60456

Working Paper Series No. 23

EAP DRM KnowledgeNotes

Disaster Risk Management in East Asia and the Pacific



DISASTER RISK FINANCING: CASE STUDIES

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The accelerated frequency and severity of disasters has made disaster risk financing integral to the ability of a country to compete in the global market. Without adequate planning and preparation, post disaster financing needs are often met by a diversion of funds from development budgets or by taking expensive loans, both of which harm the long term growth prospects of a country. The extant literature on disaster risk financing has created a body of good practices and indicated that geo-political realities are fundamental elements of good design. Financing risk, therefore, requires a process of evaluating the models and matching the elements best suited to the individual country.

WHAT IS COVERED IN THIS NOTE?

In this note, the instruments supporting risk retention and risk financing at the national and regional/international levels will be the sole focus. Risk transfer, including insurance, is a very broad subject and requires a separate discussion; however, when a hybrid solution involves a transfer of risk or an instrument at the household or community level, a brief explanation of the instrument ensues. To this end, the note reviews examples generally considered to be good practices in the sector and seeks to elucidate well-regarded risk retention instruments and financing.

Concept of Risk Layering

The risk layering concept says that risk financing instruments should be selected on the basis of the frequency and severity of disasters. Risks with high frequency and low severity (e.g., floods) can be self-financed by the insured party (government or affected populace). Disaster reserve funds or budgetary allocation would be appropriate instruments in this case. On the other hand, risks with low frequency and high severity are likely to cause extensive damage and should be transferred to better-equipped third parties. Catastrophe bonds and catastrophe insurance pools fall into this category. Based on the frequency and severity of the disaster, risk layering has been classified in a model with five groups.¹

This working paper series is produced by the East Asia and Pacific Disaster Risk Management Team of the World Bank, with support from the Global Facility for Disaster Reduction and Recovery (GFDRR). The series is meant to provide just-in-time good practice examples and lessons learned from projects and programs related to aspects of disaster risk management.







Category	Probability of Event or Return Period	Damage as Proportion of GDP	
0	5%		
Group 1	or Up to 20 years	Up to 3%	
	3.33%		
Group 2	or	Up to 5%	
	20-30 years		
	1%		
Group 3	or	Above 5%	
	30-100 years		
	0.5%		
Group 4	or	Above 5%	
	100-200 years		
	Below 0.5%		
Group 5	or	Above 5%	
	Above 200 years		

Risk Layering Pyramid

Risk retention: Disasters in Groups 1 and 2 are high frequency–low severity disasters, meaning that they are highly predictable and cause mild damage. Recurring floods and hurricanes in many countries can be put in these categories. The risk transfer premium for these types of disasters normally charged by the insurers is a 1.5 to 2.5 risk–cost multiple (i.e., the ratio of the premium payment for the insurance to the expected losses for the insurance policy period). Thus, it makes more sense for the insurance outweighs the benefits.

Intended Audience

The intended audience of this note is county and provincial governments, international agencies, and development organizations, working in the disaster risk management field with an interest in risk financing strategies and instruments.

Risk pooling or financing: The risk of damages from larger disasters (also in Group 1 &2) can be covered by pooling the risk within a group of countries or states susceptible to disasters. A common Reserve Fund is established by the members, and then drawn upon when affected by a disaster.

Risk transfer: Groups 3 to 5 are high severity-low frequency disasters, where provisions for possible dam



ages at the country level may not be feasible. Such risks are best shared widely. Countries can cover these risks by purchasing insurance from professionally managed insurance companies that diversify risk globally. One point is clear; countries should opt for insurance or risk transfer only when the expected losses are beyond their means. In other cases the risk transfer costs may be very high.

Apart from the frequency and severity of disasters, other factors have a bearing on the selection of instruments.

Liquidity: While a country may be able to retain risk up to a certain threshold, problems of liquidity may arise after disasters due to concerted disbursements of funds. Risk financing or insurance are prudent choices in this case, since these instruments are intended only to cover the liquidity gap.

Political economy: Risk retention instruments are not immune to pressures from the political economy. For example, the annual appropriation to a reserve fund comes under pressure when a surplus has built up for lack of disaster. Legislatures would readily divert the appropriations to more visible schemes. Risk transfer offers the government an attractive and pragmatic solution: the government executes binding contracts with insurance companies for a fixed number of years and the issue largely disappears from the legislative agenda. **Procedural issues:** How the funds flow takes through government system can also affect the choice of instruments. Government financial rules and procedures in many countries may not be conducive to a fast flow of funds. Budget allocations and reallocations normally need legislative approval, which can be slow and drawn out. Some reserve funds try to side step this requirement by setting a provision for the accumulation of funds at the end of the financial year. It also matters how the government classifies funds received from international organizations; if they are treated as revenue receipts, the process for disbursal can be very time consuming.

Borrowing capacity: Countries with a large debt burden would be well advised It to choose risk transfer instruments rather than risk financing instruments even for moderate frequency disasters. The reason being, their revenue resources may not be able to sustain the additional debt.

Another way of mapping risk financing tools is by social/geographical relevance and financing modes. The tools for the national or regional levels are obviously different from those for the individual household. The following table shows the tools useful for different levels of targeting.



	Financing Modes								
Levels		Savings	Credit	Investment	Insurance				
	Poor Households	Micro Finance			Micro Insurance				
	Small Businesses								
	Middle Income households								
	Community			Social Funds	Catastrophe				
	National				Pools				
	Regional/ International								

Source: Pro Vention Consortium (2009).

NATIONAL DISASTER FUND, MEXICO

The 1985 earthquake in Mexico City killed 6,000 people, injured 30,000, left about 150,000 victims, and caused direct economic losses to the tune of US\$4 billion. As a direct result, many new institutions were created to respond to disasters, including FONDEN in 1996.

At the outset, FONDEN served as a budgetary tool to allocate funds on an annual basis through three separate funds (i) *infrastructure fund* to repair uninsured public infrastructure, (ii) *agriculture fund*, to support low income farmers, and (iii) *assistance fund*, to provide relief to victims of disasters. In 1999 a separate catastrophe fund was created within FONDEN to accumulate the unspent disaster budget of each year. At present, FONDEN mainly provides financial support to repair public infrastructure through the FONDEN program and assistance to low income households (e.g., shelters, food, primary health care) through FONDEN Trust Fund manages the assets of FONDEN, including its risk transfer strategy.

In addition to the FONDEN trust at federal level, trusts have been set up in all the 32 states of Mexico. While the federal fund is supported by the federal government, the state funds get support from the state governments as well as the federal fund. FONDEN covers the total cost of repair of federal public infrastructure; however, the state and municipal infrastructure is covered by co-financing, which ranges from 50:50 to 20:80 depending on the type of assets. States and municipalities are expected to cover their share from their own sources of funding.

Reserve Funds

Reserve funds are disaster risk financing instruments that cover small and recurring losses caused due to natural disasters. Normally, they are funded from annual budget allocations. At the financial year end, remaining balances may accumulate as in the case of FONDEN (Mexico) or lapse like the National Calamity Fund (Philippines).

The repair work of federal infrastructure is supervised by the respective technical ministries, that is, monitoring the work and verifying the bills; contractors are paid directly by FONDEN. In the case of state/municipal infrastructure, FONDEN transfers funds to the concerned state fund only after the state/municipality has transferred its share of funds. Local departments oversee the execution but contractors are paid directly by the local funds.



Source: Timeline made from data collected from World Bank note on FONDEN³

At present the federal government is trying to promote insurance of federal and state infrastructure to decrease its dependence on FONDEN. FONDEN is also trying to transfer its risk by purchasing reinsurance and issuing catastrophe bonds. The Government of Mexico has issued two catastrophe bonds: the first in 2006 for US\$160 million and the second in 2009 for US\$290 million.³

Political Economy Issues of Risk Financing in FONDEN

Why should the federal government rely on oil surplus and not provide a regular budget allocation to FON-DEN? The reason seems to be the difficulty in getting approval for the large fund allocation for disaster management. Since world oil prices and production in Mexico were generally above annual estimates, the resultant annual revenue surplus was given to FON-DEN. This bypassed discussion and approved in legislature, and FONDEN was received the funds necessary to keep it operational.

Strengths

The reserve funds provide the government a ready instrument to respond immediately to disasters. While these funds are not meant as a solution to high severity disasters, they are normally the first line of response against small and recurrent disasters like floods and hurricanes.

The main strength of the system is the fact that it separates the disaster funds from normal budgetary operations and designates oversight of the funds to an institution with systems for rapid dispersal in times of disaster.

A major positive aspect is the fact that any funds unspent at the end of fiscal year do not revert to treasury.

Scope for Improvement

The main problem faced by FONDEN today is a scarcity of funds. FONDEN used to receive federal funds of about US\$600–650 million annually, although not from annual budgetary allocation. Usually a notional allocation was made for FONDEN in the annual budget and the bulk of the funds were later provided from the surplus in oil revenue. With the fall in oil production in Mexico and the downward trend of oil prices, this stream of funds has vanished. FONDEN is now experiencing a resource crunch and is exploring alternative sources. <u>A continuous revenue stream for the disaster fund, made legally binding in order to deflect political pressures, is a must.</u>

Another challenge is the time taken to complete the repair of infrastructure schemes. While a strict timeline of 23 days has been prescribed for the release of funds, not all states and municipalities have the requisite capacity. Many schemes have been pending for more than five years even though the completion time was one year. Ensuring a financing mechanism is necessary but not sufficient: Executing capacity is required to complement the funding provided by reserve funds.

The existence of a national reserve fund and the possibility of getting money from it generate a tendency to exaggerate the scale of disaster from its actual level. The pressure to declare disaster and release funds, even when in actuality the natural disaster is below the threshold, is considerable. FONDEN relies exclusively on the certification of federal agencies to consider assistance. But the states also cite lack of instruments in many places and, thus, a difficulty in identifying disasters affecting small geographical areas. <u>A transparent, credible, and reliable system to identify and declare the occurrence of disaster is required, and devised to withstand political and popular pressures.</u>

Another question facing FONDEN is to what extent it should finance projects. A large part of infrastructure damaged by disasters is old (e.g., buildings or bridges), so it make sense to improve the specifications and design during repairs, a technique known as "build back better." Insurance companies do not finance the improvement even if the assets are insured. Currently, FONDEN is funding this component but the scarcity of funds has placed considerable pressure on it desist. The scope of risk financing needs to be clearly defined with guidelines on what will and will not be included.

POST DISASTER RISK FINANCING MECHANISMS, COSTA RICA

The legislative framework for budget management and the institutional organization for the post disaster recovery process in Costa Rica have evolved over four decades. In 1969 Costa Rica established a mechanism for declaring a state of emergency. It also established the National Risk Prevention and Emergency Management Commission or CNE (*Comision Nacional de Prevencion de Riesgos y Atencion de Emergencias*) and the National Emergency Fund or FNE (*Fondo Nacional de Emergencia*). Its most recent reform was the National Emergency and Risk Prevention Law of 2005, which addresses the problem of disasters from a more comprehensive development point of view. The end result of this long-standing practice of continuously updating the framework is well-designed mechanisms to respond to disasters.

State of Exception

As per Article 180 of the Constitution, a State of Exception can be declared for emergency situations, including public disasters, war, and civil unrest. The government can issue a decree specifying the events that have occurred, the general features of the crisis, and the area covered by the declaration. The main effect is that CNE can access the State of Exception, which enables it to:

- Receive special treatment in times of budget constraints
- Use fast-track procedures to procure goods and services
- Hire personnel by emergency appointments.

The condition is that there should be direct causal relationship between these actions and the emergency, and they are subject to subsequent economic, legal, and fiscal controls. The State of Exception also increases the government's powers to impose such restrictions as expropriations and demolitions temporarily. For example, works executed under a State of Emergency are exempted the procedures and required clearances of environmental laws.

The law defines three phases of emergency management: response, rehabilitation, and reconstruction. CNE is given five years to complete the reconstruction phase using emergency procedures. In other words, emergency procedures cannot be used endlessly to bypass normal procedures.

National Emergency and Risk Prevention Law of 2005

The National Emergency and Risk Prevention Law of 2005 introduced the concept of "humanitarian assistance." The law enables CNE to use the State of Exception without a declaration of emergency. CNE can acquire and deliver humanitarian assistance as well as procure machinery to clean affected areas for a maximum 100 hours. The mayor of an affected municipality can contact CNE directly to request help.

Institutional Arrangement

The institutional organization is covered by a national risk management system. CNE has the primary role in the system and is responsible for planning, coordinating, managing, and supervising the response. This includes initial response to affected populations, damage and needs assessment, formulation of recovery plans, coordination with other agencies, and procurement for implementation of rehabilitation and reconstruction projects.

As per the law, other institutions and local governments are obliged to act under the direction of CNE and to participate and support works assigned by CNE over their regular work. Public institutions are required to provide technical assistance for the assessment and implementation phases.

CNE appoints Executing Units to implement the projects. These units are normally comprised of the departments with the technical competence to implement and monitor the projects. This measure ensures technical supervision and consequent responsibility by the appropriate sector.

Sources of Funding

The National Emergency Fund (FNE) finances all the activities related to prevention and mitigation, emer-

gency management, rehabilitation, and reconstruction. The main sources of funding are:

Current budget: The current budget allocation for FNE is generally meant for prevention activities to be carried out by CNE. The allocation ranged from US\$4 to US\$5 million until 2006 and was increased to over US\$18 million in 2007 to meet the growing responsibilities of CNE.

Supplementary budget: All public entities are required by law to contribute 3 percent of their profits/surplus to FNE at the end of the fiscal year. If an emergency has been declared, public entities can transfer money to FNE for emergency operations. These public units are normally appointed as Executing Units (agencies which actually carry out or implement the schemes) for the projects funded by these funds. The supplementary budget is the main source of funding for emergency operations.



Source: World Bank note on FONDEN³

Allocation for risk management: A 2005 law requires all public entities to make allocations for risk management in their annual budgets.

Planning and investment instruments: There are two instruments for project planning and implementation: the General Emergency Plan and the Investment Plan. The General Emergency Plan defines, prioritizes, and organizes the actions required to manage a specific crisis. It includes a sector-wide diagnosis of the situation, designates activities for the response, rehabilitation, and reconstruction phases, delineates institutional responsibilities, and calculates the required funds as well as any necessary additional resources. The Board of Directors of CNE approves and authorizes the implementation of the plan within two months of declaring an emergency, and the plan is binding on local governments and public entities.

The second instrument, the Investment Plan, is triggered for each project proposed in the General Emergency Plan. This document consists of all the technical details, budget, etc. and is prepared by CNE in collaboration with the relevant public entities. This plan too is approved by the Board of Directors, which also approves the appointment of an Executing Unit. Based on the approved Investment Plan, CNE carries out the procurement of goods and services. After this, the Executing Unit takes up the technical implementation of the project.

Delineation of Responsibilities across Agencies

The friction between disaster management agencies and technical lines ministries over fund allocation and control is a general problem. In Costa Rica, the Executing Unit system and a provision of fund transfer to CNE seem to solve the problem to a large extent. A mutually beneficial arrangement, CNE receives additional funds for disaster management activities while the public entity gets access to simplified procurement procedures without losing technical control over the project. Generally, the public entity that transfers funds to CNE, is appointed the Executing Unit of the corresponding projects.

Strengths

Clarity of roles and responsibilities: The legal framework clearly defines the roles and responsibilities of various public agencies, including CNE. The central role of CNE is important for speedy procurement and design while technical supervision is provided by concerned departments/agencies.

Coordination: The overall framework streamlines the process for CNE and allows coordination across all stakeholders. The fund flow mechanism described earlier incentivizes the departments to coordinate with CNE, while CNE has the authority and mechanisms to monitor implementation and ensure joint co-responsibility.

Strong credibility: Owing to its extensive experience, CNE enjoys high technical credibility with the population as well as confidence in the transparency of its use of reconstruction resources.

Scope for Improvement

The main challenge with this system is that CNE may be used just to avoid the normal safeguards like procurement or environmental safeguards. While the mutually beneficial arrangement of fund transfer and appointment of an executing agency may support coordination, it also gives rise to the possibility of use (or abuse) of emergency provisions to bypass the safeguards. Establishing provisions to prevent this possibility is a necessity.

The applicability of the State of Exception should be as per requirement and a phased approach may be appropriate. CNE can also balance its risk management strategy to put more emphasis on ex ante measures and transfer risk to the appropriate entities.

CATASTROPHIC RISK DEFERRED DRAWDOWN OPTION, WORLD BANK

The Catastrophic Risk Deferred Drawdown Option (Cat DDO) is a financial product offered to middle income countries by the World Bank. Its purpose is to make financing immediately available after a natural disaster. It is intended to fill the gap while other sources of funding, such as emergency relief aid, are being mobilized. Coun-

Pan-African Disaster Risk Pool for Food Security

This pool is still in the conceptual and discussion stage but the idea is very appealing. Preliminary findings indicate a 50 percent savings from diversification of drought-related losses across Africa. This means that if African countries were to pool their drought risk, the pool's capital requirement would be half the sum of each country creating its own reserves - making a Pan-African Disaster Risk Pool an attractive financing mechanism in support of African food security. At present, the United Nations World Food Program (WFP) is the primary responder to droughts in Africa in terms of food security. But the process of responding to such disasters is designed in such a way that the relief comes much later than required. For example, lack of rain in the October-April rainy season clearly signifies impending disaster during next October to December, or "the hungry period." If steps are taken to ensure food security in April-May, the selling of assets and a decline in consumption can be avoided. Due to established procedures, WFP cannot take proactive measures and can only carry out a needs assessment after the onset of drought in November-December. The whole process (assessment, issue of an appeal, procurement, etc.) takes time, with delivery of food relief long after the actual requirement and at a much higher cost.

Based on experience of Caribbean Catastrophe Risk Insurance Facility, the Pan-Africa Disaster Risk Pool would help prevent this delay and spread risk among countries. The idea is to take ex ante measures by having better early warning systems and making a common contingency pool to quickly respond to droughts. The World Food Program has developed a methodology to assess the impact of weather events on food security across Africa: Africa RiskView is a software platform that translates satellite-based rainfall information into near real-time estimates of potential emergency responses. The Africa Risk Pool would be the instrument to provide ready liquidity should the early warning system predict a drought.¹³

tries can access funds from the facility if they declare a state of emergency as a result of a natural disaster.

Pre-approved, Cat DDO disburses quickly if and when the borrowing government declares an emergency. The loan amount is limited to US\$500 million, or 0.25 percent of GDP (whichever is smaller), because Cat DDO provides short term liquidity (rather than reconstruction financing) following the disaster. It does not preclude other borrowings. Cat DDO is available for three years and can be renewed up to four times. There is a single front-end fee of 0.5 percent of the approved amount, and each subsequent renewal entails a fee of 0.25 percent. The interest is set at the IBRD rate prevailing when the funds are disbursed. The funds can be repaid at any time before the closing date, and the amount paid back would still be available for subsequent borrowing. Borrowers must, however, have an adequate macroeconomic framework in place when the loan is approved, and a disaster risk management program monitored by the World Bank.

The world economic crisis in 2008 had an adverse impact on the program because countries needed funding for their regular programs. Given that Cat DDO comprises part of a country's overall credit limit (called exposure limit), using this facility would have reduced the availability of regular funds. Thus, borrowers were not keen on availing this facility. With some positive change in the economic situation, the World Bank foresees one or two contracts in Year 2011.

Cat DDO

The World Bank modified the Cat DDO to eliminate the instrument's unintended implicit disincentives. Countries used neither the 2001 Development Policy Loan DDO nor the 2008 CAT DDO for two main reasons. First, uncertainty surrounded the disbursement of funds, because concurrent Bank reviews were required to drawdown funds. Second, DDO was more expensive than regular IBRD loans: a higher commitment fee was charged in addition to a surcharge for a longer maturity. To maximize the potential of the instrument, the Bank now monitors a borrower's economy continuously to facilitate disbursement upon request. The funds may be drawn down at any time unless the Bank gives prior notification to the borrower that one or more of the drawdown conditions have not been met. The second change aligned the pricing of the DDO with standard IBRD terms, thus eliminating the commitment fee and surcharge for the longer maturity.7

Costa Rica is the second most exposed country to multiple natural hazards (Natural Disaster Hotspots 2005) and was the first to have a Cat DDO approved. In September 2008, US\$65 million was allocated. Domestic politics delayed the payment of the front-end fee until a 6.2 magnitude earthquake struck on January 8, 2009, causing damage estimated at US\$100 million. The loan nonetheless, was disbursed by the World Bank, as soon as the fee was paid. As of December 2009, Cat DDOs had been approved for Costa Rica, Colombia, and Guatemala.⁶ The CAT DDO proposal for Peru is in the process of being approved.

Strengths

Cat DDO is a very cheap source of funds. In fact, it is cheaper than the reserve funds, as the cost of maintaining reserve funds is higher due to high liquidity requirements.

Cat DDO ensures immediate liquidity in the aftermath of disasters. The mutually agreed targets for disaster mitigation measures between the government and the World Bank work beneficially to encourage disaster preparedness and implementation of stronger financial mechanisms. Better disaster preparedness and planning also reduce the impact of disasters.

Scope for Improvement

At present, this contingent credit line is only available for middle income countries. This facility could be established for low income countries. Not only would low income countries be provided with an additional source of liquidity but they also would be incentivized to better prepare for disasters.

A loan repayment holiday or loan forgiveness provisions would make the program more attractive. In the aftermath of a disaster, countries could be given the benefits of either a repayment holiday or forgiveness for a period of three to four years. The Cat DDO would act as an additional liquidity source for affected countries.

If the contingent line of credit is beyond a country's CAS envelope, countries will have more incentive to take advantage of the facility.

CARIBBEAN CATASTROPHE RISK INSURANCE FACILITY

The Caribbean Catastrophe Risk Insurance Facility (CCRIF) was established in 2007 basically to solve the short term liquidity problems of Caribbean governments in the aftermath of disasters. It is an exempted company under Cayman Islands laws, holding an insurance license, and is governed by a trust deed. CCRIF is a joint reserve mechanism that provides participating governments with coverage in case of disasters.

Primarily an instrument to pool resources in order to buy parametric insurance, CCRIF also covers risk from its own reserves. It is being discussed here as an example of risk pooling. To understand CCRIF, one could consider a system through which several countries agree to combine their emergency reserve funds into a common pool. If each individual country were to build up its own reserves to sustain a catastrophic event, the sum of these country-specific reserves would be much larger than the actual needs of the pooled countries in a given year. Considering that, on average, only one to three Caribbean countries is/are affected by a hurricane or an earthquake in any given year, a pool holding only the reserves for three potential payouts should be sufficient for for all pool participants. Each year, as the pool is depleted, participating countries would replenish it in proportion to their probable use. The CCRIF works in a similar manner by combining the benefits of pooled reserves from participating countries with the financial capacity of the international financial markets. It



retains some of the risks transferred by the participating countries through its own reserves and transfers some of the risks to reinsurance markets where this is costeffective. This structure results in a particularly efficient risk-financing instrument that provides participating countries with insurance policies at approximately half the price they would obtain if they approached the reinsurance industry on their own (structure of CCRIF and reduction in premium with increase in number of participating countries shown in illustrations below).

Commercial insurance is available in the Caribbean region, yet the total premium that businesses paid averaged about 1.5 percent of GDP between 1970 and 1999 while losses (insured and uninsured) amounted to only about 0.5 percent of GDP. This justifies the purchase of parametric insurance jointly, where the cost comes down substantially.

Donors provided US\$67 million in start-up capital, and 16 member governments paid in US\$22 million. Governments purchased parametric insurance, paying CCRIF about US\$20 million in premiums for parametric insurance coverage roughly totaling US\$450 million. The Facility retains responsibility for the first US\$20 million of payout (backed by its capital) and



Source: Esquivel⁸

transfers the remaining exposure through reinsurance and catastrophe swaps that the World Bank intermediates. Donors expect the Facility's capital and reserves to grow and, thus, to be self-sustaining.

Within two weeks of the November 2007 earthquake, the most severe in the eastern Caribbean in 30 years, the Facility paid about US\$1 million to St. Lucia and Dominica . It paid US\$6.3 million to the Turks and Caicos Islands after Hurricane Ike in September 2008.^{1,2,5} There have also been disasters that did not trigger the parameters set: Hurricane Dean in 2007 caused considerable damage in Jamaica because of rain, but no payout occurred because wind speed was the parametric trigger. Similarly, the cumulative effect of the 2008 hurricanes in Haiti was devastating, but the winds were not strong enough to trigger a payout. The 7.0 magnitude earthquake that struck Haiti on January 12, 2010, was of sufficient magnitude to trigger the full policy limit for Haiti's earthquake coverage purchased under the Facility. Based on calculations from the preliminary earthquake location and magnitude data, Haiti will receive US\$7.8 million, the maximum payout under its earthquake policy. This is about 20 times its premium for earthquake coverage of US\$385,500. Although shaking was felt in Jamaica, another CCRIF-covered country, it was insufficient to generate any loss under the parametric index.

Participating countries can decide on coverage as follows:

- Perils Covered: Hurricane (protection against hurricane wind damage) and earthquake.
- Coverage Limit: The maximum possible payout for all claims in any one policy period, not to exceed US\$100 million and specified for each insured peril.
- Attachment Point: Level of government loss that triggers the policy, being the equivalent of a deductible. It can also be expressed in terms of the return period of experiencing the level of loss or more. The Attachment Point cannot be set at loss levels with return periods of less than 15 years. (For CCRIF insurance purposes, the only valid method to calculate the amount of government loss is the parametric loss model specified in the policy itself.)

Strengths

CCRIF allows the participating countries to pool their risks and resources, creating a more diversified portfolio. While this increases the funds at the disposal of affected country as a retention mechanism, it also reduces the cost of insurance. In the case of CCRIF, the premium is reduced by half as compared to what a country would pay for individual insurance.

CCRIF is backed by donor funds held by the World Bank in a multi-donor trust fund. These additional resources help reduce the CCRIF's dependence on the reinsurance market by increasing its own reserves.

Scope for Improvement

A review of parametric trigger mechanisms is needed. Non-payment of any damages in Hurricane Dean in Jamaica has shown that only wind speed measurements as triggering devices are not sufficient and more frequent events need to be covered giving wider coverage.

The procedures for a multi-country fund need to be streamlined. Another important requirement in a multicountry fund is to have very clear and transparent procedures with high visibility and communication at all levels. This precludes any confusion in the aftermath of disasters as to whether a country could have received payments.

CONCLUSION

The choice of instruments in disaster risk financing depends on many factors. One way of looking at it is to classify the disasters in terms of their expected severity and frequency. More frequent disasters with low expected severity (e.g., recurring floods) are better financed by retaining the risk, as the cost of transferring such risk will be disproportionately high compared to the expected damages or payments. On the other hand, risk associated with low frequency-high severity disasters (e.g., major earthquakes) is best transferred to the international reinsurance market, as government may not have the capacity and resources to sustain the damages caused by such disasters.

Another way of looking at the issue is to map the risk financing tools by social or geographical relevance. Tools for the individual or household level naturally will differ from those for national governments.

Taking in to consideration the scope of the topic, this note focused only on risk retention and financing tools relevant for national governments or international bodies. The mode chosen was to study successful examples in the field and to assess their strengths and weaknesses. To the extent that this review is fungible, the countries will benefit from mixing and matching the models and instruments to their specific geo-political context. Finally, as the case studies in this note indicate, the uptake of risk retention and risk transfer mechanisms has made countries more resilient to natural disaster.

REFERENCES

- Dumitru, D. 2010. Mitigating the Adverse Impacts of Natural Disasters on the Philippines Economy: A Study of Disaster Risk Financing Options. Mimeo.
- World Bank. Catastrophe Risk Financing in LCR: Recent Solutions and Challenges Ahead. IBRD Results Working Paper. Washington, DC.
- World Bank. FONDEN: National Disaster Fund in Mexico. Note Prepared by World Bank Team for Indonesia Mission. Washington, DC.
- 4. Interview with Rubem Hofliger Topete, Director General, FONDEN.

- Ghesquiere, F. and F. Ramirez Cortes. 2008. Mechanisms for the Mobilization and Allocation of Financial Resources in Post-Disaster Solutions in Costa Rica. Washington, DC: World Bank.
- Sanghi, A. et al. 2010. Unnatural Disasters, Natural Hazards: Effective Prevention through an Economic Lens. Washington, DC: World Bank.
- Background Note on CAT DDO available at World Bank website http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0 "contentMDK:21670477~pagePK:64257043~piPK:437376~t
- 8. Esquivel, M. Caribbean Catastrophe Risk Insurance Facility (CCRIF): A Joint Reserve Mechanism for Island States in the Caribbean. Washington, DC: World Bank.

heSitePK:4607,00.html

- 9. World Bank. 2008. A Review of CCRIF's Operation after Its First Season. Washington, DC.
- World Bank. 2008. The Caribbean Catastrophe Risk Insurance Facility: Providing Immediate Funding after Disasters. Washington, DC.
- 11. Cummins, J.D. and O. Mahul. 2008. Catastrophe Risk Financing in Developing Countries: Principles for Public Intervention. Washington, DC: World Bank.
- 12. O'Donnell, I. 2009. Practice Review on Innovations in Finance for Disaster Risk Management. Geneva: ProVention Consortium.
- 13. Climate and Disaster Risk Solutions-Equipping Africa with Technology and Tools to Manage Natural Disaster Risk, Rockfeller Foundation and UNWFP.

	Type of Instrument	Instrument	Speed of Disbursement	Cost of Financing	Examples	Comment
A	Risk Retention	Reserve Funds	Fast	1-2	National Disaster Fund (FONDEN), Mexico National Calamity Fund, Philippines	The funds in FONDEN, Mexico accumulate over years, while funds in NCF, Philippines lapse at the end of the financial year.
		Budgetary Reallocation	Moderate	1	Budgetary re-allocation is used by most countries to get funds from other budget heads. Procedures, level of approval, and time required varies across countries.	
		Tax Increase	Slow	1	Tax increase as a response to disasters is difficult, as it adversely affects much-needed investment and is not popular. Connect it with the disasters is also difficult, as well as assessing to what degree this instrument is used as a resource.	
		Donor Assistance	Slow	0-1	Normally donor assistance is available only in high severity disasters with international exposure and not for low severity-high frequency disasters. It is also normally slow to come, sometimes with conditions attached, and does not solve the immediate liquidity needs.	
В	Risk Financing	Contingent Credit Line	Fast	1	Catastrophic Risk Deferred Drawdown Option (Cat DDO) from the World Bank.	Only 3 countries have used it through December 2009.
		Loans from International Organizations	Slow	1	Loans from international organizations are normally slow to come and useful mainly for reconstruction.	
С	Risk Pooling	Multi Country/ State Reserve Funds	Fast	1	The only pooled fund in operation is CCRIF, which emphasizes parametric insurance over risk retention, but this concept of combined reserve funds can be very useful for counties with similar disaster vulnerabilities.	

ANNEX 1: INSTRUMENTS OF RISK MANAGEMENT^{1,2}

(Cost of Financing: The cost of financing here means the ratio of funds to be paid as a premium in the case of insurance, interest in the case of catastrophe bonds, or the opportunity cost of funds to be kept in reserve without investing them to the expected losses from the disaster for the coverage period. Reserve funds have a cost of financing more than 1.0 because the funds cannot be invested in long term instruments and so cause losses.)



East Asia and the Pacific Region

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