, this may be done by to extracting the costs from documents such as construction bidding budgets that contain detailed construction and equipment costs for each project.

If it is difficult to obtain construction costs from DPWH or other relevant agencies, it may be possible to obtain the cost data from publications such as the Construction Cost Books. The Construction Cost Books are used as a basis for calculating prices expected costs associated with a proposed construction projects. For reference, examples of Construction Cost Books/Journals from other countries and Construction Cost Books containing cost data for the Philippines are summarized Table 6-9 and Table 6-10.

However, unlike schools and offices, whose replacement cost can be easily estimated once the construction unit costs are established, replacement costs of assets with special equipment such as medical facilities and transportation facilities often need to be appraised by a third party valuation company. The proposed system will make us of available appraisal reports from third party valuation companies as reference to costs of the special equipment/facilities.

BTr has commented that it will provide the necessary support in requesting data from DPWH, including providing contact information and meeting scheduling. However, as DPWH is one of the primary agencies responsible for COVID-19 pandemic response, arrangement of a joint meeting would not be feasible at this time. Requests for cooperation to DPWH and other relevant agencies will be made after the start of the technical assistance project.

Table 6-9 Well-known Construction Cost Books from Various Countries

Book title	Publisher	Description	Covered regions
2021 Building Construction Costs with RSMeans Data, Square Foot Costs with RSMeans Data, and various titles.	Gordian, (Leading provider of construction and equipment cost data , acquired RS Means in 2014)	Most well-known construction cost book in the U.S. Contains construction-related costs and regional cost index for major U.S. cities.	North America (970cities)
Spon's Architects' and Builders' Price Book 2021, Spon's Civil Engineering and Highway Works Price Book 2021	Spon (Book edited by AECOM Technology Corporation, a leading infrastructure consulting firm.)	Contains construction material, construction work, labor cost data, etc. for construction, mechanical, electrical, civil engineering, and landscaping work.	The U.K.
Rawlinsons Australian Construction Handbook 2021 , Rawlinsons Construction Cost Guide 2021	Rawlhouse Publishing	Contains data on building price index, regional price index, construction cost, renovation cost, labor cost, etc.	Australia
Quarterly Journal on Construction Cost, Quarterly Journal on Civil Engineering Cost, and various titles	Construction Research Institute	Contains survey results on actual transaction prices of building and facility construction works in the market. Cost is provided by type of construction, standard and location.	Japan

Table 6-10 Construction Cost Books with Philippine cost data

Book title	Publisher	Description	Regions covered
Global Construction Costs Yearbook	Compass International	Construction cost data is not as detailed as the above sources, but includes the cost of building materials, building equipment and construction labor.	Includes data for 101 countries, including the Philippines.
Construction Hand Book	Arcadis	Construction cost data for assets such as residential buildings, office/ commercial buildings, hotel, schools, hospitals, etc.	Includes data for several Asian countries, including Philippines (Metro Manila).

### 6.4.3 Information indices

When estimating the replacement value, the rate of change in cost from the time of construction to the present is usually adjusted using inflation rate published by banks and other financial institutions. Inflation rates in the Philippines are published by institutions such as the Bangko Sentral ng Pilipinas (Central Bank of the Philippines) and the Philippine Statistics Authority.

The differences in construction costs that arise between different regions will be addressed either by directly using cost data of the region or by adjust the appraised value using a regional cost index. It is assumed that the DPWH, which is in charge of construction project management, would possess relevant information on construction costs and material costs per

region, but as of now, only selected information on construction costs per region is available from DPWH for roads and bridges.

When developing the proposed system, it will be necessary to obtain either region-specific construction costs or information that will enable the development team to establish the regional cost index from DPWH. If it is difficult to obtain such information from DPWH, the team will have to inquire with other sources that may possess such information such local or foreign construction consultant companies. It is also possible to establish a regional cost index using statistical data published by the Philippine Statistics Authority, such as regional consumption levels and population.

## **6.5 Methods to estimate replacement cost of the target assets**

As mentioned in 6.3 several methods to estimate the replacement value depending on the type of asset. Considering the information that is currently available to the public and that will become available to the system development team in the future, these methods deemed appropriate for the estimation of replacement cost for the proposed system are as follows.

### **(1) Buildings and ancillary facilities**

The replacement cost of buildings and its ancillary facilities will be estimated by establishing a cost database with unit costs for each appropriate for element including occupancy, construction, number of floors, furnishings, equipment specifications, construction year, location, etc. The issues on limited cost data available from asset registers and adequacy of available data described in Section 6.4.2, will be addressed by utilizing data from construction project documents and unit construction cost data from relevant agencies.

When using estimating cost using the new build unit cost method, it is necessary to devise a set of model buildings (model types) for each asset type. Table 6-12 shows an example of model types devised based on the basic information of the target assets (technical information from NARS and classification of asset used by relevant agencies).

### **(2) Machinery and equipment**

For general type of machine and equipment, cost data from asset ledgers such as NARS will be sorted to establish machinery/equipment costs per unit area for type of occupancy. The established unit cost will be organized into a database used for estimating replacement cost of general type of machinery and equipment. For special equipment, the replacement cost will be estimated using the acquisition cost in the accounting books at the time of installation and asset appraisal reports made by third party valuation companies.

Table 6-11 Proposed estimation methods for target assets

Target asset	Component	Estimation method
Schools	Building and ancillary equipment	Using data from NARS and other agencies, construct a database with construction cost per unit area based on occupancy, construction, number of floors, furnishing, facility specifications, year built, location, etc. Verify adequacy of construction costs from NARS and other agencies and collect missing data by utilizing the data identified in Section 6.4 and available construction cost valuation systems.
	Equipment, machinery	Compile data from NARS and other agencies into a database with equipment/machinery cost per unit area for each occupancy. The database would be organized similar to calculation tables that insurer use for appraising common household assets in homeowner fire insurance.
Medical facilities, airports	Building and ancillary equipment	Using data from NARS and other agencies, construct a database with construction cost per unit area based on occupancy, construction, number of floors, furnishing, facility specifications, year built, location, etc. Verify adequacy of construction costs from NARS and other agencies and collect missing data by utilizing the third party appraisal reports from GSIS.
	Equipment, machinery	Replacement cost of special equipment will be estimated based on acquisition cost at the time of installation from the accounting book.
Rail roads	Civil engineering structure	Using data from the DPWH Atlas, construct a database for construction cost per unit distance based on construction, width, number of lanes, year constructed, pavement, surface, etc.
Bridges	Civil engineering structure	Using data from the DPWH Atlas, construct a database for construction cost per unit distance based on bridge type, span, pier type, etc.
Railroads	Civil engineering structure	Using data from NARS and other agencies, construct a database for construction cost per unit distance for elevated structures, railway tracks, etc. The database will consist of two main parts: costs for structures and cost for construction work.
	Station building	Using data from NARS and other agencies, construct a database with construction cost per unit area based on construction, number of floors, furnishings, facility specifications, year built, location, etc.
	Trains, special equipment	Replacement cost of trains will be estimated using the acquisition cost at the time of procurement from the accounting book. Replacement cost of special equipment will be estimated using on acquisition cost at the time of installation from the accounting book.

Table 6-12 Examples of proposed model types

Type of Asset	Model type	Description
School	Standard School Building	DepEd Calamity Resilient School Building Design 2013
	Upgraded School Building	DepEd Calamity Resilient School Building Design 2017
	Modified School Building	Modified Standard DPW DPWH-DepEd School Building Design
	Technical Vocational Schools	School for specific activities with high use of equipment, computers, and technology.
Hospitals	Level 1	In accordance with DOH’s definitions.
	Level 2	
	Level 3	
Airports	International	Support the international airport system by providing communities access to national and international markets.
	Regional	Support regional economies by connecting communities to regional and national markets.
	Local	Located near larger population centers, and support local communities by providing access to markets within a State or an immediate region.
	Basic	Supports general aviation activities such as emergency response, air ambulance service, flight training, etc.

### 6.5.2 Information to be obtained in the future

Accurate and up-to-date cost data needs to be obtained in order for the system to generate a reliable replacement cost. At present, the only data that can be utilized from NARS and other asset registers is the asset information. There is almost no information on unit cost for construction and equipment nor regional indices that is available to the public; thus these information will need to be obtained via other means in the future. In addition, the amount of usable data may be limited because it is not clear whether each agency has providing all the information specified by the NARS template. Possible sources from where these additional information can be obtained are as follows.

BTr has expressed concerns about the difficulties on obtaining accurate data for unit cost of buildings due to age of the building and unavailability of data for many of the assets. The proposed appraisal method is to use the “new-build” unit cost to estimate the cost of the target asset. The “new-build” unit cost data required in the proposed appraisal method is to be collected from new/recent construction projects of the same type of asset, thus the proposed appraisal method will require data to describe the asset features but the “actual unit cost” of the target asset will not be mandatory.

#### (1) In-house cost database of local construction consulting companies

Since it will be difficult to extract unit costs using only the financial information from existing asset registers, this Study propose the use of in-house cost databases from relevant industries such as construction consulting companies. The cost database of construction

consulting companies would often contain standard unit prices for civil, engineering, and architectural works for various types of properties, including the target assets. This data can be used as the base data for the cost database of the proposed system.

There are at least two construction consulting companies in the Philippines that owns such an in-house cost database system.

**(2) Local construction companies, construction design companies, etc.**

The Philippines is subdivided into 17 Regions. In order to accurately estimate the construction cost in each region, it will be necessary to construct a regional cost index. If the database in (1) does not include construction costs for each region, the survey team will need to manually collect unit costs from local construction companies and suppliers in each region through direct inquiries. An example of the information to be obtained is as follows

Table 6-13 Examples of mandatory construction material costs

Materials	Unit costs
Concrete	PHP/kg
Aggregates	PHP/m <sup>3</sup>
Reinforcing bars, intermediate grade 40	PHP/kg
Reinforcing bars, high yield grade 60	PHP/kg
Structural steel, angle bar	PHP/kg
Structural steel, wide flange	PHP/kg
Concrete hollow blocks	PHP/pc

**(3) Government agencies**

As described in 6.4.2, DPWH has made some of the unit costs for bridges and roads available in the DPWH Atlas, which is disclosed to the public. It is presumed that DPWH also holds unit cost for other types of assets as well. Cost data from DPWH and other agencies can be used as reference for comparison with the information collected in (1) and (2).

**(4) Construction project documents**

As described in 6.4.2, unit costs and labor costs can be extracted from construction project bidding documents, etc. Collecting past construction documents of the target assets from DPWH and other relevant organizations, will allow the study team to extract cost data, assess the adequateness of the unit costs collected, and accumulate the resultant data in the cost database.

## **6.6 Proposal on development of the replacement cost appraisal system**

Asset values are one of the key variables in prioritizing insurance procurement, and in order for NARS to fulfill its function of determining the prioritization of assets to be insured, it is necessary to obtain adequate asset values. However, government agencies such as the BTr and GSIS do not currently have the tools for assessing the adequacy of asset values. Therefore, this Survey proposes to develop an appraisal tool that can assess the adequacy of asset values listed in the asset registers.

This section will introduce some examples of asset valuation tools available in the market, and propose the structure and development plan of the replacement cost appraisal system that can be used alongside with NARS and other existing asset management systems. The detailed configuration of the system and its integration with other asset management systems should be further discussed with the BTr, which is in charge of development of NARS, and other relevant agencies (prospective users of the proposed system) during the system development stage.

### **6.6.1 Asset valuation tools in other countries**

There are a number of tools for estimating asset values that are already available in the market. Examples of asset valuation tools from other countries are as follows and summarized in Table 6-14.

#### **(1) Building Cost Calculator by Persatuan Insurans Am Malaysia (PIAM)**

This building valuation tool is developed by the Property Insurance Association of Malaysia (PIAM) for residential buildings. This tool is available online and the main purpose is to estimate the sum insured for residential properties.

The system automatically calculates the replacement cost based five categories of input data: general building description (address, etc.), building construction, furniture, features (elevator and air conditioning equipment), and renovations.

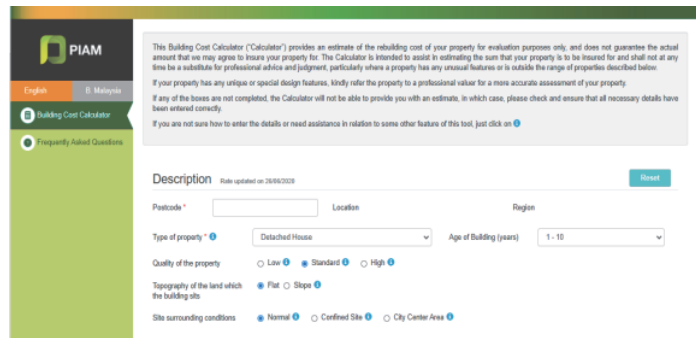


Figure 6-3 Operation screen of the Building Cost Calculator<sup>94</sup>

## (2) Building Cost Information Service's (BCIS) Residential Building Cost Calculator

This Residential Building Cost Calculator is developed by the Building Cost Information Services (BCIS) of the Royal Institution of Chartered Surveyors (RICS), and commissioned by the Association of British Insurers (ABI). This tool is available online to provide guidance to the general public on the rebuilding cost of residential buildings.

Similar to PIAM's Building Cost Calculator, this tool was developed for property insurance and is used as a reference for establishing the sum insured of a residential building. The replacement cost is automatically calculated based on the input data such as zip code, number of rooms and bathrooms, and construction of the exterior walls and roof.

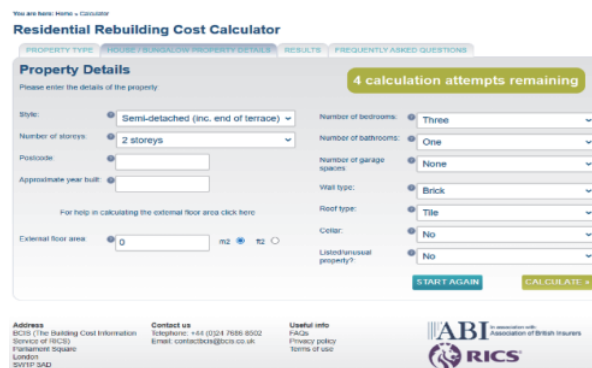


Figure 6-4 Operation screen of the Residential Building Cost Calculator<sup>95</sup>

## (3) AIG's Homeowners Replacement Cost Estimator

This online Homeowners Replacement Cost Estimator is developed by AIG, a general insurance company. The replacement cost is automatically calculated based on input data such as address, floor area, construction year, and housing characteristics.

<sup>94</sup> Source: Building Cost Calculator, PIAM, <https://bcc.piam.org.my/>, accessed 2021/03/21.

<sup>95</sup> Source: Residential Building Cost Calculator, BCIS, <https://calculator.bcis.co.uk/register/register.aspx>, accessed 2021/03/21.



Figure 6-5 Operation screen of the Homeowner’s Replacement Cost Estimator<sup>96</sup>

#### (4) Craftsman Book Company’s National Estimator<sup>97</sup>

The Craftsman Book Company is a publisher specializing in technical reference books for the construction professionals, including a variety of cost books. The National Estimator is developed by the Craftsman Book Company is tool is a fee-based software program for calculating estimated cost of materials and labor for construction projects. The estimated cost of construction project is calculated by selecting items related to the work from the built-in cost database and entering the necessary information such as size, quantity, and work hours. The Craftsman Book Company also offers an online tool called the Insurance Replacement Estimator, which evaluates replacement value, however, this tool is only for residential properties.

	Craft@Hrs	Unit	Material	Labor	Total
Sand fill base 1.40 tons equal 1 cubic yard					
Using sand, per CY	-@.000	CY	18.60	--	18.60
1" fill (.309 CY per CSF)	BL@.001	SF	0.06	0.03	0.09
2" fill (.517 CY per CSF)	BL@.002	SF	0.11	0.05	0.16
3" fill (.926 CY per CSF)	BL@.003	SF	0.17	0.07	0.24
4" fill (1.23 CY per CSF)	BL@.004	SF	0.23	0.10	0.33
5" fill (1.54 CY per CSF)	BL@.006	SF	0.29	0.15	0.44
6" fill (1.85 CY per CSF)	BL@.007	SF	0.34	0.17	0.51
Add for fine grading for slab on grade	BL@.008	SF	--	0.20	0.20

Qty	Craft@Hours	Unit	Material	Labor	Equipment	Total
0.4			23.00	10.00	0.00	33.00
						Subtotal:
						15.00% Overhead:
						10.00% Profit:
						Estimate Total:
						41.75

Figure 6-6 Operation screen of the National Estimator

<sup>96</sup> Source: Homeowners Valuation Estimator, AIG, <https://www-604.aig.com/landing/homeowners-valuation-estimator#Confirm>, accessed 2021/03/21.

<sup>97</sup> National Construction Estimator – Introduction: Building an Estimate Basics (video), Craftsman Book Company, <https://www.youtube.com/watch?v=mzYv8jxiRxI&list=PLgqplazIU4BuFRGnwxA6gNaluaNdbvMeB>, accessed 2021/03/21.

**(5) CoreLogic’s Marshall & Swift SwiftEstimator<sup>98</sup>**

The SwiftEstimator developed by a major North American cost consulting firm, is a fee-based tool for estimating construction cost for both residential and commercial properties<sup>99</sup>. It is often used by real estate appraisal companies, government agencies, tax consulting companies, and other industries other than insurance companies. Replacement value and sum insured in this tool are estimated using unit costs assigned various building types. The replacement cost is calculated using information such as address, occupancy, size, and ancillary facilities. As shown in Figure 6-7, this tool allows for the selection of detailed equipment and machinery types.

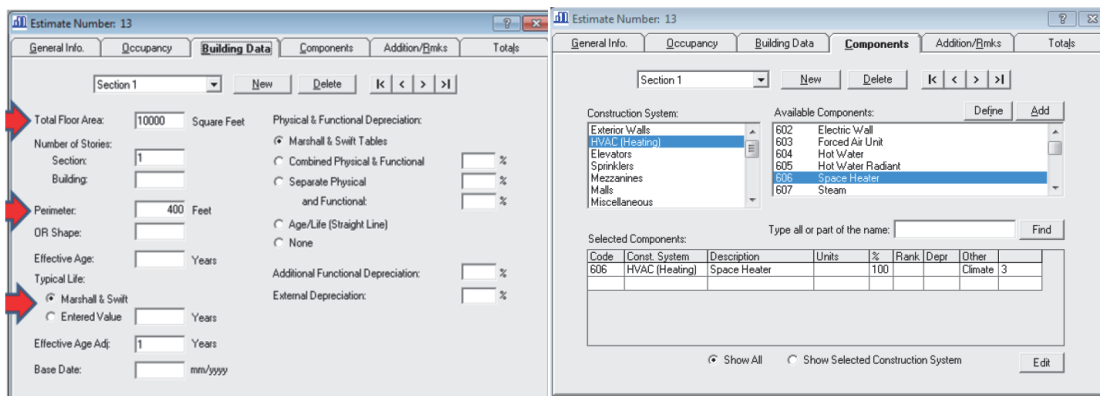


Figure 6-7 Operation Screen of the SwiftEstimator 7<sup>100</sup>

Table 6-14 Asset valuation tools in other countries

Name of product/tool	Developer	Type of tool	Asset types covered
Building Cost Calculator (BCC)	PIAM	Online only	Residential buildings and small shops (Shop House, Shop Office) in Malaysia
Marshall & Swift Commercial Estimator, Residential Estimator	CoreLogic	Both online use and downloadable versions	Residential and commercial buildings in the U.S. and Canada.
National Estimator	Craftsman Book Company	Both online use and downloadable versions	Residential buildings, commercial buildings and industrial plants in the U.S.
Homeowners Replacement Cost Estimator	AIG Inc.	Online only	Residential buildings in the U.S.
Commercial Reinstatement Tool	RICS	Online only	Commercial buildings in the U.K.
ABI/BCIS Residential Building Cost Calculator	RICS	Online only	Residential buildings in the U.K.

<sup>98</sup> <https://www.corelogic.com/buy/appraiser-solutions/>

<sup>99</sup> Marshall & Swift is a building cost consulting firm in North America, acquired in 2014 by CoreLogic, a leading financial information services company.

<sup>100</sup> Source: Marshall & Swift Commercial Building Cost Data Best Practice April 2018, CoreLogic, [https://www.lincolnst.edu/sites/default/files/sources/events/martinez\\_marshall\\_and\\_swift.pdf](https://www.lincolnst.edu/sites/default/files/sources/events/martinez_marshall_and_swift.pdf), accessed 2021/03/21.

### 6.6.2 Overview of the Replacement Cost Appraisal System

The proposed Replacement Cost Appraisal System should be capable of the following:

- Used by multiple agencies including BTr, GSIS and other relevant agencies,
- Estimate the replacement cost of assets based on the asset information entered,
- Allow information such as regional cost index and inflation rates to be easily updated periodically.

The overall framework of the Replacement Cost Appraisal System is proposed as follows, by referencing examples listed in “0asset value evaluation tools in other countries”. This system is to be composed of two parts: a cost database and a valuation module. The cost database is a database that will store the data necessary for the estimating the replacement cost, including unit cost of construction and equipment for each model types, and the regional cost index. The valuation module is a calculation tool that contains various calculation formulas linked to the input information. The detailed configuration of the system, etc. should be adjusted after consultation and confirmation with the relevant agencies (prospective users).

The replacement cost is to be estimated using a set of a predetermined model type and unit cost. This system will allow for adjustment of the estimated value (results) according to specific characteristics of the facility (e.g., presence of special equipment, machinery, or facilities, etc.). In addition, labor and material costs are calculated in taking account of the regional cost differences (using the regional cost index) and inflation rates. The general description of this system and its deliverables (appraisal report) are shown in Figure 6-8 and Figure 6-9.

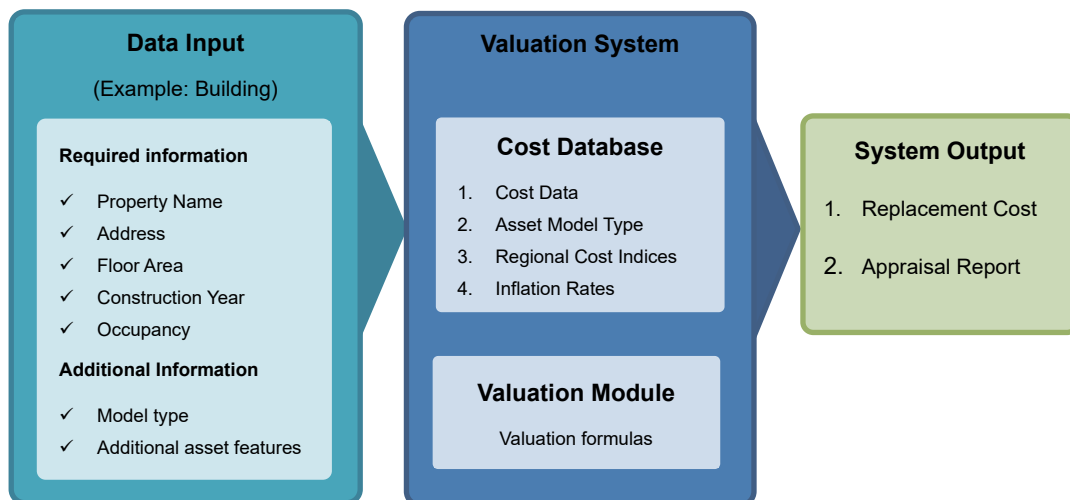


Figure 6-8 Overview of the Replacement Cost Appraisal System

(include digital signature)

**Asset Insurance Valuation**  
updated: Q2 2020

**Report for Asset Insurance Valuation**

Report Reference Number: 0001  
Assessment Date: 01 June 2021  
Assessor: GSIS  
Client Name / Policy Holder: Department of Education  
Client Type: Government

**Property Details**

National Asset Number (A.1):  
Asset Name (A.5): Makati Elementary School  
Site Address (B.1 – B.8): Barangay San Antonio  
Municipality (B.3): Makati  
Number of Buildings: 1  
Total Cost to Construct (D.1): n/a  
Improvements made to date (D.10.2): n/a  
Policy Start Date (E.8.1): n/a  
Current Building Sum Insured (D.11.3): n/a

**Click policy features**

- Repair
- Replacement
- Provide for Demolition costs
- Provide for Professional Fees
- Provide for Emergency Services

**Buildings**

Building Name	Building Model Type	CFA (sqm)
School Block	Standard School Building	1,500

**Click additional asset features**

- Swimming Pool 25m
- Swimming Pool 50m
- Covered Court
- Gymnasium
- Science Laboratory
- School Garden
- Computer Classroom
- Playground
- Water & Sanitation Facility

**Elemental Breakdown of Costs**

Element	Quantity	Unit	Rate	Total
Preliminaries	1500	M2	250	375,000
Structural	1500	M2	10,000	15,000,000
Architectural	1500	M2	5,000	7,500,000
MEPF	1500	M2	7,500	11,250,000
Additional Asset Features	2	Number		2,000,000
<b>Total (PHP)</b>				<b>36,125,000</b>

**Allowance for Demolition (optional)**

Item	Allowance	Total
Demolition	10%	3,612,500

**Locational Adjustment (Philippine Regional Index)**

Municipality	Factor	Total
National Capital Region	100	0

**Professional Fees (optional)**

Item	Allowance	Total
Estimate of Professional Fees	10%	3,612,500

**Emergency Services (optional)**

Item	Allowance	Total
Estimate of Emergency Services	10%	Not provided

**Contingency**

Item	Allowance	Total
Estimate of Contingency	10%	3,612,500

**Summary**

Item	Total
Buildings	36,125,000
Allowance for Demolition	3,612,500
Locational Adjustment	0
Professional Fees	3,612,500
Emergency Services	0
Contingency	3,612,500
<b>Total Reinstatement Cost Assessment (PHP)</b>	<b>46,962,500</b>

Figure 6-9 Sample Report for the Replacement Cost Appraisal System

### 6.6.3 Proposed development plan for the Replacement Cost Appraisal System

The steps (phases) which will be required in the development process of the Replacement Cost Appraisal System are proposed as follows. Please refer to Table 6-15.

(1) Draft an implementation plan

Draft an implementation plan. The plan should include the scope and objectives of the system. This phase will also include the following actions: select types of public assets to be assessed (target assets), identify information necessary for estimating the replacement cost of each target asset, and conduct preliminary survey of sources for the necessary information. The types of information necessary can be found in Section 6.4.

(2) Determine the responsible agency and the form of use

The agency required responsible for ownership of the Replacement Cost Appraisal System and its operational maintenance will need to be established after consulting with the relevant agencies. In addition, as the prospective users include multiple agencies, the system operation flow and approval processes should also be established in this phase.

As of currently, BTr envisions the proposed Replacement Cost Appraisal System to be part of the NARS. BTr will grant relevant agencies such as the GSIS with access to data generated by Appraisal System.

(3) Review replacement cost appraisal methods

Based on the results of (1) above, review the replacement cost appraisal methods. Identify the data necessary to estimate the replacement cost using the unit cost method and ways to obtain these data. Model types for assigning unit costs for the “new build unit cost method” should also be established in this phase.

(4) Collect and analyze data

Collect the data identified in the above phase. Organize collected data and reassess the feasibility of collecting all necessary data, and reflect the findings in the appraisal methods and model types. Provide alternatives solutions for any missing data.

(5) Finalized replacement cost appraisal methods

Review the results from the above phases and finalize the replacement cost appraisal methods. Prepare all necessary information (base data) for the system for the next phase: a master list (Table 6-16), list of unit costs, and list of model types.

(6) System development and trial tests

Discuss and draft system specifications based on the selected replacement cost appraisal methods in (5). The system specification should clearly describe the estimation procedure and the design of the deliverable.

Once the client (agency) and the system developer have agreed on the specifications, the system developer will then move on to the system design process. The design process consists of two parts: basic and detailed design. This will be done by the system developer according to the agreed specifications. The system developer will proceed to the next development process (programming) after the designs are approved by the client. Once the system is complete, it will undergo various tests including system test before being released to the client for the acceptance test, which will be carried out by the client/user to verify that the system operates normally according to the functional specifications.

(7) Create system manual

The manual should include procedures on system operation, maintenance, and audits.

(8) Deploy new system, conduct training and trial operation

Conduct trainings according to the manual above to relevant agencies to facilitate the system deployment process. Conduct trial operations within selected agencies/departments. The system will be formally deployed once it receives approval from the relevant organizations.

(9) Operation and maintenance

This phase concludes the system development process and includes actions post system deployment: start of operation and scheduled maintenances and audits. After the start of operation, system maintenance will need to be carried out periodically to ensure that the system continues to function normally. In addition, the entire system, including the cost database, will need be audited once a year.

Table 6-15 Timeline for each development process

Development process	Estimated timeline
(1) Draft an implementation plan (2) Determine the responsible agency and the form of use	1.5 months
(3) Review replacement cost appraisal methods (4) Collect and analyze data	12 months
(5) Finalized replacement cost appraisal methods	1.5 months
(6) System development and trail tests	12 months
(7) Create system manual	3 months
(8) Deploy new system, conduct training and trial operation	3 months

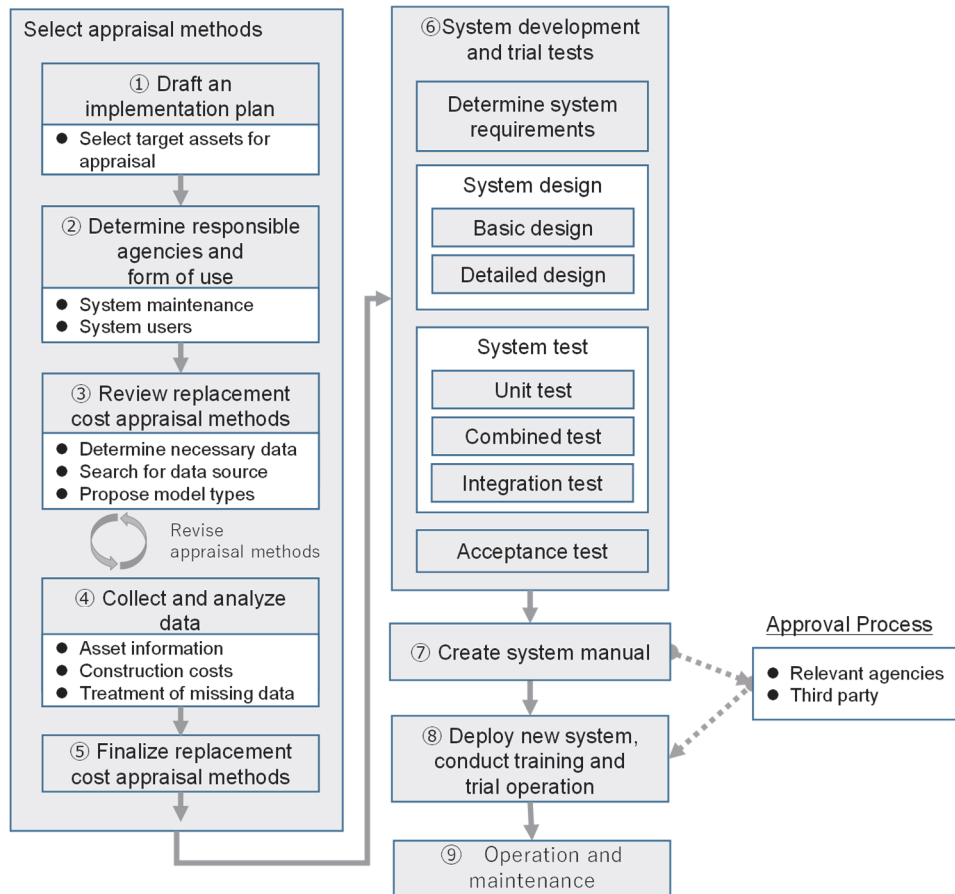


Figure 6-10 Proposed development flow of the Replacement Cost Appraisal System

Table 6-16 Proposed Master List for the Replacement Cost Appraisal System

Item	NARS reference number*
National Asset Reference Number	A.1
Asset Name	A.5
Site Address	B.1-B.8
Municipality	B.3
Number of Buildings	
Construction Floor Area (CFA)	
Total Cost to Construct	D.1
Improvement Made to Date	D.10.2
Policy Start Date	E.8.1
Current Building Sum Insured	E.11.3
Replacement Cost	D.11.1-D11.3

\*The reference numbers are provided for the case when asset information is to be drawn from NARS. The reference numbers are linked to the template in Annex B of the DOF-DBM-NEDA Joint Memorandum Circular No. 2020- 1<sup>101</sup>, dated September 24, 2020.

The estimated costs associated with the development of this system are summarized in Table 6-17. Costs listed in Table 6-17, operational costs including recurring costs (staff, cloud server access fee, etc.), annual auditing and internal maintenance costs should also be considered. In order to maintain the high reliability required by this system, it is recommended that the operational status and appraisal results be periodically checked by system audits.

The construction of the cost database should be handled by a professional project management team with practical experience in fixed asset appraisal. This team will be responsible for obtaining the cost data and developing the cost models (model types) required for this database. The estimated cost for construction of the cost database includes data collection and development of overall framework. Cost for the database system (programming) is included to the system (software) development.

System (software) development is a series of processes that involves developing programs that run on computers to estimate replacement cost and generating the result in a report (deliverable). This work will need to be outsourced to a software developer.

Table 6-17 Estimated Cost for Development of Replacement Cost Appraisal System

Items	Estimated cost
Project management, including building of cost database (12 months)	26,400,000 JPY
Software development	11,000,000 – 275,500,000 JPY
Server equipment	11,000,000 JPY

<sup>101</sup> “Implementation of a Philippine Government Asset Management Policy (PGAMP)”



## 7 Review of introducing the DRR Certification Program

### 7.1 Objective of introducing the DRR Certification Program

Insurance is a system that financially compensates the policyholder for losses incurred due to a sudden accident based on a prior agreement in exchange for a premium. The policyholder transfers the risk of disaster loss to the insurance company, but this does not reduce the risk of the occurrence of the sudden accident itself. While the main purpose of insurance is to transfer the risk of loss, it also incorporates mechanisms to reduce the occurrence and severity of the loss when it occurs. In the case of natural disaster insurance, premium rates based on disaster risk (disaster hazard X facility strength) and premium rate adjustments for seismic retrofit and flood protection measures are mechanisms that encourage loss mitigation.

Natural disasters such as earthquakes, floods and typhoons are difficult to be covered by insurance products when considering risk diversification, because they are widespread disasters and can result in an enormous amount of loss. In Japan, the recent increase in damage by typhoons and floods has prompted a review of risk-based insurance premiums. In the U.S., the National Flood Insurance Program (NFIP), the federal government's flood insurance program, is also revising its premium calculation method to be more risk-based than before. (See Box)

**U.S federal insurance system, a mechanism for evaluating local government involvement  
in disaster management**

The NFIP is a flood insurance program based on the involvement of local governments in disaster management, and has features that are linked to the adjustment of premium rates and the availability of federal subsidies after a disaster. The NFIP also has a Community Rating System (CRS) that evaluates the disaster prevention efforts of local governments using a scoring system. In the case that a participating municipality in the NFIP implements flood protection measures based on stricter standards than those set by the NFIP, the municipality will be classified into a 10 level (Class 1-10) set by the CRS, and premiums are discounted by 0% (Class 1) to 45% (Class 10) according to its classification level. The classifications are based on 19 creditable activities, organized in four categories: (1) Public Information, (2) Mapping & Regulations, (3) Flood Damage Reduction, and (4) Flood Preparedness. The number of municipalities covered by the CRS is 1,520, representing more than 3.6 million policies, or more than 70% of all NFIP policies. This mechanism is designed to reduce flood losses by improving the flood resilience of municipalities through incentives in the form of premium discounts.

In response to the increasing number of weather-related disasters in recent years, unless efforts are made to reduce the disaster risk itself, premium rates will continue to increase, leading to unacceptable premiums for insurance buyers and inability of insurance companies to provide adequate coverage. In the Philippines, where many natural disasters occur, public

insurance provided by GSIS is intended to contribute to the reduction of vulnerability of facilities in addition to compensating for losses by strengthening the inherent risk reduction function of non-life insurance.

## 7.2 Differences between the Previous Survey and this survey

In the Previous Survey, we calculated premium rates for public schools in Metro Manila using a loss assessment model and examined the possibility that premium rates which better reflect the disaster risk would encourage policyholders and facility managers to invest in disaster prevention. As a result, it was concluded that although investment in disaster prevention retrofits may reduce insurance premiums, the premiums themselves are small compared to the amount of investment required, therefore, discount adjustment of insurance premiums alone is insufficient to incentivize disaster prevention. To compensate for this, the Previous Survey proposed to introduce an incentive to the insurance program where “investment in disaster prevention” would lead towards “premium rate adjustment”, and for public schools a "safe building" would lead to "disaster prevention certification". The certification method for each type of hazard was laid down in the previous report.

Table 7-1 “DRR Certification” Assessment Method in the Previous Survey

Hazard	Expected level	Assessment tool	Verified by		
			GSIS	DepED	DPWH
Earthquake	Building will not collapse when exposed to the hazard occurring in that area	RVS / Seismic diagnosis	○	●	●
	Measures in place to prevent collapse of non-bearing structure, fall of fixture and contents, tipping over of fixtures	MEXT <sup>102</sup> check list	●	△	△
Flood	No flood risk (200 year rain event)	Risk tool	●		
	Exposed to flood risk, but flood-prevention measures are in place	On-site survey	●	△	△
Typhoon	Building of reinforced concrete construction	Asset information	●		
	No damage on roof	On-site survey		●	△
	No failure detected in securing of roof panels and frame			●	△
	Roof equipment such as tanks are fixed to structural elements			●	△

● : Main, ○ : Future Plan, △ : Technical Support

In the proposal made in the Previous Survey envisioned joint work with DPWH and DepEd, but because of the challenges involved in collaboration with other agencies, this survey reviewed the possibility of creating a mechanism that links this proposal to the new Risk-based Premium Rate Calculation System described in Chapters 4 and 5, which will allow GSIS to implement the proposed incentive independently

<sup>102</sup> Japan Ministry of Education, Culture, Sports, Science and Technology

### 7.3 Proposed design for the DRR Certification Program

The “certified level of disaster prevention of buildings” of the DRR Certification described in the Previous Survey will remain unchanged, but in the confirmation methods, on-site survey and confirmation process using checklists will be minimized. In the DRR Certification Program, the buildings will be assessed using its facility information, assessment indicators on hazard and facility vulnerability from the Risk-based Premium Rate Calculation System, and hazard information from GeoRisk Philippines. The facility information will be obtained from either NARS or GSIS insurance application form (disaster prevention checklist will be filled out by the policyholder).

The structural standards for buildings in the Philippines references the U.S. building code, thus, the use of the RVS, Rapid Visual Screening, provided by FEMA in the U.S. as a simplified seismic review tool to assess buildings exposed earthquakes was deemed appropriate and the Previous Survey assessed 10 public schools using the RVS. DPWH has been conducting seismic review using RVS since 2017 and by 2018 it has assessed approximately 6,000 public buildings, including schools and medical facilities located in Metro Manila. Since the RVS is designed to be used by personnel other than structural specialists, with sufficient trainings, it can be used by the GSIS insurance group's risk engineering team and insurance underwriters as well.

The WB approved an IPF named the "Philippines Seismic Risk Reduction and Resilience Project" (USD 300M) in June 2020, and with this, DPWH plans to retrofit 425 of the schools and medical facilities located in Metro Manila against earthquakes. The buildings retrofitted under this project can be certified for DRR Certification for earthquakes based review of the construction inspection certificates and other documents, and the results will be reflected in the premium rates. It will be possible to incorporate the results of the simplified seismic review of many facilities conducted by DPWH into the DRR certification program as well. It should be noted that the DPWH is currently in the process of unifying new public schools to be built to the "standard design". GSIS has an insurance underwriting management system, GIIS, which can easily obtain hazard information from latitude and longitude of the facilities.

Table 7-2 Proposed DRR Certification System Design: Changes in Assessment Methods

Risk Reduction Incentives	Hazard	Level	Assessment Methods (Upper portion: Previous Survey, Lower portion: This Survey)	Changes in Assessment Methods
DRR Certification	Earthquake	<ul style="list-style-type: none"> <li>• Low risk of building collapse</li> <li>• Non-structural elements, fixtures and equipment poses a low risk of harm to occupants</li> </ul>	<ul style="list-style-type: none"> <li>• Simplified review (FEMA RVS)</li> <li>• Checklist for non-structural elements</li> <li>• Construction inspection records</li> <li>• Additional items on insurance application form (building structure /number of floors, year built, seismic review /retrofit, school design, construction inspection records).</li> <li>• Insurance premium rate calculation system (hazard index, facility structure)</li> <li>• Disaster prevention training, disaster preparedness</li> </ul>	<ul style="list-style-type: none"> <li>• The simplified review and filling out of checklist is to be done by the maintenance department of the insured.</li> <li>• Additional items are added to the insurance application to substitute the on-site survey.</li> </ul>
	Typhoon	<ul style="list-style-type: none"> <li>• Low risk of damage to roof</li> <li>• Low risk of harm to occupants</li> </ul>	<ul style="list-style-type: none"> <li>• Building structure → asset information</li> <li>• Items to be checked on-site: roof damage, securing of roof plates and roof equipment on to structural elements.</li> </ul>	<ul style="list-style-type: none"> <li>• Additional items are added to the insurance application to replace on-site survey.</li> <li>• Hazard information is to be obtained (automatically) from premium rate calculation system or GeoRisk Philippines</li> <li>• Checklist is to be filled-out by the insured.</li> </ul>
			<ul style="list-style-type: none"> <li>• Additional items on insurance application form (building structure /number of floors, year built, , school design, roof inspection records).</li> <li>• Insurance premium rate calculation system (hazard index, facility structure)</li> <li>• Disaster prevention training, disaster preparedness</li> </ul>	
Flood	<ul style="list-style-type: none"> <li>• Low risk of flood</li> <li>• Flood prevention measures in place to prevent water from entering important buildings</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare hazard map</li> <li>• On-site survey</li> <li>• GeoRisk Philippines, previously created hazard map</li> <li>• Insurance application form (location information, flood prevention measures)</li> <li>• Disaster prevention training, disaster preparedness</li> </ul>		

#### 7.4 Review of other incentive programs

The following mechanisms will be included in the insurance contract as other incentive programs.

##### ① Link insurance premium discounts to DRR Certification

Adjust premium discounts for eligible policies according to the DRR Certification of the building. Adjustment will be made for each type of disaster.

##### ② Endorsement for natural disaster risk

For policies for which GSIS considers the sum insured is adequate to cover the replacement value, additional coverage will be provided for (a) "Endorsement on additional cost for compliance with new building standards at the time of loss," (b) "Endorsement on increased disaster recovery cost," and (c) "Endorsement for roof repair

cost (on strengthening of roofing system against typhoons)". This will encourage the insured to maintain adequate sum insured to cover the replacement cost. The strengthening of building structures and roofs will also help to prevent and/or reduce the recurrence of loss from natural hazard in future.

**③ Reduce insurance deductible for roof damage**

The current GSIS Standard Insurance Policy stipulates that natural disasters are subject to a 2% deductible (policyholder's own expense) of the cash value of the affected area of the insured asset. While the 2% deductible for natural disasters is standard in the insurance industry, damage to roofs and other structures may not be covered by the insurance payment depending on how the "affected area" is determined. An appropriate repair of roofs is a cost effective measure against disasters induced by severe winds and can help prevent and/or mitigate the recurrence of future disasters.

**④ Endorsement of a special clause for covering emergency response expenses for emergency response incurred by the insured**

Having an "endorsement that includes emergency response expenses as part of the insurance payment" will benefit the local governments, thus serve as an incentive for the local governments to purchase insurance. This type of endorsement aims to compensate a predetermined amount of expenses incurred by local governments in setting up and operating evacuation centers, procuring food, drinking water, and sanitary supplies in the event of a typhoon or other disasters. Disaster response cost insurance product that includes such endorsement is already being utilized by municipal governments in Japan. As many of the policyholders of GSIS are local governments, we believe that providing this type of coverage may motivate them to purchase more suitable property insurance coverage from GSIS. It may also help GSIS to better demonstrate its role in the field of disaster prevention and mitigation through public insurance.

In (2) above, (a) is an endorsement to compensate for any increase in costs due to change of the applicable laws and regulations at the time of the accident (for example, newly updated structural standards which require stronger design in the structure). This is a generally accepted and common in insurance coverage. (b) is an endorsement that covers cost increase in rebuilding expenses following a disaster. Both of these endorsements are currently not included in the GSIS standard terms and conditions. (c) is the "endorsement for roof repair costs (endorsement for strengthening the anchorage of roofing materials)" that includes the additional costs to build a stronger roof, in comparison with the original, in the insurance payment. Insurance is meant to cover the cost of restoring the insured building to its condition immediately before the accident. Although this is not a common practice for insurance payment to result in upgrading of the building, as the damage to the roof in a typhoon event is directly related to the damage inside the building, it is highly cost effective to strengthen the roof against

strong winds. While a proper limit on the amount of additional insurance payments will be necessary, we believe that this endorsement will be an effective way to strengthen the resistance of public assets through insurance. While extension of coverage to large-scale upgrades to strengthen disaster prevention in the event of a disaster should be considered, as such extension would deviate from the normal scope of insurance coverage, therefore only a limited items are selected for discussion.

Table 7-3 Changes to insurance contract (changes in endorsement and deductibles for DDR Certification Insurance premium and disaster coverage)

Risk Reduction Incentives	Methods	Details	Objective/rationale
Insurance contract	• DRR Certification Discount	• Adjust insurance premium when asset obtains DRR Certification	• Expected loss is low (good risk) • Promote an increased number of good risks.
	• Endorsement for natural disaster risk	• For replacement cost policies. Endorsement for “restoration using current building standard”, “increased cost for post-disaster restoration”, “roof repair cost (improvement on securing of roof materials) “.	• Prevent recurrence of loss by strengthening buildings • Reduce loss of assets inside the building by strengthening roofs, which is highly cost-effective measure.
	• Reduce deductible for roof damage	• The current deductible of 2% for catastrophes, is large. Repair cost for roof is likely to fall under the deductible, thus, there is a risk that the damage will not be repaired effectively.	• Reduce future loss by decreasing the deductible for roof damage repair.
	• Endorsement for coverage of emergency response cost	• Partially compensate for emergency response cost incurred by local governments in the event of a disaster (cost includes purchasing of water, food, etc. for evacuation shelters).	• Encourage local governments to purchase natural disaster insurance.

## **7.5 Procedure for introducing the DRR Certification Program**

It will be necessary to explain to GSIS management and gain their understanding that the above disaster prevention certification itself is part of GSIS's public insurance operation and does not deviate from GSIS's mandate. The actual implementation plan and detailed design will be specified after the implementation plan for the risk-based premium calculation scheme is finalized, but it will be considered as part of the enhancing GSIS's functions on public insurance and risk control. The above plan differs from what was presented in the Previous Study in that most of the work procedures will be completed by GSIS. Although training of risk engineering teams and underwriting departments will be required, it is directly related to the ability to assess natural catastrophe risks in the public insurance service lineup and can be beneficial from the perspective of insurance operations.

With regard to incentives that involve changes in insurance contracts, the DRR Certification discounts, endorsements for natural disaster losses, and reducing deductibles for roof damages are all changes that affect insurance underwriting and premium rates. Depending on the degree of impact, changes to the insurance underwriting rules (MOOs) may require approval from the GSIS Risk Monitoring Committee as well as approval and resolution by the GSIS Board of Directors as does the procedure for the transition to risk-based premiums. The degree of impact associated with the changes is expected to require analysis using the loss assessment models. A training program of the loss assessment models for analysis of risk accumulation and premium rates for about 30 reinsurance contract procured every year will be developed as a part of capacity building.

## **8 Summary (Proposals for strengthening disaster risk finance / insurance and improving public insurance system)**

### **8.1 Summary of findings**

#### **8.1.1 Status of initiatives taken since the Previous Survey, as confirmed in this Survey (regarding uninsurance and underinsurance)**

The results of this Survey's finding on the current status of the issues regarding uninsurance and underinsurance discussed in the Previous Survey and the initiatives taken by the GSIS and relevant agencies to address these issues are summarized in the following (1) to (3).

#### **(1) Current status of activities① to ⑦ of Section 4.4.1 of the Previous Survey relating to uninsurance**

##### **① Disaster reduction activities based on the NDRRMP**

⇒ • GeoRisk Philippines, an application developed by PHIVOLCS has been made available online (since 2019). This application allows the user to grasp natural disaster hazard information by generating an assessment report on the exposed natural hazard and its impacts facility and population at any given point on the map. (Section 4.5.2 of this Report)

- GeoRisk Philippines can be used to check natural disaster hazards at the location of facilities insured by the GSIS.

##### **② GSIS's national caravan for insurance promotion ("Insurance Caravan")**

⇒ Ongoing activity carried out by the Insurance Group (Section 5.2 of this Report)

##### **③ The Circular from DILG to uninsured municipalities to request for compliance with RA 656 (Memorandum Circular No. 2016-63<sup>103</sup>, dated May 11, 2016).**

⇒ The number of uninsuring agencies is decreasing.

##### **④ Memorandum issued by COA to enhance verification of RA 656 compliance (Memorandum No. 2016-024, dated December 14, 2016)**

⇒ • The number of uninsuring agencies is decreasing.

- In accordance with the Circular (COA Circular No. 2018- 002<sup>104</sup>, dated May 31, 2018), agencies and local governments have submitted public asset information to the GSIS. However, the contents of the information submitted are insufficient and the GSIS is proposing to obtain information from NARS (Section 2.1.3 of this Report).

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<sup>103</sup> "Reminding all local government units to insure properties with GSIS in compliance with the property insurance law"

<sup>104</sup> "Guidelines prescribing the submission of the Property Inventory Form as a basis for the assessment of general insurance coverage over all insurable Guidelines prescribing the submission of the Property Inventory Form as a basis for the assessment of general insurance coverage over all insurable assets, properties and interests of the government with the General Insurance Fund of the Government Service Insurance System"



- ⑤ Strengthen supervision of risk transfer mechanisms through amendment of RA10121
  - ⇒The Sunset Review of RA10121 (an assessment of the effectiveness and impact of RA10121) was initiated in 2014 and the results have been reflected and published in the NDRRMP 2020-2030. The NDRRM framework itself has not been reviewed, thus revision to the Republic Act has not yet been made. (Section 2.1.2 of this Report)
- ⑥ Enactment of legislation to amend RA 656 and establishment of a review council of relevant agencies
  - ⇒The proposed amendment to RA656 has been approved by the GSIS Board for submission to the Houses and Congress (GSIS Resolution No. 2020-08, dated January 28, 2020), but no amendment has been made to date. (Section 2.1.1 of this Report))
- ⑦ Natural Disaster Insurance Program for Local Governments (December 2016)
  - ⇒The parametric natural disaster insurance program covering 25 LGUs was launched in July 2017 with the WB's support. The program was renewed in 2018 with a doubling of coverage, but was not renewed after the second year. (Section 2.3.1 of this Report)
  - The COA's audit report on the GSIS pointed out that the GSIS is not authorized to offer parametric insurance product, and that the procedures for initiating and procuring the insurance program are inadequate and deviate from the regulations. This resulted in concerns over whether the premiums, a national asset, are adequately protected.
  - The COA further concluded that while there were 14 earthquakes and 62 typhoons that caused damage in the Philippines during the insured period (two years), the program only paid out 84 M PHP for one typhoon, resulting in an insured loss ratio of 4.5% for a two-year premium of 1,886 M PHP under this program. Thus, it was concluded that the parametric insurance program is not cost-effective (as a mechanism to compensate for post-disaster recovery costs).

**(2) Current status of proposed measures ① to ④ of Section 4.4.2 of the Previous Survey relating to uninsurance**

- ① Provision of natural disaster risk information and loss assessment to insureds using risk assessment tools
  - ⇒The natural disaster loss assessment system developed in the previous survey was only for Metro Manila, and since significant progress has been made on development of the disaster risk assessment tool in the NDRRMP, there was no need to utilize the developed system.

- ② Considerations on changing the deductible provision for natural disaster coverage
  - ⇒ There is no change in the deductible for natural disaster coverage for both reinsurance procurement contracts other than MRT3 and GSIS retention contracts. On the other hand, for MRT3, the deductible in the September 2017 contract has been changed from 2% to 0%.
- ③ Specifying mandatory natural disaster coverage in the amended RA656.
  - ⇒ A proposed amendment to RA656, "A proposed GSIS non-life insurance law," was resolved by the GSIS Board in January 2020 (GSIS Resolution No. 2020-08, dated January 28, 2020); however, the GSIS has yet to receive feedback from congress and is uncertain whether or not the congress and is uncertain about whether or not the amendments will be deliberated in the future. Section 2.1.1 of this Survey).
- ④ Monitoring of natural disaster coverage rates at GSIS
  - ⇒ In addition to the list of agencies with and without fire insurance, a list of agencies without natural disaster coverage is being prepared.

**(3) Current status of proposed measures in Section 4.5 of the Previous Survey relating to underinsurance**

The reinsurance procurement for the insurance programs covering DepEd schools and DPWH roads has begun. Although the underinsurance is still an issue, in the case of roads, DPWH has provided information on the length and the unit cost of construction, so it is expected that the insurance contracts will be implemented with the sum insured set close to the replacement cost. On the other hand, the GSIS still needs to establish a framework to allow it to assess the replacement cost of the facilities to be insured, which includes the development of a replacement cost appraisal system.

- ① Setting incentives on insurance contracts to encourage correction of underinsurance
  - There are no changes to the terms and conditions of the insurance policy.
- ② Confirmation of replacement cost by GSIS
  - There are no changes to the manual.
- ③ Assessment of replacement cost by the insured
  - There is no change in the procedures for insurance underwriting and renewal.

**8.1.2 Survey results and future directions**

The following table summarizes the current status confirmed in this Survey and proposed future directions by considering areas requiring future support and cooperation as indicated in the Previous Survey, including efforts to address the above-mentioned issues of uninsurance and underinsurance. For each item, references to the specific descriptions in previous chapters are shown in parentheses.

Table 8-1 Proposed future directions based on the results of this Survey

Previous Survey Report		Chapter 9. Proposed Areas That Would Need Future Cooperation and Support		Results of this Survey	
		Chapter 9. Proposed Areas That Would Need Future Cooperation and Support		Current status	Future direction (draft)
Chapter 8. Suggestion of Infrastructure Resilience through Property Insurance	8.1.1	Increase the role played by disaster insurance by eliminating uninsurance and underinsurance of public infrastructure	Support for development of Replacement Cost Database for buildings of public institutions to solve underinsurance	9.1.1	According to GSIS, in response to COA Circular No. 2018-002, a total of 224 agencies and municipalities have provided lists from 2019 to 2021. However, the content is inadequate; GSIS recognizes the need to acquire a comprehensive list of assets and the necessary data to be insured from the NARS asset data that is being developed in the BTr. (8.1.1 (1)④)
				9.1.2	<ul style="list-style-type: none"> <li>Several commercial-based natural disaster loss assessment models have been developed since the 2014 Philippine Disaster Risk Assessment Model by the DOF, as well as cooperative projects to develop open-source typhoon and flood models, which have enabled the discussion of risk-based premiums throughout the Philippines.</li> <li>As a result of the NDRRMP, the GeoRisk Philippines, a natural disaster hazard assessment tool covering all regions, is now in operation. (8.1.1 (1) ①)</li> </ul>
8.1.2	Introduce a Mechanism to Promote Prior Investment in DRR	Supporting extension of the Risk-Based Premium Rate Calculation Tool beyond Metro Manila	Assistance with design of DRR certification scheme	9.1.3	<ul style="list-style-type: none"> <li>As a result of the NDRRMP, the GeoRisk Philippines, a natural disaster hazard assessment tool covering all regions, is now in operation. (8.1.1 (1) ①)</li> </ul>
				9.1.4	The World Bank loan (300M USD in June 2021) will be used by DPWH to carry out seismic retrofitting of 425 schools and hospitals in Metro Manila. (Chapter 7)
8.1 Recommendations for Solving Public Infrastructure Insurance Problems and Improving Its Role	8.1.3	Capacity building of GSIS for Underwriting Natural Disaster Risks	Expanding the role of the GSIS underwriting division's risk engineering team and strengthening the team's capacity	9.1.5	The GSIS is well aware that the smooth operation of the reinsurance procurement requires appropriate risk surveys of the insured facilities. On the other hand, there has been no change in the structure of the risk surveys department since the time of the previous survey, and GSIS hopes to build its capacity. (Chapter 3)
				9.1.6	<ul style="list-style-type: none"> <li>In accordance with GSIS internal regulations, the GSIS procures facultative reinsurance for policies with a maximum loss of more than 2B PHP per accident. In addition, treaty reinsurance is procured for losses exceeding 1B PHP in total for the insurance line of Property and Engineering.</li> <li>It is difficult to determine the maximum bid price when procuring reinsurance, and there are some infrastructure projects for which bids have failed. (Chapter 3)</li> </ul>
8.2 Recommendations for Promoting the Strengthening of Public Schools	8.2.1	Necessity of DRR retrofitting works for existing public school buildings	Sharing Japanese experience of DRR retrofitting	9.1.7	Information on payment operations is insufficient at this time.
				9.2.1	<ul style="list-style-type: none"> <li>Through A Presidential Order (EO No. 52, May 2018), PMO-ERG is established directly under the Office of the President to enhance the resilience of Metro Manila against major earthquakes.</li> <li>DPWH will take the lead in preparing and implementing the retrofit plan.</li> </ul>
8.2.2	A standard property insurance program with an incentive for DRR investment	Necessity of funds for DRR retrofitting work	Necessity of funds for DRR retrofitting work	9.2.2	<ul style="list-style-type: none"> <li>A 300 M USD loan from the World Bank has been approved to finance the seismic retrofitting of public assets in Metro Manila (June 2021). DPWH will retrofit 425 facilities (389 schools and 36 hospitals) in Metro Manila. (Chapter 7)</li> <li>There are also many facilities owned by local governments, but these are not included.</li> </ul>
				9.3	<ul style="list-style-type: none"> <li>A standard property insurance program utilizing Green Climate Fund as an integrated disaster risk management initiatives promoting for resiliency of the public schools against natural disasters</li> </ul>
				N/A	N/A
				<p>9.1 Collaborating to Solve Problems and Improve the Role of Public Infrastructure Insurance</p> <p>9.2 Cooperation to promote the resilience of public schools (cooperation to introduce a comprehensive disaster prevention and rehabilitation)</p>	<p>【Replacement Cost Appraisal System】 Compare the list of assets received by GSIS according to the COA notification with information on NARS to develop a database of information needed for the GSIS's public insurance operation. (Chapter 6)</p> <p>【New Risk-Based Premium Rate Calculation System Development】  <ul style="list-style-type: none"> <li>Based on the current situation described in the left column, a new risk-based premium rate calculation system will be developed without developing a new disaster risk assessment model. (Chapter 4)</li> <li>It is reasonable to use GeoRisk Philippines for natural disaster hazard assessment in the GSIS public insurance. (Chapter 4)</li> <li>The risk categories of natural disaster premium rates (earthquake, typhoon, and flood) currently used in the GSIS public insurance will be subcategorized into risk-based categories to develop the new risk-based premium rates. (Chapter 4)</li> </ul> </p> <p>【DRR Certification Program】 For schools and hospitals in Metro Manila that DPWH will conduct seismic retrofit to (425 facilities in total are planned) and for facilities that DPWH considers no need to be retrofitted, GSIS will formulate            ① Regulations and disaster prevention standards that will provide preferential treatment in terms of insurance premiums, etc., and ② DRR Certification Program for the facilities which meet the criteria. (Chapter 7)</p> <p>【GSIS Capacity Enhancement: Insurance Underwriting and Disaster Management】  <ul style="list-style-type: none"> <li>The capability to conduct risk surveys is essential for procuring reinsurance. (Chapter 3)</li> <li>In the view of strengthening the role of public insurance in compensating for losses from natural disasters, it is necessary to improve the capability to assess natural disaster risks and the condition of facilities against natural disasters. (Chapter 3)</li> <li>This will also be effective in the GSIS's role in risk control and disaster prevention management for reinsurance procurement. (Chapter 3)</li> </ul> </p> <p>【GSIS Capacity Enhancement: Reinsurance Procurement, Accumulation Management】            - For contracts ceded to the reinsurance, it is possible to calculate premiums and assumed losses for the natural disaster coverage using commercial models. If it is possible to obtain commercial models for this operation, commercial models can be used for risk assessment, insurance design, and accumulation management of insurance programs. (Chapter 3)</p> <p>【GSIS Capacity Enhancement: Assessment of insurance claims in the event of a wide-area disaster】 It is possible to share information on examples of approaches taken by private insurance companies in Japan</p> <p>Assess the seismic retrofitting of schools and hospitals made by DPWH, apply the new risk-based premium rates, and certify them for disaster prevention. (Chapters 4, 5, 7)</p>

## 8.2 Recommendation and roadmap for improving public insurance

### (1) Enhance the role of public insurance in securing post-disaster recovery costs

As mentioned, insurance is designed to transfer the risk of loss and reduce financial impact while securing recovery costs in the event of a disaster. For this purpose, sufficient and prompt payment is important. To this end, the following specific recommendations are made as a result of this Survey.

#### ① Develop the replacement cost appraisal system in line with the proposed development plan (Chapter 6)

The replacement cost must be adequately valued in order for the insured to receive sufficient insurance payment to restore the asset. A development plan is proposed in this Survey to develop a replacement cost appraisal system, which will help resolve the issue of under-insurance in many public insurance contracts. It is recommended that the system be developed in line with the proposed development plan.

#### 【Development Plan (draft)】

- 1) Draft an implementation plan
- 2) Determine responsible agencies and form of use
- 3) Review replacement cost appraisal method
- 4) Collect and analyze data
- 5) Finalize the replacement cost appraisal method
- 6) System development and trial tests
- 7) Create system manual and conduct training
- 8) Prepare and deploy new system (including approval processes)

#### ② Capacity building for GSIS to strengthen insurance operation functions (Chapter 3)

The GSIS is expected to maintain financial solvency as a public insurance provider. The GSIS's operation of underwriting for risk retention and risk transfer is one of the critical areas maintaining its financial solvency so that GSIS will continue to be able to appropriately protect the asset of the insured. This Survey collected and reviewed information on the actual situation at the GSIS such as underwriting operations, and identified areas that needs to be strengthened.

In particular, with regard to accumulation management of catastrophe loss in reinsurance procurement, this Survey concluded that the GSIS will need to obtain further knowledge and expertise on accumulation risk calculation methodology and amend accumulation management guidelines in order to procure reinsurance smoothly and adequately.

Japanese private insurance companies are assessed for risk management related to

retention and ceding in accordance with the FSA<sup>105</sup>'s "Comprehensive Supervisory Guidelines for Insurance Companies," which includes the following items<sup>106</sup>. The insurance companies conduct risk assessments, establish policies, develop detailed guidelines in regulations and procedures, and are audited in accordance to these guidelines.

**FSA's "Comprehensive Supervisory Guidelines for Insurance Companies"**

Excerpt from "II. Risk Management for Retention and Ceding", evaluations item for insurance supervision

- Are appropriate retention and ceding policies formulated by the board of directors, etc., in order to adequately manage the amount and concentration of risks through ceding?
- Do retention and ceding policies include criteria for managing retention limits for single and aggregate risk units, ceding company solvency, and concentration on a single reinsurer according to the characteristics of the underwriting risk?
- Are insured risks in excess of retention limits under retention and ceding policies adequately covered by reinsurance?
- Has a framework been established to ensure that each division that procure reinsurance autonomously checks the status of compliance with retention and ceding policies? Also, is there an established framework to allow the entire company to check the status of compliance with the retention and ceding policy independently of each division?
- Has the status of the reinsurance payment, future collectability of reinsurance contract, and the results of reinsurance contract been assessed?

In addition, in order to facilitate reinsurance procurement, this survey confirmed the necessity of risk surveys, especially those that cover natural disasters, as a tool to facilitate reinsurance procurement as the risk surveys provide the reinsurers with the information to appropriately assess the risks and encourage the insured to control risks at that facilities. Japanese private insurance companies, having experienced numerous natural disasters, have simulation-based disaster forecasting technology, established methods for calculating PMLs based on quantitative analysis of natural disasters, and accumulated experience and knowledge in risk surveys of numerous facilities.

In addition, utilization of various underwriting schemes can help strengthen risk control and meet the needs of the insured, thus it is recommended to consider adopting these schemes from a long-term perspective.

Furthermore, the results of this Survey confirmed that insurance payments for Typhoon Yolanda (2013) have not been completed for about 25% of the total losses. The ADB, which is designing the insurance program of the Philippines, also indicated the need to create a mechanism for prompt and appropriate payment of insurance claims. Japan is similar to the Philippines in that it is exposed to widespread damage from natural disasters. Each insurance company will set up a task force and gather the staff in the disaster area throughout the company to speed up the payment of insurance claims every time a major disaster occurs.

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<sup>105</sup> Financial Services Agency

<sup>106</sup> <https://www.fsa.go.jp/common/law/guide/ins/02c.html>

According to the General Insurance Association of Japan, in the case of the Kumamoto Earthquake that occurred in April 2016, 40,000 claims in earthquake insurance were paid in approximately one month after the disaster and almost all of the 236,000 claims were paid within five months (in September).

To share Japan's knowledge and experience, this Survey proposes for GSIS to conduct a training course in Japan. The course will introduce approaches taken in Japan, which will help GSIS to strengthen its insurance operation functions. The specific contents are as follows.

**【Training in Japan (draft)】**

(Target participants)

The candidates proposed based on comments from the GSIS are as follows:

- Insurance Group (persons in charge, marketing and underwriting personnel)
- key persons from the Actuary Office and Risk Management Office

(Contents)

- Accumulation management:  
Calculation method of accumulation risk, establish framework to reflect calculated accumulation risk into internal regulations and guidelines
- Reinsurance procurement: Ceding policy, ceding conditions
- Underwriting: Underwriting expertise, introduction of various insurance schemes
- Risk survey and disaster management:  
Risk survey methods for natural hazards for individual facilities and recommendations for disaster prevention
- Insurance payment:  
Introduction of the mechanism and approaches to insurance payment post-disaster

## **(2) Role as a financial tool to provide incentives for disaster mitigation measures**

Insurance is meant to provide compensation in the form of insurance payment to a loss caused by a disaster, and does not reduce disaster risk by itself. However, as a financial tool that is linked to disaster risk, insurance can contribute to the creation of a framework that leads to disaster risk reduction. For this purpose, this Survey proposes the following two suggestions based on the survey results.

- ① Development of a new risk-based premium rate calculation tool that fully reflects risk in line with the proposed development plan (Chapters 3, 4, and 5)

By ensuring that insurance premium rates fully reflect the risks, government agencies as owners of public assets will recognize the disaster risk assessment result of their public assets.

Disaster mitigation measures will lead to a reduction of insurance premiums and this discount in premium will serve as an incentive for disaster reduction. In this Survey, through an initial analysis of the current insurance premium rates, a development plan (draft) for the introduction of rates to adequately reflect risk (new risk-based premium rate) was formulated, and the survey results indicated that it would be possible to proceed to the implementation of the development tool in line with this draft.

**【Development Plan (draft)】**

- 1) Draft implementation plan
- 2) Collect and analyze data
- 3) Design new risk-based premium rates
- 4) Obtain GSIS Board approval(Finalization of new risk-based premium rates)
- 5) Develop and test the new premium rate calculation system
- 6) Prepare the revised application forms and create the system manuals
- 7) Plan and implement training
- 8) Prepare the system development report
- 9) Obtain GSIS Board approval (introduction of new premium rates)
- 10) Deploy the system

② Pilot trial implementation of the DRR Certification Program based on the proposed design

The Previous Survey found that the introduction of risk-based premiums alone would not necessarily provide an incentive to the insured for investing in disaster reduction because the insurance premiums are relatively small compared to required investment. Therefore, the concept of a DRR certification system was proposed in the Previous Survey to supplement the incentive by risk-based premium, and a design was reviewed in this Survey.

A proposed program is considered practically feasible provided that necessary technical assistance and capacity buildings to GSIS are made. However, it remains unclear if GSIS is capable to allocate adequate resources at this moment. A clear definition of mandatory for GSIS should be established to assume responsibility for a role of the DRR Certification Program.

Therefore, it would be better to start from the design of the new risk-based premium rate, and examine options such as policy endorsements presented in Chapter 7. A proposed design of the DRR Certification Program should be reviewed and adjusted in line with policy endorsement. This should be followed by a pilot study to implement Risk-based Premium Program and DRR Certification Program so that GSIS can decide to officially

implement them and integrate the programs into its operation.

**【 Introduction of DRR Certification Program (draft) 】**

- 1) Draft an implementation plan
- 2) Design the detail
- 3) Prepare manuals and conduct training (in collaboration with training in Japan)
- 4) Obtain GSIS Board approval (pilot trial implementation)
- 5) Implement pilot trial

**(3) Propose roadmap (overview and details), personnel, and concept for (1) and (2)**

The following road map summarizes the above items. The roadmap below includes an overview that of the goals for public insurance improvement and details (activities) for each item.

In addition, personnel (technical experts) necessary to proceed according to the roadmap are proposed in Figure 8-2. Note that (1) to (2) ① and ② in Figure 8-2 and 8-3 corresponds the item numbers in Figure 8-1.

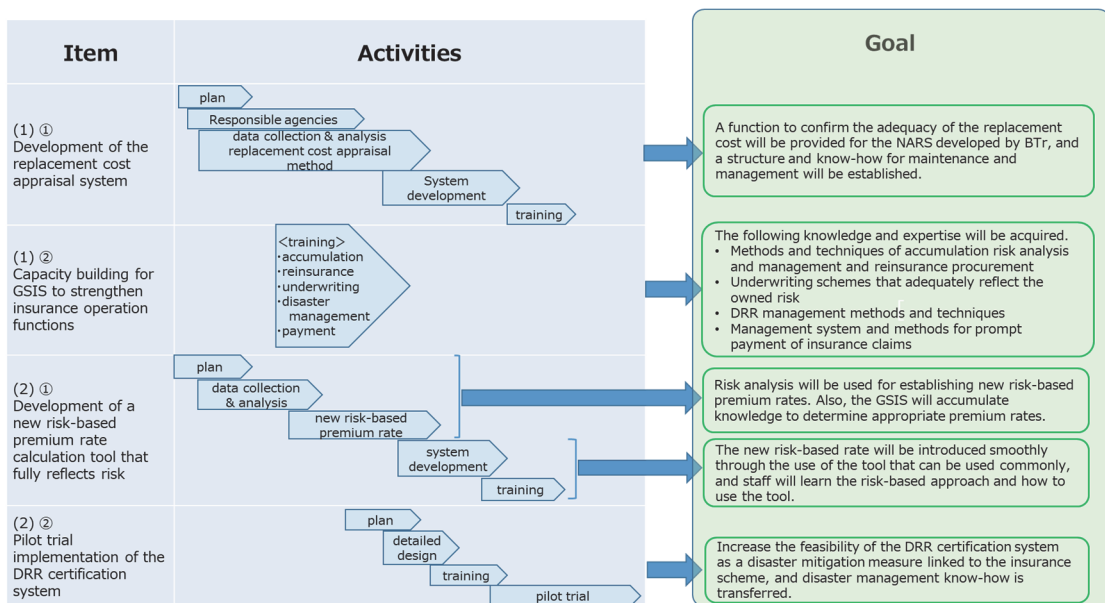


Figure 8-1 Roadmap I - Overview -



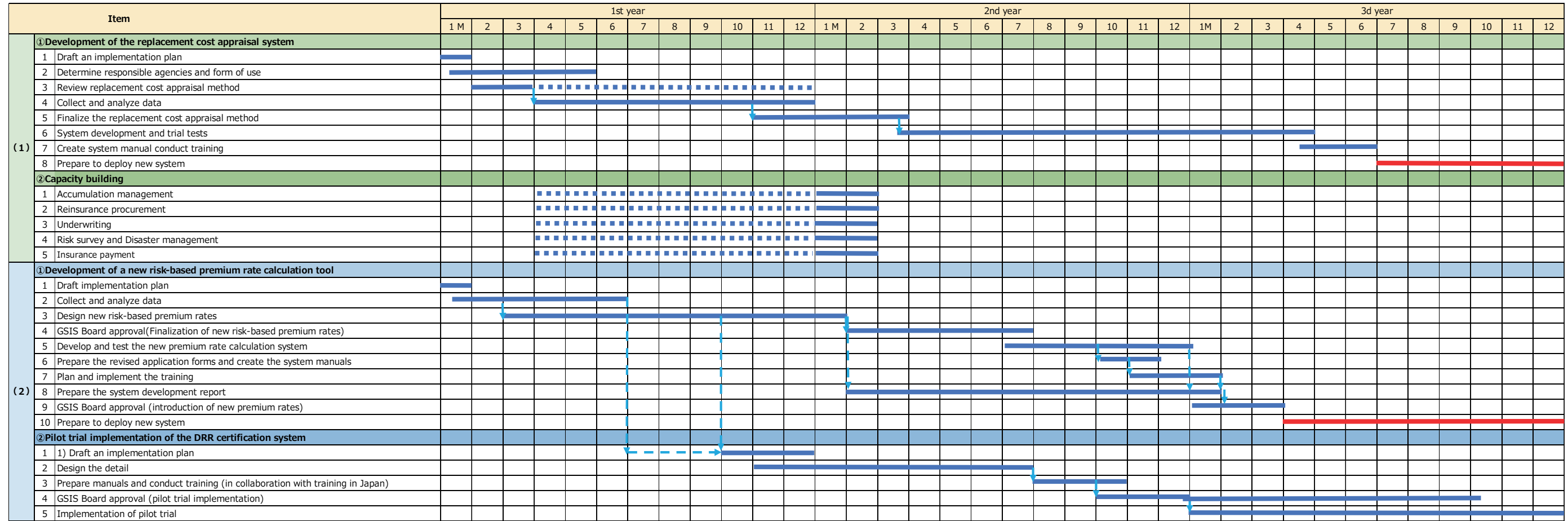


Figure 8-2 Roadmap II – Project timeline –

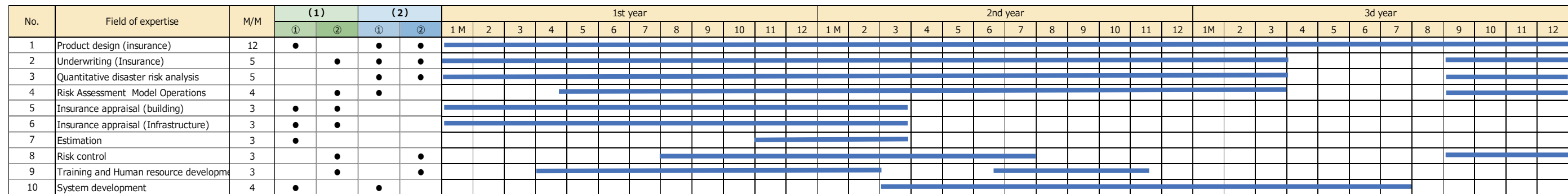


Figure 8-3 Roadmap III – Proposed personnel –

The survey team believes that the implementation these proposed activities will allow insurance to exhibit its traditional function to secure post-disaster recovery cost, but also for insurance to serve as a financial tool for risk reduction. These will in turn strengthen both pre- and post-disaster measures and thus contributing to protection of both lives and assets from disasters.

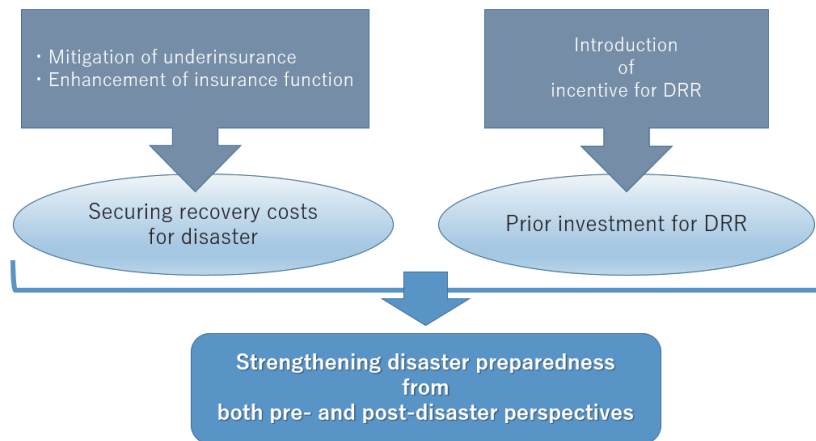


Figure 8-4 Diagram of the support concept

### 8.3 Suggestion for the implementation stage

The following is a list of issues to be kept in mind for the implementation stage based on the findings of this Survey. As the considerations on ensuring risks are adequately reflected in the risk-based premium (transitioning to the new risk-based premium) are described in detail in Section 5.2, this section will only cover the items relating to the overall picture.

#### (1) Coordination with the related projects

As described in Chapter 2, the Philippine government has been continuously promoting the policy on disaster risk financing, with support from donors such as the WB and ADB. In particular, NARS, which is developed by the BTr with support from the WB will have a significant impact on the future development plan of the Replacement Cost Appraisal System proposed in this Survey. Since the main users of the Replacement Cost Appraisal System will include the GSIS as insurer, and public asset owning agencies as insured, it is necessary to carefully confirm the specification and utilization of NARS and coordinate with stakeholders before moving forward with implementation.

The WB's SEADRIF is also seeking to develop the next support (financial and non-financial services) to member countries, including the Philippines, in the next six months. Last year, SEADRIF conducted a webinar series with main subject on public assets. For public insurance

related activities of them, it would be preferable to watch the progress for possible collaboration and demarcation. The Japanese government (Ministry of Finance) is also supporting the establishment and operation of SEADRIF. When SEADRIF started flood insurance for Laos and Myanmar, major Japanese private insurance companies were approached for reinsurance. Although there are currently no concrete plans for the Philippines, it would be important to keep an eye on these developments as activities relating to this Survey moves forward. This Survey confirmed that ADB is designing a parametric insurance for cities and plans to implement a pilot this year. Once the parametric insurance has formally been put into operation, the GSIS portfolio and accumulation risks will change. In considering the new risk-based premium, these changes should be taken into account, so that the rates will be more in line with the actual situation.

Thus, as policies and projects related to public insurance are currently underway or may be implemented in the future, it is necessary to keep an eye on these developments and coordinate with relevant parties as necessary.

## **(2) Information sharing and collaboration among relevant organizations**

The subject of this Survey, public insurance, is managed by the GSIS, the output of this Study and future projects will impact not only the GSIS, but also DOF and BTr, who are in charge of the overall risk finance policy. In fact, the BTr is in charge of development of NARS, and the specification and utilization of NARS will affect the GSIS's work in promoting decrease of uninsurance and collection of information from insurance contracts.

In the future, in order to promote support, it is necessary to grasp the activities of the agencies involved in risk financing, and it is important to thoroughly exchange information on each plan and policy for activities that affect one another in order to discuss and collaborate as necessary. In particular, in the development of the Replacement Cost Appraisal System, which is assumed to utilize information from NARS and to share an interface with the system, it is essential to coordinate well with the policies and progress of NARS. As mentioned earlier, the agencies responsible for the ownership and operation of the proposed Replacement Cost Appraisal System has not yet been determined, and the method of utilization of NARS is still under discussion. Developing a system that will be compatible with various agencies will be fairly difficult and result in a high cost; therefore, sufficient measures will be required in consideration of the complexity in managing system development. The Replacement Cost Appraisal System is expected to be used by the BTr, which manages the overall public asset management, the GSIS which operates public insurance, and public asset-owning agencies as insured, thus sufficient consideration must be given to ensure that the system is managed and operated appropriately and efficiently.

**(3) Examining the possibility of collaboration with the Philippine government's disaster prevention and mitigation measures**

As already mentioned, insurance itself does not strengthen facilities and equipment against the disaster risk, nor does it serve as measures to protect human safety, however, it can establish mechanisms for disaster mitigation and risk reduction through the insurance financing scheme. In this Survey, of the recent developments in the U.S, Federal Flood Insurance Program was presented as one example to incorporate disaster reduction measures into the insurance mechanism.

The Philippine government has been implementing various disaster prevention measures from both hardware and software aspects. Although the DRR Certification Program has been proposed as a tool to link insurance to disaster prevention and reduction, it is important to continue to observe disaster prevention developments in various fields and consider the possibility of incorporating the observed risk prevention efforts with insurance schemes to further improve public insurance and promote disaster prevention.