

DRAFT WORKING PAPER FOR SEADRIF WEBINAR

An Overview of Financial Protection of Public Assets

Introduction to SEADRIF Knowledge Series



Disaster Risk Financing
& Insurance Program



Introduction¹

Natural disasters cause widespread damage and losses, leaving fast-growing, emerging economies particularly exposed. Damages to infrastructure and assets and disruption to infrastructure services from disasters impede the smooth functioning of economies and societies and are estimated to cost households and firms well over US\$400 billion per year across low and middle-income countries². A large proportion of infrastructure and assets are publicly owned. As such, governments are often fully responsible for contingent liabilities arising from them in terms of securing targeted and efficient funding for service recovery post-disaster as well as the reconstruction of damaged assets.

Financial protection helps countries manage the financial impact of disasters on infrastructure efficiently and protect service delivery to the population. Financial protection is critical to cushion the financial impact of these shocks on the budget, and to ensure that rapid, reliable and cost-efficient finance is available to speed recovery and reconstruction. Equally, it helps to pre-arrange the plans and systems to quickly restore service delivery to the population. This becomes increasingly important in a world of growing risks associated with climate change and strained finances.

Among countries around the world, there is a growing awareness about the need to strengthen the financial protection of public assets. Many countries, particularly those across the South East Asia region, have made significant advances in recent years in putting in place financial protection of public assets. This is also a key priority under the Southeast Asia Disaster Risk Insurance Facility (SEADRIF), which provides both technical support as well as financial instruments to its members (see Box 1).

The objective of this knowledge series is to provide government officials with an understanding of the steps required to design, develop, deliver and operate effective financial protection of public assets, particularly through risk transfer and insurance. This series will draw upon case studies from within and outside the Association of Southeast Asian Nations (ASEAN) region to illustrate the key issues commonly encountered when designing and implementing financial protection measures. When taken together, these factsheets are designed to act as a guide for governmental officials.

This first overview paper provides an introduction to key concepts. It is designed to guide readers through the upcoming series, highlighting cross-cutting themes and issues to be

¹ This draft working paper has been prepared by Matt Foote, Lit Ping Low and Nicola Ranger with inputs from Benedikt Signer, Hideaki Hamada, James Allchorne and Greg Fowler, all from the Disaster Risk Financing and Insurance Program (DRFIP) of the World Bank's Finance, Competitiveness and Innovation Global Practice. The draft will be refined and finalized after the series of SEADRIF webinar on the Public Asset Financial Protection, building on the feedback from the SEADRIF members and other webinar participants.

² Stephane Hallegatte, Jun Rentschler and Julie Rozenberg. "Lifelines: The Resilient Infrastructure Opportunity." Sustainable Infrastructure. (Washington, DC: World Bank, 2019). See: <https://openknowledge.worldbank.org/handle/10986/31805> License: CC BY 3.0 IGO

considered in each part of the series. It will focus on the following key areas (each will then be discussed in more detail throughout the series):

- **Why** should governments develop a financial protection strategy for public assets?
- **When** can insurance be a good option for the financial protection of public assets?
- **Who** are the key stakeholders (both external and internal) that play roles in each stage of the insurance development process?
- **What** are the most important step-by-step considerations involved in the development of a strategy for public asset insurance?

Box 1: Southeast Asia Disaster Risk Insurance Facility (SEADRIF) Public Asset Financial Protection Program

The financial protection of public assets was identified as a key priority by SEADRIF member countries, particularly support for policy development through analytical, advisory and financial services. The Technical Working Group for a Public Asset Financial Protection Program (“the TWG”), co-chaired by Japan and the Philippines, will deliver a program of work to develop and appraise options for the provision of joint financial solutions by SEADRIF. Specifically, it will support members in financially protecting public assets, and in implementing a Technical Services Support Program. As such, it will incorporate analytical and advisory services, training and knowledge sharing and innovation. This knowledge series and the accompanying webinars on financial protection of public assets is the first activity under the Technical Services Support Program.

This series of factsheets will focus on insurance of public assets (Table 1). Risk transfer and insurance provides a means of transferring some of the financial burden for reconstruction efforts away from the government budget. This is important for reinstating services provided by those assets in a timely way. However, insurance is not a panacea for the financial protection of public assets. The fact sheets will also describe how insurance should be considered in the context of a wider disaster risk financing strategy.

Figure 1 provides an overview of the knowledge series, including each factsheet. They cover the full end-to-end development of public asset financial protection and insurance. Each covers a major theme related to the process, highlighting issues and considerations from the perspective of governmental officials and other stakeholders tasked with developing solutions.

The factsheets draw on and are intended to supplement information provided in a number of other guides and reports, which have been prepared to support public asset insurance. In particular, the following are useful, recommended background reading:

- **The 2017 Local Government New Zealand (LGNZ) Guide to Risk Financing in Local Government.** This guide provides comprehensive background to the concepts underlying the financial protection of public assets. It highlights the key concept of ‘risk appetite’, which underpins much of the strategic design of a risk-transfer program. It does so by defining the level of risk deemed appropriate between all stakeholders, while also determining the capacity and price likely to achieve commercial risk transfer,

including insurance. This leads to determining the level of self-insurance which is acceptable to risk owners as part of a strategic approach.

- **The 2017 World Bank Catastrophe Insurance Program for Public Assets – Operational Framework.** This technical contribution to the Asia-Pacific Economic Cooperation (APEC) finance ministers’ process provides a broad overview of risk-financing mechanisms and instruments applied throughout the APEC region. It examines all the components of a financial protection strategy for public assets.
- **The 2019 Insurance Development Forum (IDF) Guide to Insuring Public Assets** outlines some of the main considerations related to the use of insurance and reinsurance for the financial protection of public assets. The guide provides an overview of the general types and structures of insurance available for public asset coverage, as well as the processes of insurance and reinsurance applicable to public assets — including a high-level overview of key functions such as claims management. It also provides a summary of the relative differences between the two main applied types of insurance products, indemnities and parametric.

Readers are encouraged to consult these and other resources listed in the factsheets for further information to supplement the information presented here.

A brief description for each of the factsheets and webinar schedules are included in Table 1.

Figure 1: Overview of the Knowledge Series

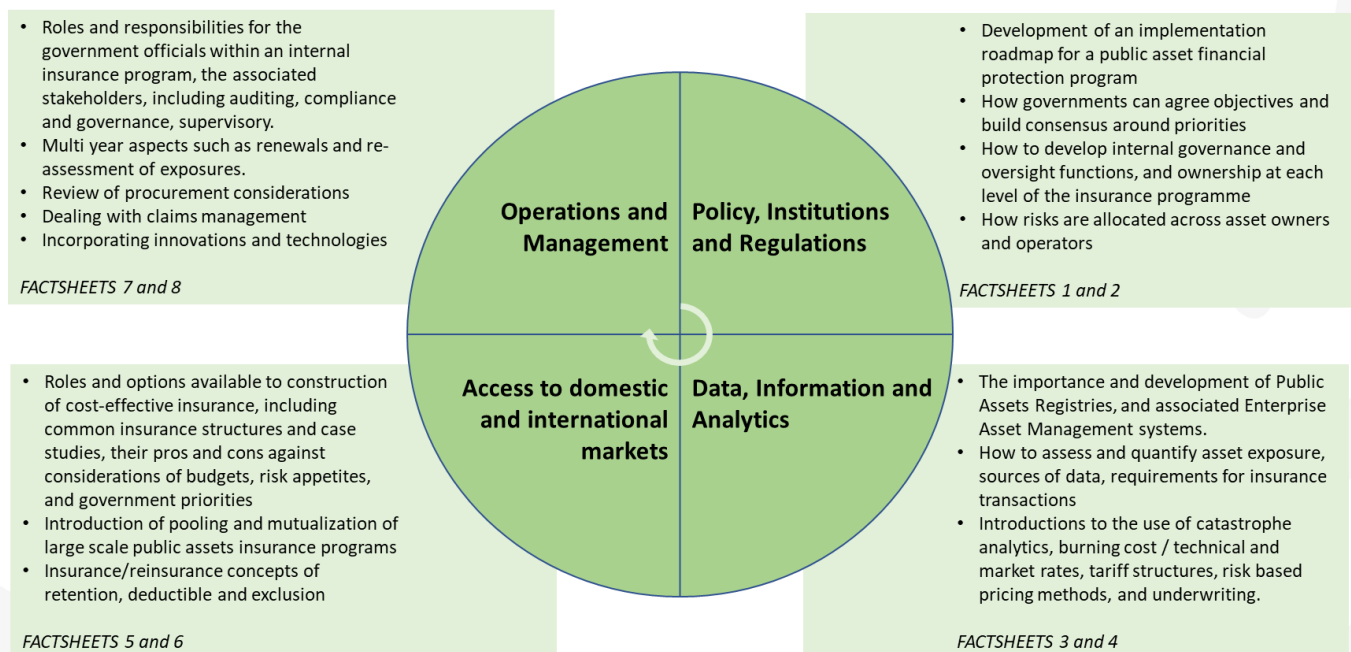


Table 1: Overview of Fact Sheet Series

1	High level roadmap and stakeholder definitions	Outlines the steps commonly required in the formation of a public asset financial protection program — from legal to data and analytics, to institutional and operational requirements. It will outline the key decisions and considerations for government officials.
2	Policy, institutional and regulatory requirements	Overview of the roles of policies, governance, institutions and regulations in the establishment and operation of a public asset insurance program. It will detail the need for governments to outline their objectives and build a consensus around priorities.
3	Public asset management and the role of data	This factsheet covers the wider aspects of public asset management and the role of insurance. It will use case studies to demonstrate the key aspects of a public asset management program, including public asset registries. It will also highlight key policy and business requirements for these systems and compare the data and functional needs for general public asset management versus insurance.
4	Information requirements for public asset disaster risk financing and insurance	This factsheet will address data requirements for an insurance transaction for public assets. It will include an overview of approaches for assessing and quantifying asset exposure; the use of catastrophe risk analytics; historical loss and damage data; risk-based pricing methods; underwriting information packs and engineering data; and claims management requirements.
5	Developing and leveraging domestic and international markets	This factsheet will outline the various roles and options available to construction of cost-effective insurance. This will include consideration of insurance programme structures commonly used, indemnity versus parametric, and will use case studies of existing programmes. It will highlight pros and cons of options (financial, operational) and needs to consider in relation to budgets, risk appetites, and government priorities
6	Pooling and mutual options for public assets insurance	This factsheet includes a description of approaches, advantages and disadvantages of pooling and mutualization of large-scale public assets insurance programs. It will include detailed case studies of existing municipal programs in the United States (US) and elsewhere, as well as management and operational considerations. It will also explain the general concepts of mutual insurance and reinsurance structures
7	Managing insurance programs	The operational aspects of managing a large-scale public asset insurance program will be outlined. The factsheet will look at the roles and responsibilities of governmental officials and stakeholders within an internal insurance program as compared to commercial approaches. It will consider multi-year aspects, renewals, and claims management processes.
8	Innovation and the future for public assets insurance	This factsheet will examine the use of technology (platforms, smart infrastructure, data) to improve insurance efficiency. It will also address market drivers and trends, and the use of insurance expertise, including risk engineering to increase resilience of assets.

Scale of the Challenge in Public Asset Protection

Strengthening the resilience of infrastructure systems and services is at the heart of efforts to meet the Sustainable Development Goals (SDGs). To achieve this, it is estimated that US\$94 trillion in infrastructure investments will be needed between now and 2040³.

Disasters cause damage and disruption to a wide range of infrastructure systems and services. Damage to power generation and distribution and transport infrastructure alone costs about US\$18 billion a year in low and middle-income countries⁴. The larger problem in terms of macro-fiscal, economic and social impacts of disasters is the disruption to infrastructure services, such as energy, water and transport — not to mention health and education. Altogether, disruptions caused by natural hazards, as well as poor maintenance, cost households and firms at least US\$390 billion a year in low- and middle-income countries around the world. These impacts are expected to increase due to climate change.

Governments often bear the brunt of the costs of disasters, particularly when insurance coverage for these costs is limited⁵. Disasters simultaneously affect both sides of a government's balance sheet. In addition, governments often assume a significant proportion of the recovery and reconstruction costs of infrastructure, particularly for uninsured publicly owned assets. At the same time, disasters can also reduce government revenues due to disruption of economic activities and income from revenue-generating public assets. Together, this can create a significant adverse fiscal impact, leading to slower recovery. As a result, this can increase the duration and scale of the impacts on the economy, firms and households.

Box 2: Contingent Liabilities from Disasters

The costs that disasters impose on governments — and ultimately on taxpayers — should be considered contingent liabilities or, when disasters lead to reductions in public revenues, contingent revenue losses. Explicit disaster-related contingent liabilities are payment obligations based on government contracts, laws or clear policy commitments that could fall due in the event of disaster. Implicit disaster-related contingent liabilities are expenditures the government makes in response to a disaster without prior formal commitments. The expectation for such payments might arise from political or moral pressure to speed up recovery in order to stimulate growth.

Research by the World Bank⁶ citing figures from Munich Re shows that fast-growing middle-income countries face the highest relative economic impact, with an average annual direct loss estimated at 2.9 percent of GDP. This is followed by low-income countries with an average annual direct loss of 1.3 percent of GDP (Figure 2). The relative shares of losses are also increasing over time. In this regard, the high exposure of fast-growing middle-income

³ Oxford Economics and the Global Infrastructure Hub, "Global Infrastructure Outlook: Infrastructure investment needs 50 countries, 7 sectors to 2040." (Washington, DC: World Bank, 2014).

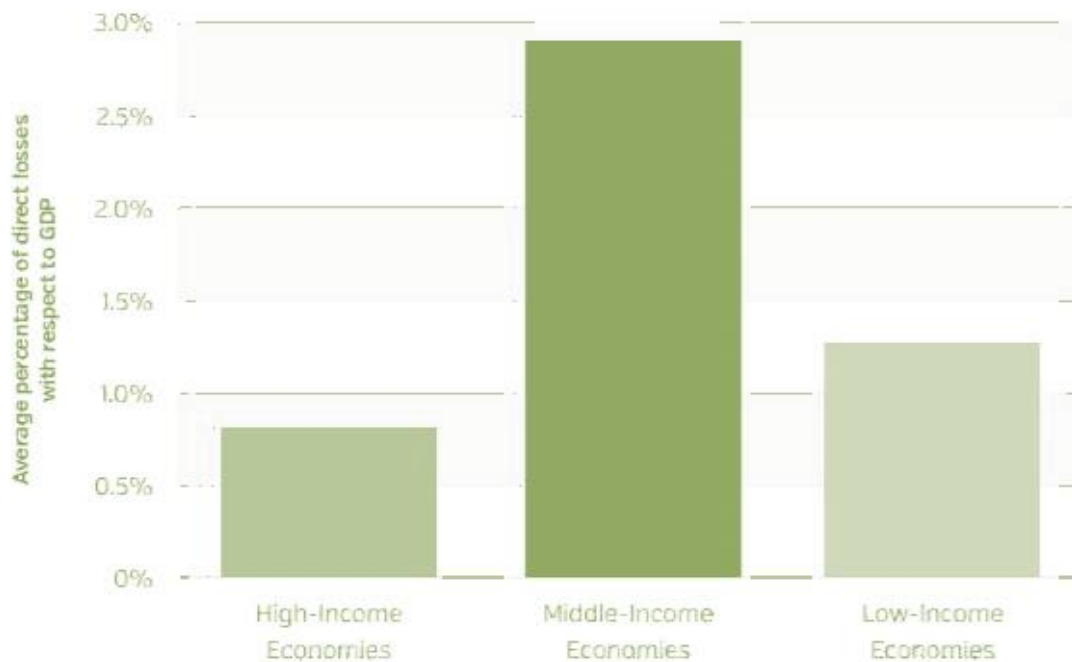
⁴ Stephane Hallegatte, Jun Rentschler and Julie Rozenberg. "Lifelines: The Resilient Infrastructure Opportunity." Sustainable Infrastructure. (Washington, DC: World Bank, 2019). © World Bank. See: <https://openknowledge.worldbank.org/handle/10986/31805> License: CC BY 3.0 IGO

⁵ Organisation for Economic Co-operation and Development (OECD). 2012. Disaster Risk Assessment and Risk Financing. A G20 / OECD Methodological Framework.

⁶ World Bank. 2014. Financial Protection Against Natural Disasters. Washington: World Bank

countries is related to their rapid urbanization and attendant growth of infrastructure assets. These assets are often less likely to adequately take disaster risk into account during construction, as is the case in higher-income countries.

Figure 2: Distribution of Direct Losses (1980-2012)



Source: Munich Re (2013)⁷.

Financial resilience is an important component in strengthening the overall resilience of infrastructure services and systems. The evidence presented here highlights the importance of building financial resilience to shocks, as well as ensuring that publicly owned assets have adequate financial protection and that finance is on standby to speed recovery. Maintaining an adequate strategy for financial protection of public assets is critical both in reducing the fiscal impacts of shocks, as well as in speeding the recovery. Hence, it helps to limit the wider economic disruption and longer-term impacts of disasters.

⁷ Munich Re. 2013. "Economic Consequences of Natural Catastrophes." Position Paper

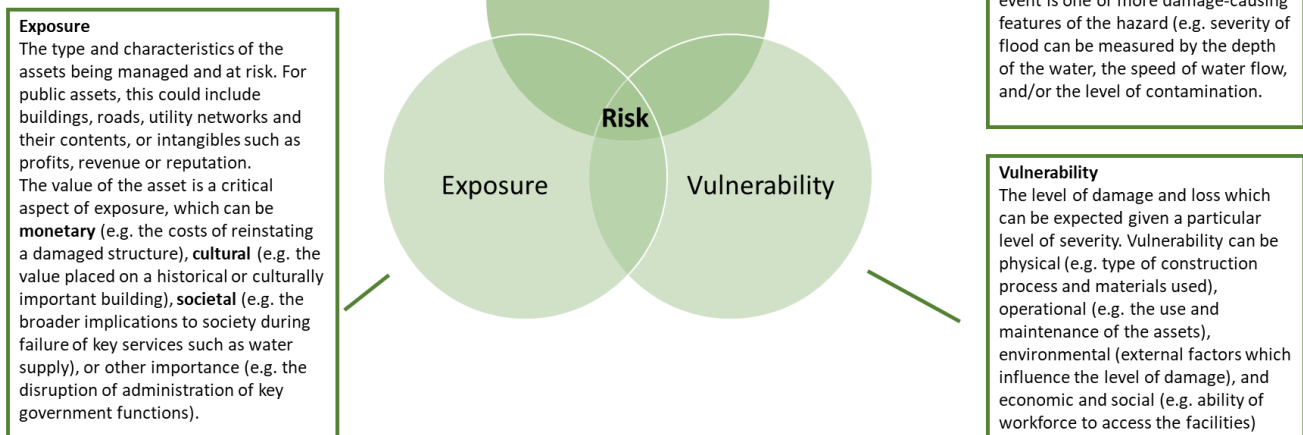
The Role of Insurance in Financial Protection of Public Assets

The factsheets provide a comprehensive guide covering all aspects of financial protection of public assets, from design to operation. This section provides an introduction to the key features of risk from the perspective of public assets (Figure 3), an overview of the role of insurance within a financial protection strategy, and an introduction to some of the key features of insurance for public assets. All aspects will be expanded upon in subsequent factsheets, as well as in the earlier noted recommended readings.

Figure 3: Characterizing Risk from the Perspective of Financial Protection of Public Assets

Risk can be considered as the combination of three basic components.

Insurance programs will need to be designed to optimize the coverage based on consideration of these factors.



Source: Authors

A comprehensive Disaster Risk Financing (DRF) Strategy establishes principles, objectives and methods for financing the response and recovery costs associated with damage-causing events. There are often numerous funding options available for consideration. Some come from internal sources (that is, within government, for example budget reserves, contingency funds, also called risk retention instruments). Some funding may come from external sources, such, risk transfer (insurance) or sovereign borrowing.

Depending on the level of risk, a DRF strategy often involves the following:

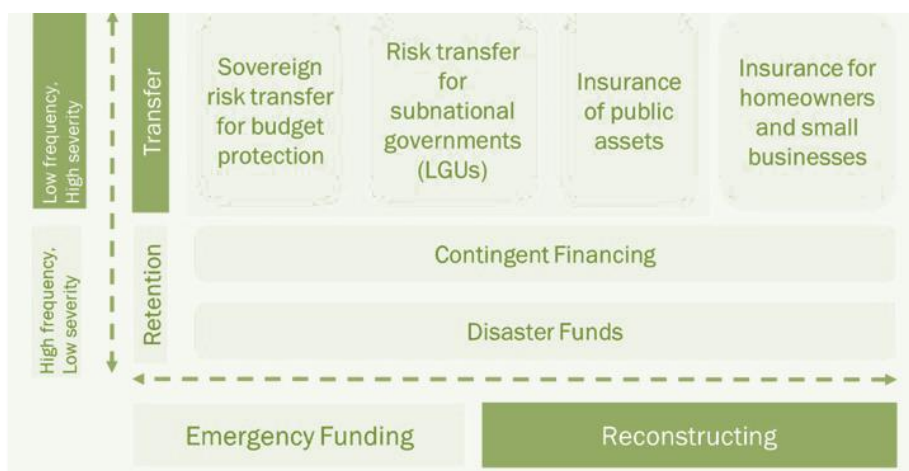
- A well-considered split between risk retention and transfer; and
- Numerous complementary risk-financing sources so that funding is diverse, and not subject to a single point of failure.

The most effective split between risk retention and risk transfer will differ for each situation, but generally the split is informed by:

- Internal influences:
 - The current fiscal position (that is, a government’s ability to bear financial risk and raise capital) and longer-term fiscal objectives; and
 - Contingent liability obligations beyond public asset risk.
- External influences:
 - The availability of external risk financing capital (for example, insurer attraction and capacity); and
 - The cost of external risk-financing capital versus self-retention.

Figure 4 illustrates how risk retention and risk transfer can be ‘layered’ to provide comprehensive coverage at least cost in the case of the Philippines. It further demonstrates how insurance of public assets can exist alongside other instruments as part of a strategy.

Figure 4: Schematic Illustration of the Philippines Disaster Risk Financing Strategy



Source: World Bank (2014) based on information provided by the Government of the Philippines
Note: LGUs = Local Government Units.

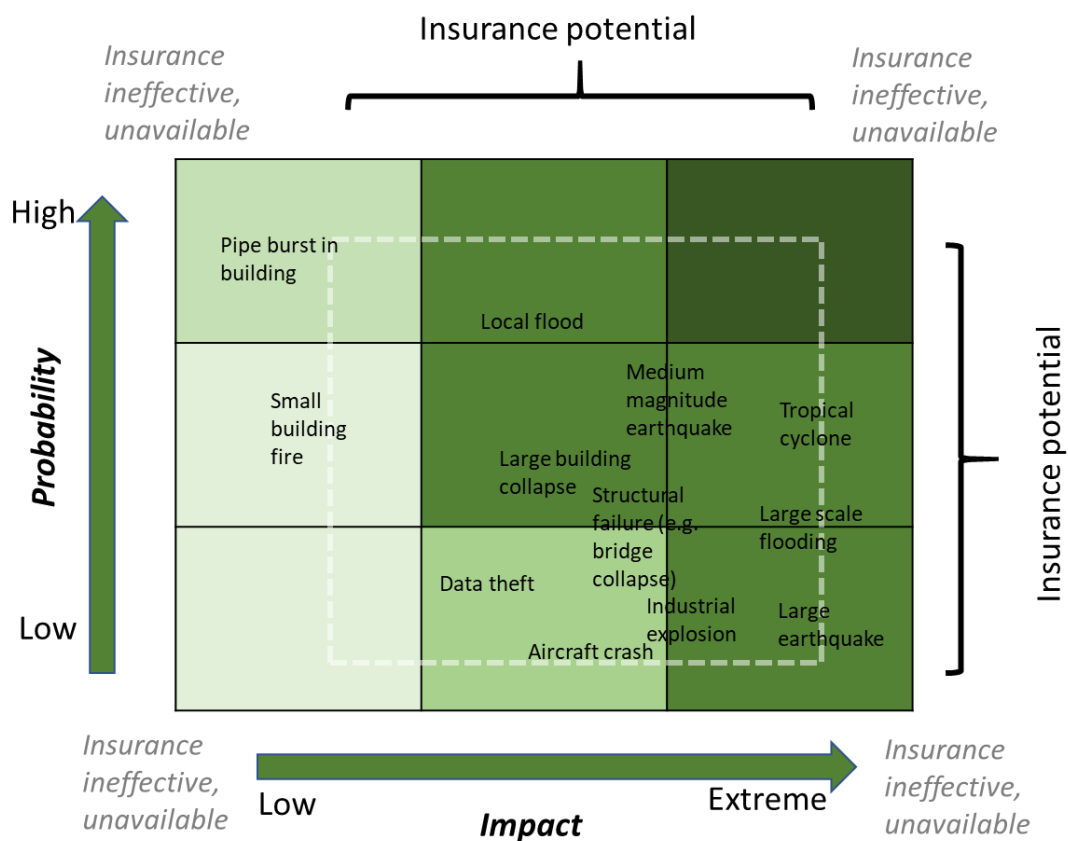
The majority of the factsheets focus on the design and implementation of public assets insurance, which is often one key component of a DRF strategy. Insurance has numerous advantages as a means for managing the financial risks to asset protection, including:

- It provides cost-effective capital to rebuild or reconstitute services after a disaster.
- It can help to develop a ‘risk management’ culture among risk owners and stakeholders by attaching a price to the risk.
- It can encourage resilience through quantification of premium discount benefits for different risk reduction measures.
- It can reduce the volatility and uncertainty of losses, which can enable more confident strategic planning for future investments in infrastructure.

However, insurance will not be suitable for covering all financial risks. In particular, the price for cover may not be economical against the expected return. Also, insurance may not necessarily be available for the type of asset or peril. An agreed **risk appetite**, as applied within a broad risk-management strategy will determine where, if at all, insurance is suitable.

Insurance may be suited to only part of a financial protection strategy, as illustrated by Figure 5, and the example from the Philippines above. Insurance can be uneconomical for both the smallest, most frequent potential losses, as well as in many cases, losses so large they are deemed either too improbable or too large to cover. Equally, as a commercial product, the price charged for smaller and more frequent losses, even if cover is available, may still not be economical. The use of retentions and deductibles is common in assisting in the optimization of insurance coverage as part of an affordable budget, while also maximizing the financial cover provided. This will be discussed further in future fact sheet.

Figure 5: Illustration of the Suitability of Insurance by Risk Type and Severity



Source: Authors

To design an effective public asset financial protection strategy, the objectives and expected benefits must be agreed between key stakeholders. Any insurance mechanism within the strategy must also be designed to reflect the objectives and nature of the risk.

If insurance is considered suitable for an aspect of the financial protection strategy, the choice of which product to use will also require consideration. Again, in considering a well-designed risk-management strategy and clearly defined objectives, the choice of insurance product can be more easily made. In the simplest terms, the primary options exist between two types of insurance – **indemnity** and **parametric**. Figure 6 provides a simple comparison between the two types of insurance.

There are also considerations around how insurance is structured and how other sources of capital may be employed as an alternative to insurance. In particular, **catastrophe bonds** and other sources of capital, based in some cases on a parametric insurance agreement, are available. A DRF strategy requires a bespoke approach, which would be developed to optimize the balance between risk retention and risk transfer for specific needs and situations. It would use either parametric or indemnity elements — or a hybrid of the two — to reflect different strategic objectives for coverage and the availability of capital. A detailed consideration of the options available will be covered in the factsheets.

Figure 6: Comparison of Parametric and Indemnity Insurance

<i>Parametric</i>		<i>Indemnity</i>
Ex-ante trigger (physical event or estimated loss) Not physical damage to insured assets	Payout basis	Payout after loss incurred Reinstatement / rebuild
Fast payout (days-weeks) Trigger based	Payment speed	Slower payout (months) Adjustment and settlement processes
Efficient, attracts wider capital markets no claims handling lower exposure data requirement	Advantages	Tailored to specific infrastructure risk profiles Pricing reflects resilience
Basis risk – potential mis-triggering Black box approach Not multi-peril	Disadvantages	Potential for underinsurance Potential capacity problems High operational / data overheads

Source: Authors

Roles and Responsibilities regarding Public Asset Risk Transfer

The factsheets provide a detailed overview of the key roles and responsibilities for each party in the insurance process, outlining a step-by-step process from design to operation. To introduce the key actors, Figure 8 shows a simplified structure for a hypothetical national public asset risk transfer approach that leverages commercial (re)insurance.

In the example of Figure 7, a Ministry of Finance (MoF) would act to consolidate the risks across a range of asset-owning entities. This could include other line ministries or agencies responsible for critical infrastructure, administration or other government services and functions. In this example, the MoF acts as the primary **policy holder** for risk transfer. An alternative approach would be for separate policies to be held by or for each asset-owning agency. The appropriate approach will depend on the organizational, legislative and governance models of the country, as well as the structure and ability of the insurance markets, both domestic and international, to participate. Specific management tasks could be undertaken either by other agencies or departments within the policy-owning ministry.

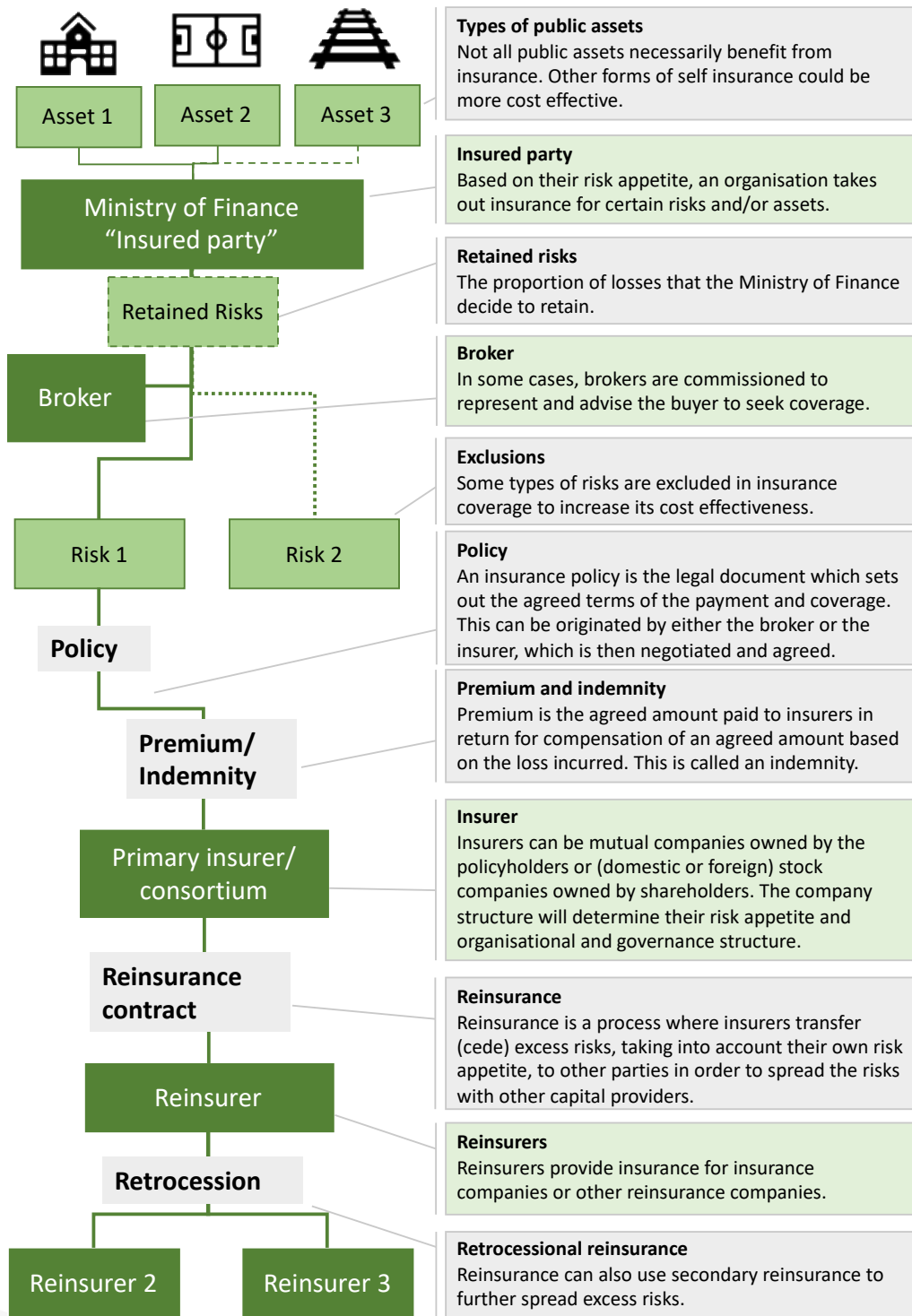
Various ways of structuring an insurance program are available to meet the objectives of the policy holder at the least cost. For example, insurer partners could be special purpose companies set up either within or on behalf of the government entities, or separately on behalf of the various entities. If a special purpose entity is wholly owned and managed directly by the insured entities, it is termed a **captive**. An example is the United Kingdom's Local Government Mutual, which pools risk across local authorities to provide financial protection of assets⁸⁸. A **mutual** insurance program can be developed whereby the insureds are the owners, as compared to commercial insurers with shareholders.

In the United States, joint pooling arrangements are a common means for local public service organizations to pool insurance and reinsurance in voluntary pooling arrangements. These are not fully mutual, as they do not return all profits back to members. However, they have common services and a joint reinsurance program. If a lead insurer or captive is not able or prepared to retain risks, it can cede the risks either wholly or in large part (with nominal retention) to other insurance or reinsurance markets. Such approaches are termed **fronting** arrangements.

In some cases, the services of a broker (intermediary) may be procured to assist in the structuring and pricing of insurance cover on behalf of the policy-holding Ministry or agency. In many cases, brokers will provide the key services required to support the insurance program design and procurement, including the provision of analytics, and actuarial and other services (including legal policy wording and claims management). A broker is not always necessary, for instance, in the case of the lead insurer(s) having their own analytics and claims management services. However, brokers can provide the kind of knowledge and expertise that is not necessarily available within the government teams.

⁸⁸ See: <https://www.local.gov.uk/local-government-mutual>

Figure 7: Simplified Structure for a Hypothetical National Public Asset Risk Transfer Approach that Leverages Commercial (Re)insurance



Source: Authors

Table 2: Summary of Key Roles and Responsibilities

<p>Asset-Owning Agencies and Line Ministries</p>	<ul style="list-style-type: none"> • Provision of data to represent the assets being insured at an adequate level of accuracy and completeness, including a schedule of asset locations and values. • Agreement on program aims and objectives. • Adherence to defined governance and management procedures. • Premium payments as allocated by risk assessment. • Claims notification and settlement, including: initial notification of claim, provision of details and evidence related to the damage; engagement with loss adjusters, contractors and claims managers; and recording of claim amounts paid and completion of works.
<p>Policy holder, for example, Ministry of Finance (or asset-owning agencies and line ministries)</p>	<ul style="list-style-type: none"> • Ownership and development of the strategy for public assets, including definition of risk appetite and risk tolerance in relation to the design of an effective approach. • Engagement with internal stakeholders including asset owners, auditors, compliance officials and regulators. • Lead government representative for the insurers and final acceptor of terms and conditions. Coordination of relationship with policy-issuing insurers, including approvals • Engagement with brokers and other third parties in line with government procurement regulations. • Provision of systems and operations to support insurance management across government agencies. • Documentation and management of the insurance process and procedures. • Determine and agree on the level of exposure to be retained by the government (for example, by asset-owning agencies and line ministries), or deductibles. • Provision of aggregated data (if multiple asset-owning entities) to the insurers at an appropriate level of accuracy and completeness. • Management of the claims process with insurers.
<p>Lead insurer / carrier (policy issuer)</p>	<ul style="list-style-type: none"> • Insurance pricing and rating of the assets as notified in the schedule of assets provided by the policy holder. • Provision of policy wording and contract to provide cover as agreed with policy holder. • Contact point for claims notification and settlement. • Organization of loss adjustment and other claims services for the policy-holding Ministry. • Ensuring appropriate governance and compliance actions to guarantee cover and payouts in line with the policy.
<p>Reinsurers</p>	<ul style="list-style-type: none"> • Provision of reinsurance capacity to ensure full coverage against largest potential maximum losses including natural catastrophes. • Ensuring payment of claims by insurers according to the reinsurance policy.
<p>Brokers / intermediaries</p>	<ul style="list-style-type: none"> • Provision of transactional advisories and marketing to ensure cost-effective coverage • Provision of analytical services to support pricing and structuring of risk transfer and selection of coverage to ensure effective coverage in support of objectives • Provision of ongoing services to support renewal of coverage as necessary.
<p>Regulators and supervisory organizations</p>	<ul style="list-style-type: none"> • Determine capital and operational rules for the provision of insurance and reinsurance, particularly with respect to the participation of domestic markets, or admission of international insurance and reinsurance markets. • Determine tariff structures as necessary for public asset risks. • Approve/supervise special purpose entities such as fronting captives, state-owned insurers, mutuals or consortia.
<p>Government audit and compliance agencies</p>	<ul style="list-style-type: none"> • Oversight and validation of insurance processes against procurement and internal accounting rules. • Validation of asset values (insured values) appropriate to the type of coverage being provided (for example, rebuilding/ reinstatement or Actual Cash Value (ACV)).

The large sums of monetary exposure associated with public asset insurance will most likely mean that no single insurer can provide the level of financial capacity necessary to cover the potential losses. Regulatory rules regarding the maximum exposure that any single insurer is permitted to retain will often act to reduce the level of coverage that is possible. In many cases, multiple insurers may be included on a coinsurance basis, with each accepting a share of the overall risk to an agreed level. Usually, this will mean that each participating insurer will receive a share of the premium paid.

Most insurance companies will themselves look to pass on (or cede) residual risk over and above their own risk appetite. Reinsurance companies will be employed to provide coverage, particularly against the largest potential losses (for example, large natural catastrophes). Brokers may well be employed by the insurance companies to assist in the reinsurance process, and a separate reinsurance policy will often be utilized.

Table 2 provides further details about the roles and responsibilities of the key actors involved in public asset insurance. Effective insurance programs require each stakeholder, both within and outside of government, to understand and fulfil their roles and responsibilities effectively at each stage of the process. **Governance** of the insurance program is a key activity, requiring clear responsibilities and oversight functions to be in place. In some cases, governance will be organized through a **Board**, and supported by **technical working groups** overseeing key aspects, including data, claims and procurement regulations. **Audit and compliance oversight** will also be key factors in covering all aspects of procurement, operations and management of the insurance program. It is essential that procurement and accounting laws are assessed regarding the use of insurance and reinsurance by government agencies as early in the design process as possible. This will help to ensure that any alterations or decrees can be developed and approved within an agreed timeline.

Developing a public assets financial protection strategy

Box 3: Stages in preparation and delivery of financial protection strategy

Design – the creation of an agreed business strategy and objectives for the financial protection of public assets in line with government policy vis-à-vis asset management.

Development – the assessment of risk and the establishment of an effective and sustainable financial protection program to achieve the strategic objectives in line with the risk appetite.

Delivery – the operationalization of the insurance / disaster risk-financing program, under agreed procedural frameworks, ensuring effective disbursement of claims and transparent accounting in line with policy terms and conditions.

Renewal – the continued review, redesign and renewal of the program to account for changes in exposure, risk and market trends to ensure ongoing cost effectiveness and sustainability.

This section summarizes some of the key considerations and principles required, as well as issues encountered, based on the stages commonly followed when developing a public asset financial protection program (described in Box 3). Each point will be addressed in detail in the relevant factsheets.

- **It is important for the strategic objectives of the proposed risk financing strategy to be fully described, as well as understood and agreed by the key stakeholders.** Most public asset strategies will include a diverse range of stakeholders, such as the various asset-owning agencies, governmental officials, and the public and commercial communities that can be impacted by service disruption. The aims and objectives of the proposed risk financing strategy must be fully understood and agreed by all stakeholders. This is particularly true for the development of a risk appetite statement / threshold that aligns with the various risk owner perspectives. Equally, the roles and responsibilities of each stakeholder / party must be understood and assured of commitment.
- **A significant length of time is required to design, develop and deliver an operational and effective insurance program.** The successful development of insurance, particularly from scratch, requires a lead time that enables the prerequisites of legislation, data and information provision, resource capacity and transaction to be put in place in advance of a fully operational program. Careful planning is required at the earliest stages to ensure critical steps are undertaken in good time — from review of existing legislation and procurement rules, through data capture and analytics, to the training of officials with specific roles and responsibilities for the insurance process. If commercial insurance markets are to be utilized, all necessary regulatory, operational and legal issues should be identified. Also, an agreement should be made regarding their remediation before entering into an insurance agreement. The development of a fully functioning insurance program can require many years.
- **Legal and regulatory rules need to be carefully developed to enable the effective use of insurance.** The successful application of insurance requires legal contracts

between the insured and insurers. Such services for insurance must be procured on behalf of government and managed by governmental officials. Consequently, the procurement and compliance rules that affect all aspects of the insurance program must be carefully considered, and the wordings / requirements clearly articulated and in line with the objectives. Various parts of the process require review as early as possible, such as the rules of procurement of third party services, including brokerage and insurance; the accounting rules for the budgeting and disbursement of insurance claims; the valuation of insurance-specific property values; and rules governing the policy and claims processes.

- **Internal operational procedures must be clear, tested, complete and consistent.** The successful operation of insurance will require a flexible, but robust framework of operational procedures, including oversight, governance and problem escalation processes. In particular, the key functions of data capture and claims management will require clear-cut desk instructions and policies for quality assessment, validation and oversight to be in place. Governance structures including managerial escalation and technical and oversight are critical aspects which must be developed, as well as stress tested to ensure their operation in periods of high stress, such as during a large-scale catastrophe. Where third parties such as loss adjusters, contractors or intermediaries are required, their capacity and processes must also be adequate to manage stress situations. Scenario testing and effective systems and data will improve the capacity for effective operations, even in extreme aggregate claims situations.
- **The importance of data and information suitable for insurance transactions cannot be understated.** Insurance transactions rely on data to inform every stage of design, development and delivery. In addition, the ongoing updating and review of data are essential to ensuring cost effective renewal, and the reduction of operational risks due to potential underinsurance or poorly priced and excessive insurance costs from inaccurate data. Claims management is equally dependent on good quality data. Strategies are required to capture data suited to insurance transactions. This will often require resources applied at the asset-owning levels, as well as centralized data management and validation. Data augmentation and remediation steps can be put in place but, require technical understanding of the underwriting and analytics processes which rely on them. Also, data capture can be costly, time consuming and resource intensive. It is important that data capture requirements are designed to be fit for the purposes of insurance transactions, without over-specifying requirements.
- **The setting of budgets for the insurance program is a key step in any strategic plan.** Funds assigned to insurance coverage can be fixed in advance, and the coverage sought should be as cost effective as possible based on the available funds. Alternatively, budgets can be based on the risk estimations, and set to optimize coverage after the initial pricing and structuring stages. In either case, all costs associated with the transaction — including premium costs, taxes, administrative overheads, third party services (including brokers, loss adjusters, and so on) — must be included in the overall budget. The impact of available premium funds on coverage can be a key determinant of the options available for coverage, including the level of retention or self-insurance that is put in place, or the

exclusion of coverage. Prioritization of coverage can be undertaken, but it must be in line with the objectives of the program and risk appetite. Budgets should be reflective of all expected overhead, while also ensuring the objectives of the coverage are fully realized with respect to risk appetite as defined in the strategy.

- **Government entities must have the technical and governance capacity to manage the insurance program over a long time period.** The use of insurance requires technical capabilities within the government stakeholder entities that cover all aspects of the insurance process, including data capture, risk assessment and management, claims management, compliance and auditing, accounting and policy management. Technical working groups, Boards and other governance and oversight functions require members with the appropriate levels of technical competency to ensure effective operations. A mix of technical, policy and institutional knowledge is also required across the team. Training, testing and professional knowledge capacity will be key to the long-term effectiveness of the insurance program. In the early stages, third parties including brokers and insurance consultants, can provide initial capacity, particularly if a pilot program is included to develop more robust mechanisms. However, it is important that training and technical capacity is underpinned by robust operational, delegation and governance procedures.
- **The insurance process will not be perfect at the start. Issues, including start-up problems, should be expected.** As a program is developed to protect public assets, it is common for issues to arise that had not been anticipated at the start. In particular, the processes of claims management will not have been fully tested until there is a large-scale aggregate loss event, with multiple and simultaneous claims. Also, it is likely that many of the procedures required to procure and manage insurance programs — including drafting appropriate decrees; implementing pricing and tariff structures; setting the level of deductibles and retentions; budgeting (including taxes); organizing third party services including broker procurement; undertaking insurance renewal activity; and dealing with asset owners and claims — will require regular updating and amendment as issues are identified. As such, it will be important to have in place the appropriate operational and governance mechanisms. A monitoring and evaluation (M&E) process can be applied, especially in the early stages of the insurance process. Specifically, it could be used to capture and mitigate for key issues encountered. A pilot program, with limited exposure, could also be used to test processes and assumptions before extension to a larger exposure.

Annex: Common Concepts and Definitions – Public Assets and Critical Infrastructure

‘Public asset’ is a term often used interchangeably with that of critical infrastructure but includes assets across much wider range of services and functions across government, including education, administration and health. As part of an effective insurance strategy, it is essential that the scope and priorities for the coverage of assets are fully determined. This enables the creation of collective approaches to prioritize risk between various asset stakeholders, as well as the ability to properly characterize the assets in relation to their risks. Therefore, defining what is a public asset and what is critical infrastructure is a key stage in the process of designing and applying insurance coverage. Definitions are applied at the national and multinational levels, as well as by various agencies and other actors with interests in managing assets or services.

Critical infrastructure includes systems, assets, facilities and networks that provide essential services and are necessary for the security of the nation and its economic security and prosperity, as well as the health and safety of its citizens. The definition of critical infrastructure is not static and can be revised in response to a changing national and international risk landscape. Overall, six sectors are widely classified as being critical: information and communication technologies, energy, finance, health, transport and water, although there are many variations. In some cases, it can include education, agriculture, the environment and defense, among others. Some definitions of public assets will be driven by consideration of their monetary value, as well as by their role in the provision of essential public services. Ownership and legal rights may also be used as definitions.

It is useful to consider public assets as elements or components of infrastructure or other systems, for example, the individual components of a power network’s generation, transmission and distribution assets. In many cases, then, the definition of public assets and critical infrastructure can be combined into one strategic approach, which considers both critical service importance and value.

Various international standards have also developed, including:

- **The International Standards Organization (ISO)** has developed an international standard ISO 55000, which relates to the management of all types of assets, including not exclusively physical or property related. ISO 55000 has been linked to the relevant Sustainable Development Goals (6,7,8,9,11,12,13). There are also many other ISO standards related to functional groups with asset characteristics, for example, resilient cities (ISO 37123), and energy management systems (ISO 50001)⁹.
- **The Institute of Asset Management** defines an ‘asset’ as an “Item, thing or entity that has potential or actual value to an organization”. It does not differentiate as to what can be constituted as a public asset. It suggests that assets may be grouped into those with ‘common characteristics’, referencing the ISO standard section ISO 55000:2014 (3.2.7)¹⁰.

The European Union defines critical infrastructure as “an asset or system which is essential for the maintenance of vital societal functions.” “The damage to critical

⁹ See: <https://www.iso.org/standard/55088.html>

¹⁰ See: <https://theiam.org/knowledge/links-and-resources/glossary/>

infrastructure, its destruction or disruption by natural disasters, terrorism, criminal activity or malicious behaviour may have a significant negative impact for the security of the [European Union] EU and the well-being of its citizens”¹¹. A European Commission (EC) Directive (2008/114/EC) and associated European Program for Critical Infrastructure Protection (EPCIP) included only energy, transport, health, financial, information and communications technologies (ICT), water, food and public order as key sectors.

The New Zealand government developed the following classification of public assets after the Christchurch earthquakes in 2010 and 2011 (Table A1).¹²

Table A.1: Public Assets grouped by services

High level	Sub level
Economic	Transport Power generation, transmission and distribution IT and networks Communications
Environmental	Land Stormwater / flood protection assets Landfill Conservation
Health	Health District assets Water supply / sewerage
Educational	Primary, secondary, tertiary, and regulatory
Social, Cultural, Heritage	Cultural and sporting assets Museums, art galleries, and libraries
Protection and security	Police, defense, correctional, fire, and civil defense assets.

Source: Controller and Auditor-General, Government of New Zealand, 2013

Regarding the insurance and reinsurance sector, public assets are generally not considered a specific class of risks. Instead, public assets are treated either as property risks in the same way as commercial risks, or in the case of infrastructure (for instance public-private partnership [PPP] projects), or specific credit, guarantee, liability or other risks, depending on the life cycle stage.

The Insurance Development Forum (IDF) ‘Practical Guide to Insuring Public Assets’ defines six general categories of infrastructure-related ‘public assets’ as follows:¹³

- Transport
- Energy
- Social infrastructure
- Water and sanitation
- Telecommunications
- Natural and green infrastructure

¹¹ See: https://ec.europa.eu/home-affairs/what-we-do/policies/crisis-and-terrorism/critical-infrastructure_en

¹² See: <https://www.oag.govt.nz/2013/managing-public-assets/docs/managing-public-assets.pdf>

¹³ See: <https://www.insdevforum.org/idf-practical-guide-insuring-public-assets>

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Glossary of selected terms

Actual Cash Value (ACV)	A method of estimating the insured value of properties and assets. ACV is equivalent to reinstatement cost minus depreciation, or the 'fair value'. It should only be used if the insured does not require funds to rebuild the asset from the ground up.
Aggregate (Loss / Limit)	The total loss experienced from multiple events over a given period. Some policies will include aggregate cover, or aggregate limits to cap payouts to an agreed total amount, usually over a 12 month period. See hours clause.
Analytics	Services and methods applied to assist in the identification, quantification and pricing of risk, and in the design of insurance and other financial transfer mechanisms. Analytics will include catastrophe modelling, underwriting, actuarial and exposure specialisms.
Annual Average Loss (AAL)	AAL is an estimate of the mean loss expected annually to an asset or collection of assets. It is a component of the 'technical rate' calculated for underwriting and pricing purposes. It is usually applied to catastrophe risk estimation.
Attachment	The monetary level of a loss at which the insurance will apply. Usually defines the point where coverage begins above a retention.
Broker (intermediary)	A specialist commercial advisory and advocacy agent which acts on behalf of the insured to acquire best cover and terms for the assets at risk. Services include analytics, legal wordings, claims services, and transactions. Brokers are regulated entities.
Captive	An insurance company that is wholly owned and controlled by its insureds. Captives are used to reduce external administrative fees, self-insure certain risks and act to seek reinsurance coverage. Underwriting profits are retained by the insureds.
Carrier	The policy issuing insurer/s, e.g. those accepting part or all of the insureds risk.
Catastrophe	An unusually large natural or anthropogenic loss, usually defined in terms of frequency and severity of the potential loss.
Cedant	An insurer or reinsurer which passes on part or all of the risk they have accepted for a premium to another reinsurer or retrocessionaire.
Claim	A formal notice and request for compensation by an insured to the insurer, or a cedant insurer to a reinsurer under the terms of the policy between them.
Compliance	The process of ensuring insurers are operating within the requirements stipulated by regulators and the law. Compliance processes are both external and internal to the insurer.
Consortium	A Consortium is a contractual arrangement under which insurers or reinsurers delegate authority under the terms of a binding authority agreement to the lead insurer to enter into contracts of insurance on their behalf.
Coverage	Coverage is the amount of risk (usually financial) which the insurer or reinsurer guarantees to the insured will be compensated for in the event of a loss.

Deductible	A deductible is the amount / proportion of a loss which is retained by the insured before any payout. Deductibles can be applied in various ways and proportions under terms of a policy.
Event	An event is a situation which will cause a claim against a policy. The definition of an event, and its duration will vary by the type of peril and terms of the policy.
Exclusion	An exclusion is a policy term which removes liability on the insurer to make a payment for loss incurred. Exclusions may be defined in various ways under a policy.
Exposure	Exposure is the situation or characteristics of the insured assets which could lead to a loss. For public assets, exposure could refer to the character of its structure, its value, and its vulnerability or resilience to the type of peril being considered.
Fronting	Fronting arrangements are between the insured and an insurer to issue a policy, without retaining any of the risk. A fee is usually charged for fronting.
Hours clause	A clause in some policies which allows aggregation of individual claims within an agreed time period after an event. These are often used for catastrophe events. The hours clause requires the date of loss to be recorded. Policies may include reinstatement options to enable multiple aggregate claims 'blocks' under the clause. Time periods will vary by peril, risk type and region. Typically, hours clauses are 72 or 168 hours.
Hazard	A situation which determines (increases) the chance of a loss from a given peril. For example, proximity to a flood plain generates a hazard from flooding.
Indemnity Insurance	An insurance agreement where one party (insurer / reinsurer) guarantees payout for losses sustained by the insured / reinsured party under the terms of a policy.
Insured (Assured)	The entity/entities who are covered under the policy issued by the insurer or reinsurer
Lead (insurer)	The policy issuing insurer of a consortium or reinsurance panel. Usually the lead will accept and retain a larger proportion of the total exposure for an appropriate share of premium.
Limit	The maximum amount an insurer / reinsurer is liable to pay the insured / reinsured under the terms of the policy. Can often be capped to the PML.
Loss (claim)	The damage or financial impact suffered by the insured. A claim for the loss will be made by the insured to the insurer under the terms of the policy.
Loss Adjustment	The process of investigating, estimating and advising on the size of a claim. Usually a Loss Adjuster is employed by the insurer.
Loss Assessment	A loss assessment is undertaken by the insured to quantify and determine the size of claim to be made for a loss to the insurer.
Market	The business of insurance and reinsurance. Used to define the general form of business conditions existing that influence the price, capacity and terms of insurance or reinsurance. Markets can be defined as 'hard' (premium is higher, policy terms are more favorable to the insurer) or 'soft' (premium is lower, policy terms are more favorable to the insured). Market conditions tend to follow cyclical trends.

Mutual Insurer	An insurance entity formed to provide collective coverage to its members. Profits are reimbursed to the members.
Parametric Insurance	A method of insurance which forms an agreement between the insured / reinsured and insurers / reinsurers to provide a payout in the event of a particular condition or set of conditions under agreed criteria being met. It does not indemnify the pure loss to the insured and is not therefore reliant on claims settlement.
Participation	The share that a particular insurer or reinsurer will take in coverage of an insured. Usually referring to both the risk accepted, and the share of premium received in return.
Payout	The sum paid to the insured in the event of a claim. In indemnity insurance, and for larger or more complex claims, commonly after conclusion of loss adjustment.
Peril	An event or phenomenon which could cause a loss to the insured / reinsured. Earthquakes, floods, landslides, wildfires, theft, explosion are all perils. The precise definition of a peril in a policy can determine the type of payout to be expected, and exclusions.
Policy	The (time limited) contract between the insured / reinsured and insurer / reinsurer which details the terms under which the insurer / reinsurer will compensate the insured / reinsured.
Policy Holder	The insured.
Premium	The agreed price paid by the insured / reinsured to the insurer / reinsurer for the coverage provided. It is derived using the rate, and value of the insured assets.
Pricing	The determination of the rates and price charged by the insurer / reinsurer for the coverage provided.
Probable Maximum Loss (PML)	The maximum loss reasonably expected to occur to the insured given the types of perils and hazard being insured. Usually defined in terms of the probability of a loss amount that could be equalled or exceeded within a given period (usually the annual or policy period).
Rating	The means of determining the price to be charged for the insured risk. A rate will be derived from both the estimated AAL, as well as fees and profits of the insurer/reinsurer.
Rebuild value / cost	An estimate of the amount required to reconstruct an insured asset in the event of it being totally destroyed. Rebuild should include estimates for materials, labor, and any reasonable fees or costs associated with the reconstruction. It determines the total sum insured for the asset and, in association with the rate, will determine the premium charged.
Regulator	An entity authorized to conduct oversight and supervision of insurers, reinsurers and brokers within a certain market.
Reinstatement	The ability for a policy to be renewed in the event of its termination. Usually in reference to the ability for coverage to be renewed in the event of a claim and payout. Reinstatement clauses can be included in a policy, usually for a premium.
Reinsurance	The insurance of insurance companies. Provides the means for insurers to cede part of the risk they have accepted, usually to reduce loss volatility and protect capital.
Retention	The amount of monetary loss which the insured remains liable for after a claim and is therefore not insured or reinsured for (see

	attachment). In the event of a limit being set, for example as a PML, the insured will retain any loss in excess of that limit (also termed overspill)
Retrocession / Retrocessionaire	A specialist form of reinsurance for reinsurers to cede excess risk. A reinsurer who provides reinsurance to reinsurers.
Risk Appetite	The risk that an entity is prepared to retain, transfer or cede. Can be applied to both insured and insurers / reinsurers. Usually determined by the management of the entity and determines risk transfer strategy.
Risk Tolerance	The level of loss which is acceptable under risk appetite conditions.
Schedule	The details of insured assets and conditions under which they are to be covered. Forms a component of the policy.
Structure	In insurance and reinsurance terms, the organization of retentions, limits, deductibles and shares based on the total insured value that determines the level of coverage to be acquired. An activity commonly performed by brokers on behalf of the insured / reinsured.
Tariff	Fixed and agreed rates to be charged and which determine premium charged for a given total insured value. Tariffs are usually authorized by regulators.
Transaction	The process of agreeing insurance or reinsurance under terms of the policy and for the agreed premium.
Underwriting	The pricing and acceptance of risk by an insurer or reinsurer. An underwriter is a professional authorized to accept risk to an agreed premium.