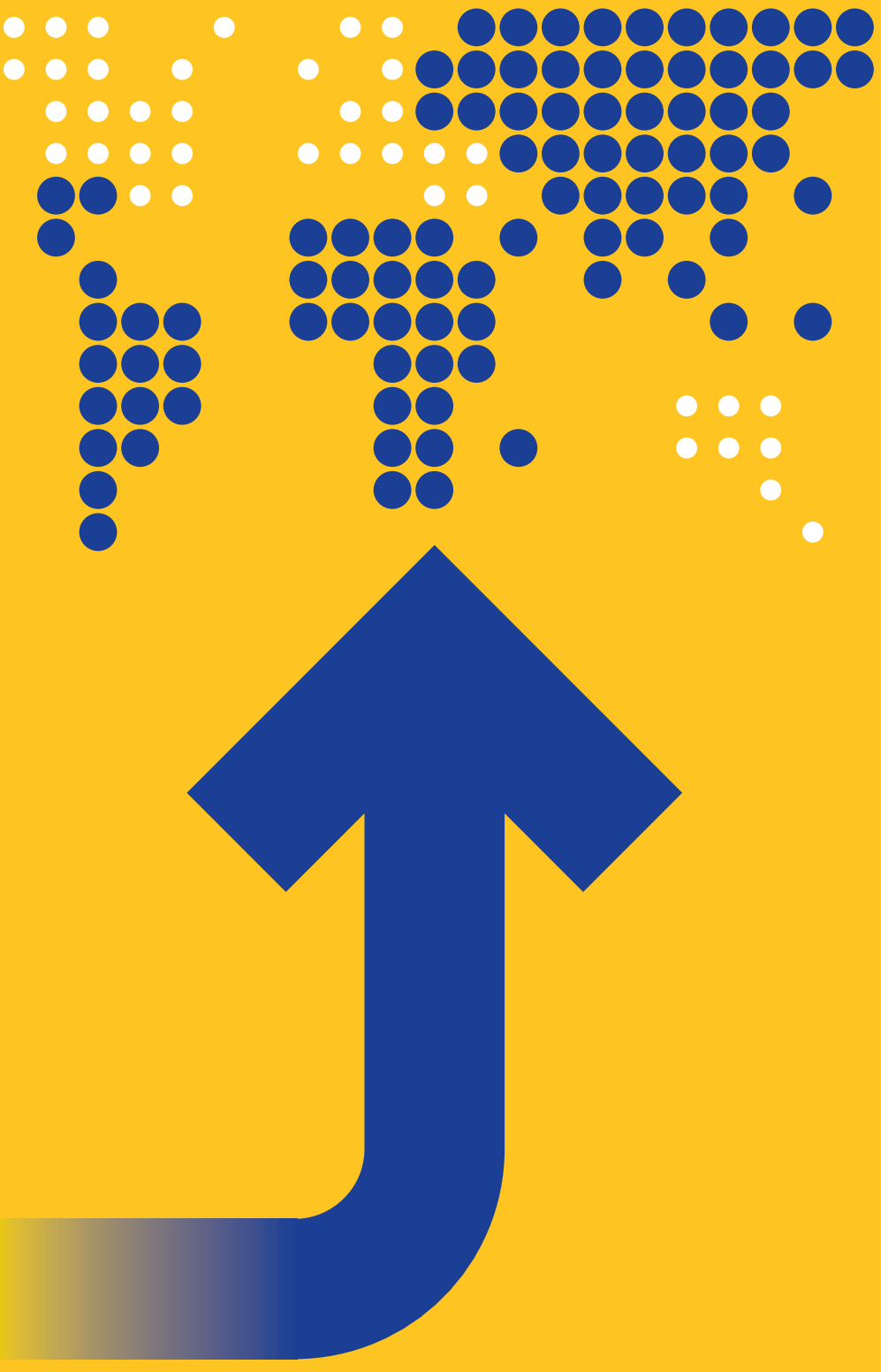

OCTOBER 20-22, 2019 LANSDOWNE RESORT AND SPA, VIRGINIA

EMERGING MARKETS FORUM

2019 GLOBAL MEETING

BACKGROUND PAPER

CLIMATE AND DISASTER RESILIENCE: INJUSTICE THROUGH FAILURES IN ADAPTING

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Emerging Markets Forum
A nonprofit initiative of the Centennial Group

Climate and Disaster Resilience: Injustice Through Failures in Adapting

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Introduction

Climate defines the course of human history. In the past, many flourishing human societies have disappeared after large changes in climate. The Maya, for example, suddenly disappeared from the Yucatan peninsula in Mexico due to drought (Science 2001). Currently, the frequencies of extreme climate events are increasing (IPCC 2018). Incidents of deadly floods caused by intensified rainfall are on the rise. Recent super typhoons/cyclones such as Yolanda (2013) and Dorian (2019) are "nuclear bombs that wipe out just everything". If we remain non-reactive to these natural disasters, many of our descendants will have to disappear. This is why youths continue protesting worldwide. As extreme climate events hit more frequently, inequality will increase between those who are prepared and those who are not.

Japan has been disaster prone but has remained relatively egalitarian. Economic growth rates in the past have not been overly disrupted by major natural disasters. How was this possible? The key lies in promoting pro-active, ex-ante measures. Being pro-active by anticipating disasters reduces total risk and can lessen the widening of inequality once hit by disaster.

At international climate debates, attention has been shifting from climate justice to implementation. At the recent UN Climate Action Summit, Gleta Thumberg accused the responsible generation of inaction. The latest report from the Global Commission on Adaptation (2019) takes the adaptation agenda forward, to push on its implementation for the well-being of the people.

In this essay, I draw from JICA's combined experience in supporting DRR (Disaster Risk Reduction) and Climate adaptation projects and programs in Southeast Asian countries. Adapting ex-ante in a systematic manner is so challenging that many countries may be left unprepared. Once hit by disaster, this will aggravate inequity both within and among countries. Therefore, injustice through failures in adapting is real.[1]

Key Facts, Concepts, and Issues Around the Implementation of Adaptation

Adaptation funding is skewed

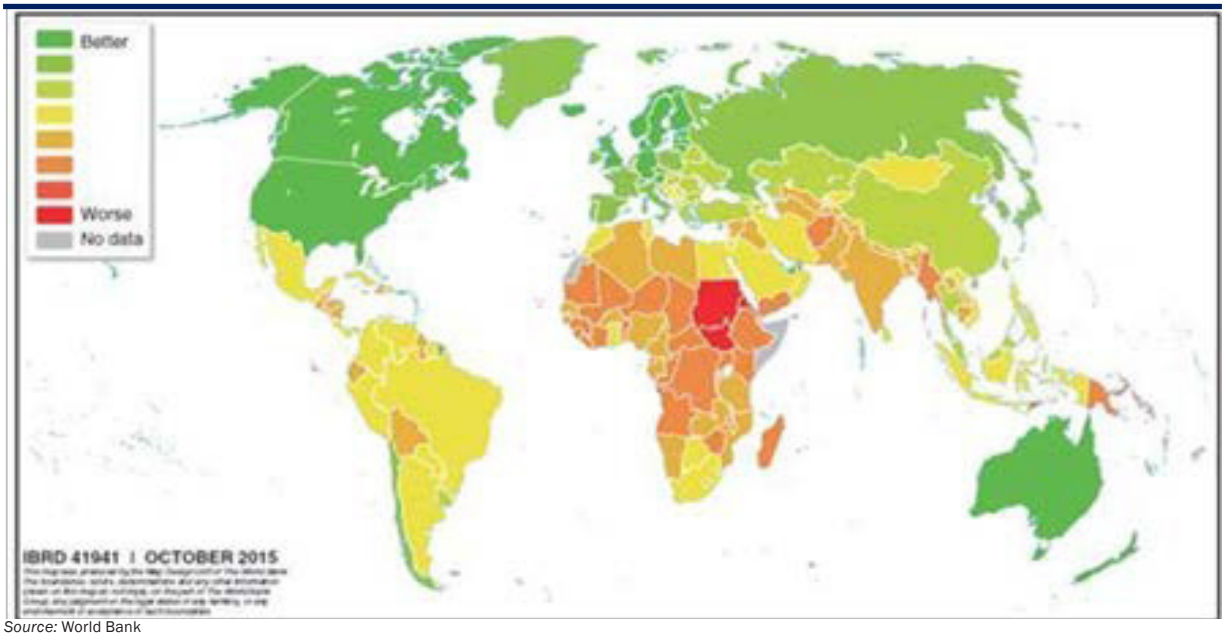
Adaptation funding tends to be distributed to countries who can plan and make decisions, not necessarily to those where the risk is the highest. The adaptation side of the Paris Agreement is anchored to country NAPs (National Adaptation Plans). So far, 13 countries have formulated their NAPs, but there is no standard recipe on how to actually implement each of the identified programs and projects. For example, the GCF (Global Climate Fund) has so far approved 111 projects, but less than half of these projects are for adaptation rather than mitigation.

The map illustrated in Figure 1 classifies the countries in terms of climate change vulnerabilities (World Bank, 2015). (Note that the vulnerability index used is an illustrative example. It does not capture, for example, the risk in coastal megacities in Asia where exposure is high). Countries and regions in red or orange include Sudan, South Sudan, the Sahel and Horn of Africa, DRC, Afghanistan, Bangladesh, Cambodia, PNG and Small Island States.

On the other hand, the distribution of the GCF fund for adaptation covers another type of country as shown below (Table 1). One could argue that GCF funding is given to countries that have the capabilities to propose a reasonably feasible plan, which has gone through the decision making mechanism of the

1. Among various climate change issues, this paper focuses on extreme events due to increase in extreme weather phenomena and intensification of tropical cyclones. Others include drought, glacial retreat, glacial outburst floods, sea level rise, among others.

Figure 1: Vulnerability to Climate Change, by Country



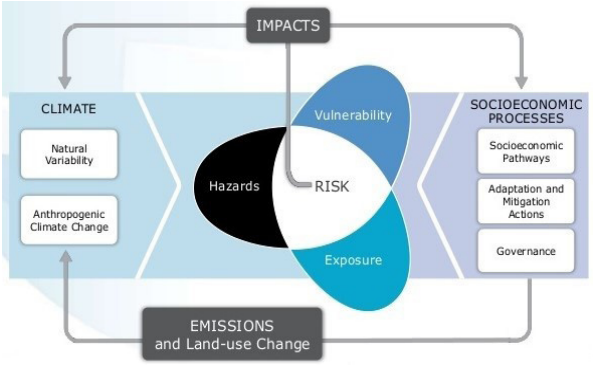
Source: World Bank

Table 2: Countries receiving GCF fund for adaptation projects

	Countries
More than three projects	Bangladesh, Benin, Morocco, Namibia, Senegal, Tajikistan
Two projects	Bhutan, India, Ghana, Guatemala, Kenya, Marshall Islands, Pakistan

Note: Based on number of projects only, not weighted with amount
https://www.greenclimate.fund/what-we-do/projects-programmes

Figure 2: Concept of Climate Risk



Source: IPCC

country. JICA's experience in preparing GCF projects as an Accredited Entity is witness to this.

The objective of adaptation is risk reduction

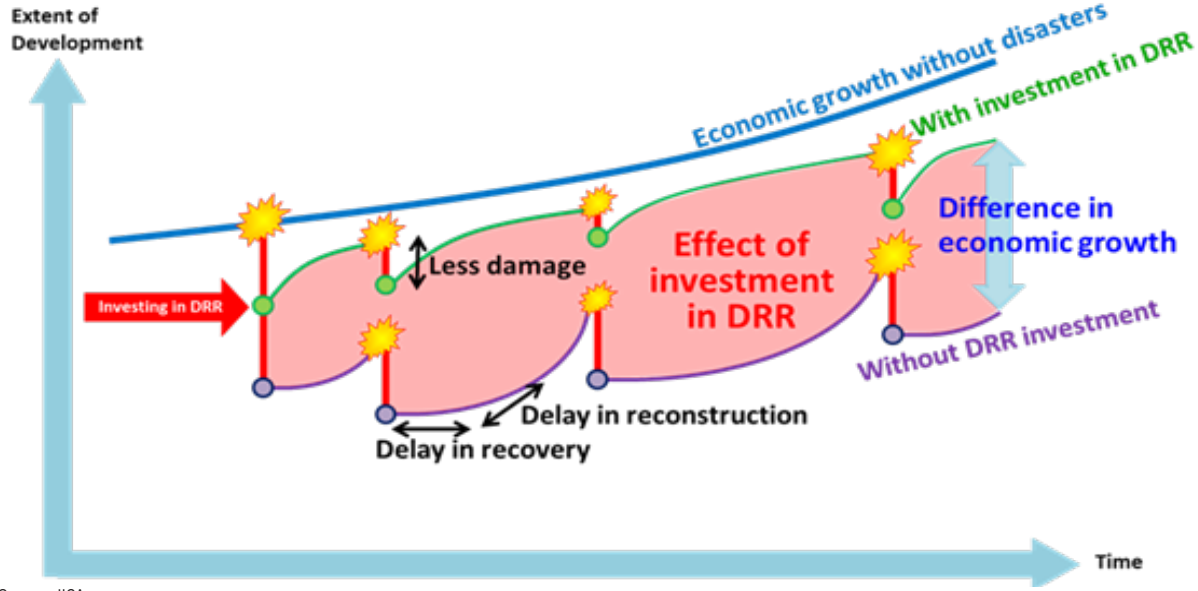
Climate risk is not only physical hazards, it is the congruence of hazard, exposure and vulnerability (Figure 2). The society's assessment of and reaction to risk influence climate (left hand side) as well as socioeconomic design (right hand side), which feed into and influence hazards, exposure, and vulnerability. Therefore, the system as a whole is endogenous and dynamic. This paper focuses on climate adaptation, which is the right hand side loop wherein exposure and vulnerability are the key determinants of the magnitude of risk.

The objective of climate change adaptation is reducing the magnitude of risk from the sides of vulnerability and exposure by taking into consideration the intensification of hazards under climate change. Exposure is the number of human lives and economic values exposed to a hazard. Vulnerability is the characteristics and circumstances of a society or asset that make it susceptible to the damaging effects of a hazard. Typically, when hazards occur successively, vulnerability in societies or economic assets increases (Figure 3).

Instead, adaptation should aim at building resilience, as in the case of Bangladesh (Figure 4).

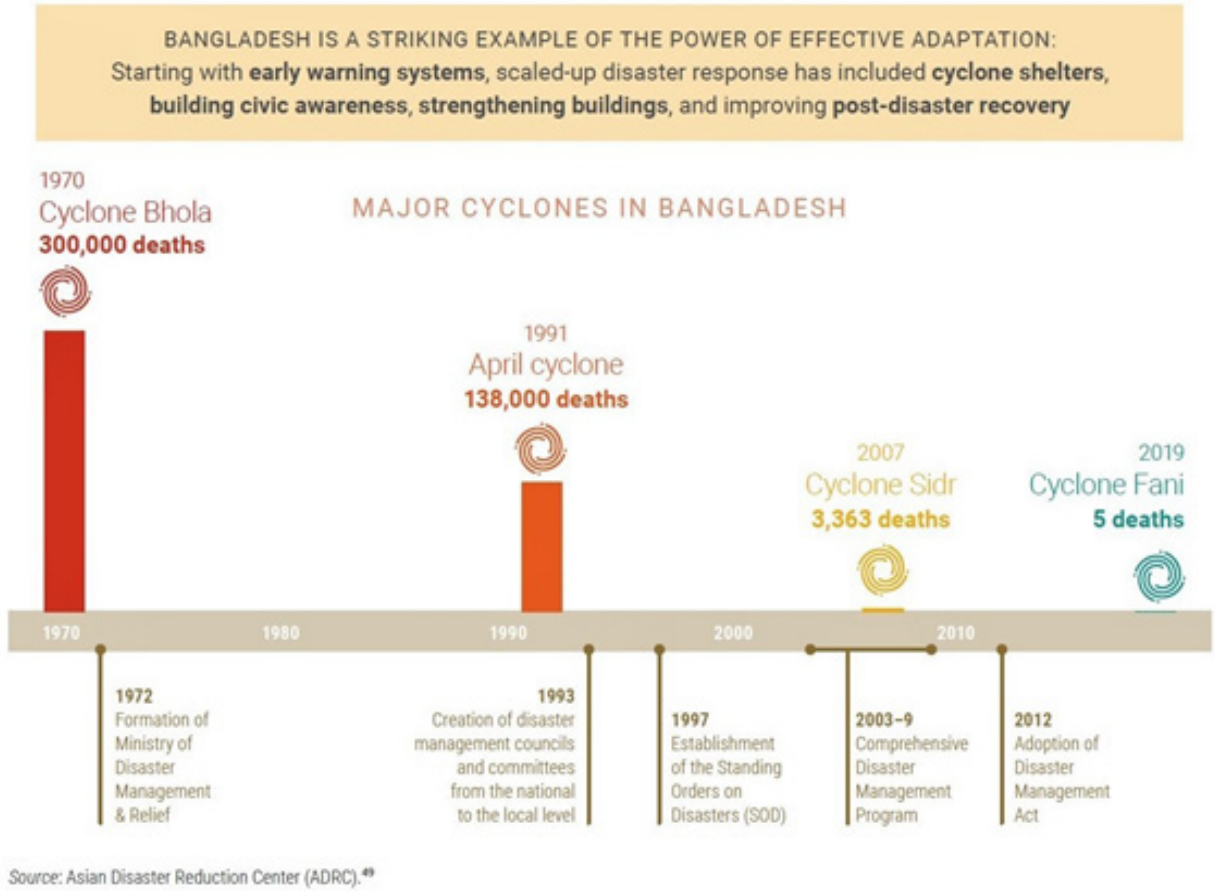
It is important to keep in mind that in the context of economic and population growth, exposure is constantly increasing. In many urban settings, a growing economic agglomeration and population influx are multiplying the level of exposure to hazards.

Figure 3: The Impact of DRR Investment



Source: JICA

Figure 4: Major Cyclones in Bangladesh



Source: Asian Disaster Reduction Center (ADRC).[49]

Source: Global Commission on Adaptation

Ex-ante risk reduction is especially important when the country is on the path to growth.

Risk reduction ex-ante pays off

Japan's past experiences in Table 2 suggest that ex-ante risk reduction pays off in terms of avoided losses. Even while hit by many floods, the number of flood victims and economic losses caused by the events have decreased over time and there has been economic and population growth.

Table 2: Ex-Ante Risk Reduction Pay Off

no. of deaths by flood (annual)	**1965** 5,500	**Present** <300
Flooded areas (km^2)	**1970s** 500+	**2004** 100
Intensity of economic damages (10k Yen/ha)	**1970s** 500	**2004** 4,500

Source: JICA using Water Disaster Statistics, Ministry of Land, Infrastructure, Transport and Tourism, Japan

Vulnerability and exposure can be reduced by ex-ante investments, albeit not perfectly. Structural measures including both hard and eco-based plans are at the heart of investment planning. Non-structural measures are also integral as part of planning to cater for residual risks.

Japan has invested 5 to 8 percent of the government budget to ex-ante structural investment for the last six decades. These policies came into existence through a series of introspections, particularly after a deadly typhoon in 1959 (Vera, Nagoya) that took the lives of almost 5,000 people. Several studies suggest that the payoff rate for these investments is around 7dollars per dollar of investment, on average.

In the Philippines, due to flood control investments along the Pasig-Marikina river system in Metro Manila, damages and losses incurred during two consecutive typhoons, Ondoy and Pepeng, in 2009 were kept relatively low at 2.7% of GDP. This is suprising considering the fact that the affected areas accounted for 60 percent of the country's GDP, including the National Capital Region (World Bank, 2011).

We should take into consideration "chronic" vulnerabilities

In order to understand risk at the micro level and to link risk to the well-being of the people, it is important to note that there is also a micro dynamic interaction between hazards, exposure and vulnerability.

Past hazards increase the vulnerability of a society and the people of a particular locality. People that have the means or are well-informed leave hazardous areas while the very poor remain. The rent then becomes cheaper and even more poor people move to the area, while social ties continue to be eroded. The incidence of past hazards induces the self-selection of people living in a particular locality in such a way that then multiplies both human exposure and vulnerabilities.

Economic exposure should be sensitive to past hazards as well. New investments that create jobs tend to avoid hazard prone areas. As a result, people remain in hazard prone areas tend to be left with less and less potential growth sources, i.e. employment with decent earnings.

This is a process akin to that of economic agglomeration, except that it moves in a negative direction and worsens the state of poverty. Therefore, past hazards, human exposure, and vulnerability feed one another negatively in certain locations despite the desperation of the people trapped there.

Many household surveys in such areas (such as the ones conducted by Ateneo University and JICA in Metro Manila) suggest that people demonstrate their own resilience by coping, diversifying their livelihoods (such as petty trading) and sending the next generation to school. However, when a disaster hits, most people are pushed back into absolute poverty. While there have been many attempts in the past to relocate these people out of hazard prone areas into safety, the outcomes of these attempts have been mixed. They come back to the original areas because of livelihood. They are the ones in "chronic" vulnerability and are the most affected by adaptation injustice.

Figure 5: Comprehensive Risk Management Plan

Source: JICA

Difficulties in Implementing Risk Reduction

Practical steps to reduce risk

To reduce risk and stop the downward spiral of reducing the well-being of people, we have to arrive at a comprehensive risk management plan (illustrated in Figure 5) for each geographical area, make necessary decisions and execute ex-ante measures. The example of flood management is used because it is most comprehensive and complicated due to its micro-locational characteristics dominated by hydro dynamics that do not necessarily coincide with administrative units. It consists of "designing and investing in reserving water (green actions)", "preparing for a flood (households and businesses, red actions)" and "designing and investing in risk minimizing water flow when flooded (blue actions)".

To plan these, local governments should go through the eight steps forward in the JICA DRR training textbook as follows:

Step 1: Collecting local hazard information
Step 2: Understanding local disaster risks
Step 3: Confirming DRR plans by national and other authorities
Step 4: Identifying residual risks considering time-scale (i.e. return periods/ time horizon)
Step 5: Listing all necessary DRR measures by local government
Step 6: Prioritizing DRR measures
Step 7: Arranging budget allocation at necessary levels
Step 8: Executing DRR measures and reviewing periodically

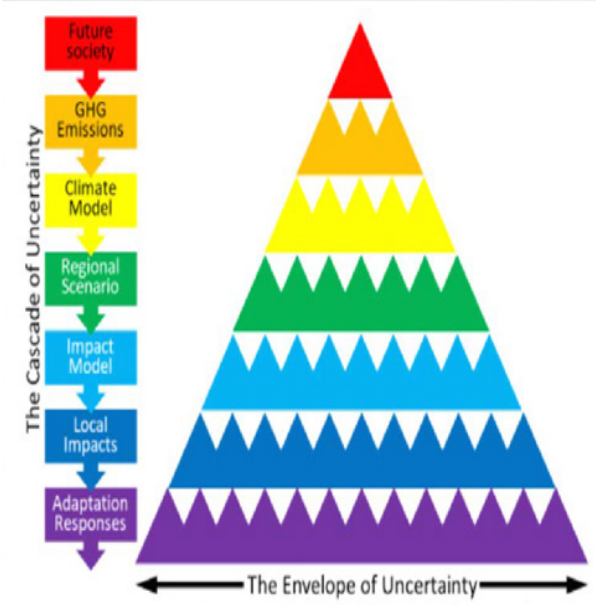
For simplicity, there are four key capacities necessary for the implementation of ex ante investments: capacity to identify risk (steps 1 and 2), capacity to plan to reduce risk (steps 4 to 6), capacity to coordinate among multiple stakeholders and decide through administrative processes (steps 3 and 7), and capacity to execute (step 8). The following section, will illustrate some of the major practical difficulties related to each of the capacities required.

Major areas of difficulties in reducing risk

Difficulty in identifying the risk: uncertainties

In adapting to climate change it is difficult to estimate what is the "right" size of risk in a given time horizon. Some hazards are extreme events that we

Figure 6: Model of Uncertainty



Source: Wilby and Dessai

can hardly observe and some others are average events that proceed slowly. We should also think about multi-hazard situations or extreme hazards occuring concurrently. The root difficulty lies in the fact that hazards are moving targets with ultiple levels of uncertainty (Figure 6). Even when we can technically downscale global circulation models to the target localities for a certain timeframe, these predictions should be interpreted as containing uncertainties.

Difficulty in planning and project preparation: takes time and cost

It is costly to prepare for adaptation in both terms of time and engineering efforts. Take the example of flood management Master Planning by JICA. The process has to start with gauging the level of rainfall and stream flows. Data accumulation for several years is necessary to arrive at robust modelling and calibration typically through technical assistance. Topography and socio-economic data for the area are also necessary. Only after establishing the datasets of the past and present, we can overlay the predictions under climate change. However, this is only the first stage of a Master Plan. We then proceed to a series of interactions between key stakeholders and decision makers on what future risk vision to share, what to protect from risk, through which measures (structure, non-structure), and a list of prioritized investments. After completing a Master Plan, Feasibility Studies and Detailed Design stages follow before governments can arrive at solid project documents. Total costs for the preparation stage can be in the order of a couple of billion yen if the river system is comprehensive.

Challenges in the coordination and decision making

There are challenges in coordinating and arriving at final and binding decisions. First, it is difficult to embed disaster risk reduction into existing administrative frameworks and decision making mechanisms because risk is tied to micro-geographies and not to administrative jurisdictions. Second, the task of risk reduction cuts across any lines of administration (public works, social protection, urban planning, both national and local levels, etc.) requiring a closely coordinated approach that is not "business as usual". Third, it can be difficult to create a sense of urgency for a risk that is not (yet) real. Finally, as some segments of the society can "win" or "lose" as a result of the plan, social consensus building can reach gridlock at local levels. Very often, it is only after significant disasters that risk reduction projects move forward.

Difficulty in execution: capital, technology and community resettlements

At the execution stage, the sheer amount of capital can be a challenge for finance ministries. Large flood control projects can be in the range of 20 billion to 100 billion yen depending on its scale and components. Some technologies (e.g. floodgate management) are not readily available and so training is necessary at the same time. The part that requires the most refined planning, compassion, and grit is resettlement. In rivers along large cities or in low-lying coastal areas, resettlements of the "chronically" vulnerable communities are unavoidable. Creation of resettlement sites that provide them with better and sustainable opportunities while keeping the communities together is a daunting yet rewarding challenge.

Case Studies: Philippines and Thailand

This section takes the cases of the Philippines and Thailand to illustrate the difficulties in implementing

risk reduction and what the final and most important piece is: leadership.

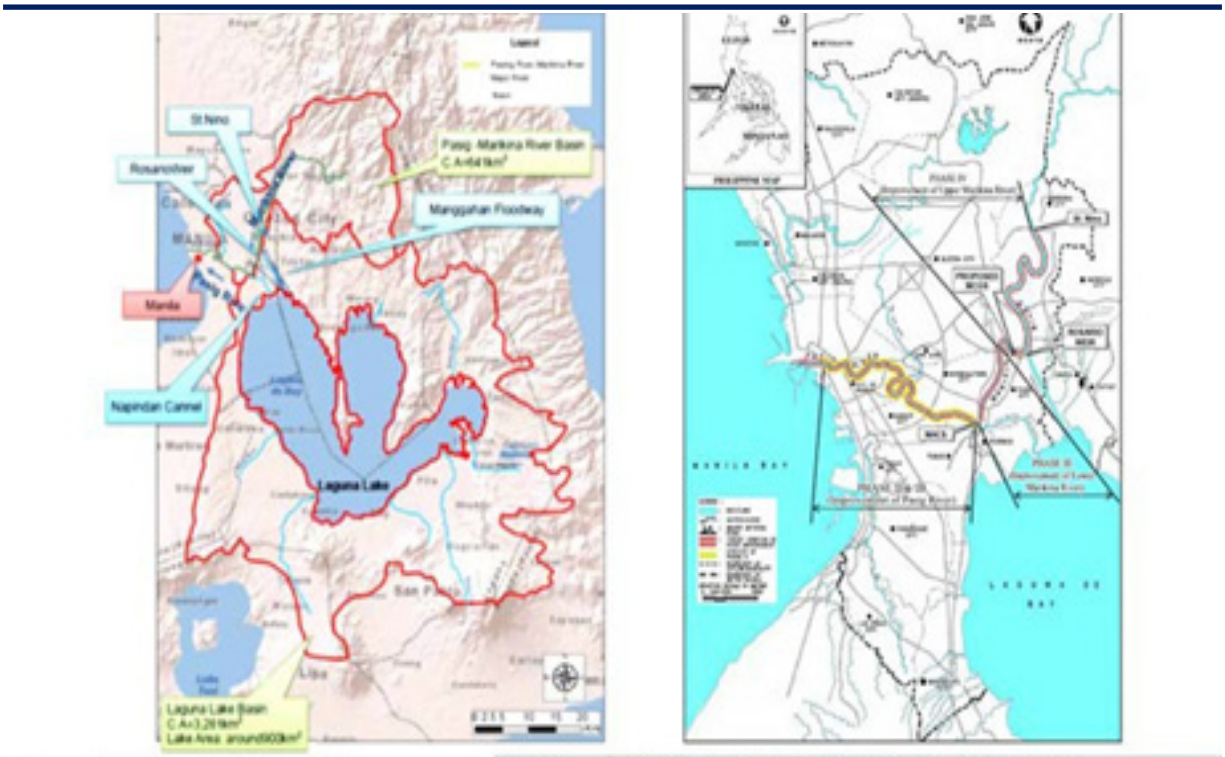
Philippines

JICA has been assisting the Philippines since the 1970's with the management of the Pasig-Marikina river system. Several floods that took hundreds of lives in the 60s prompted the Marcos government to embark on the Master Planning and preparation of the Mangahan Floodway with assistance from Japanese ODA. By the 1990's, the Ramos administration started to build pumping systems and embankments along the river based on a revised masterplan. The Benigno Aquino government decided to continue the implementation of priority projects from the Ramos administration and that continuity has held under the Duterte government.

Throughout this, consistency within the administration of the DPWH (national level) has been instrumental. They have steadily increased the number of river engineers. In particular, The Benigno Aquino administration appointed a business leader from the private sector to accelerate the decision making process and execution of priority infrastructure projects. JICA has assisted in both the planning stage as well as with the financing of these projects, alongside the long-term capacity training of river engineers. Local governments have actively participated in the approval process before taking the project to the national level. Due to the incidence of past floods, local governments have welcomed most flood control plans. They have also been heavily involved in resettlement. Some local governments that have lost voters had showed temporal opposition, but this has not lasted forever.

Uncertainties have remained but the engineering designs have provided for buffers. The missing part is the flood management of Laguna de Bay, to

Figure 7: Pasag-Marikina River Basin



1982年	パッシグ河治水事業（PH-P10，マンガハン放水路）
1990年	マニラ洪水対策計画調査（M/P策定）
2002年	PMRCIPフェーズ1（PH-P23，全体D/D）
2006年～	PMRCIPフェーズ2（PH-P26，パッシグ川区間）
2011年～	PMRCIPフェーズ3（マリキナ川下流+パッシグ川区間）

Source: World Bank

where flood water from Pasig-Marikina is discharged. JICA and DPWH are working together on this. All in all, when leadership is pragmatic and makes decisions, with timely financial and technical support, implementation proceeds.

Thailand

JICA has historically supported the Royal Irrigation Authority in its efforts to expand irrigation projects nationwide. Major projects have been in the Chao Phraya river basin where a couple of irrigation dams under royal names were constructed. Chao Phraya has been the core river basin for agriculture development, blessed by the King.

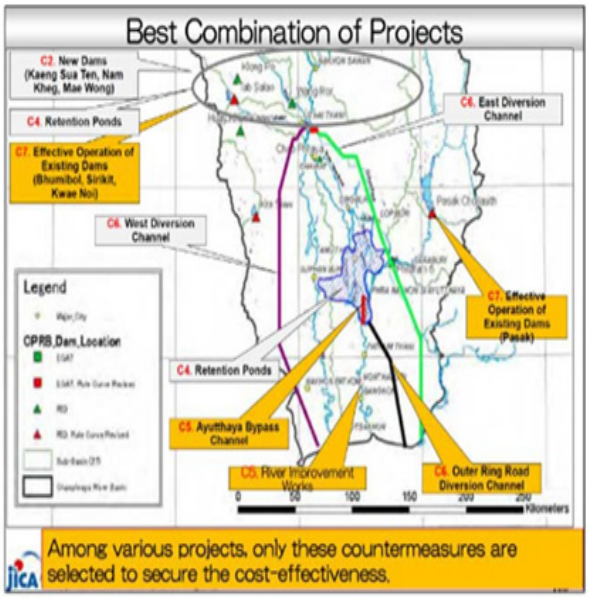
With the emergence of economic agglomerations around the Great Bangkok region, including eastern seaboard, as well as some inland industrial zones along the river, water management has become multipurpose: irrigation and flood management to protect assets other than agriculture.

The 2011 flood of Chao Phraya opened the eyes of everyone. Caused by excessive and continuous rainfall from successive, powerful monsoons and numerous subsequent dam breaches, the floods inundated more than six million hectares of land in 66 of the 77 provinces of the country, affecting more than 13 million people from July through December 2011. Right after the flood, JICA supported the renewal of the river management plan and suggested various structures to reduce risk in Bangkok. At one point, the previous King had issued the green light together with a budget envelope. However, amidst multiple political transitions taking place, the plans have not entered into the implementation stage yet.

In my personal observation, the issues are in coordination and decision making. At the root lies the fact that for the Royal Irrigation Department, protecting rice fields is the most important mission; while the Bangkok Metropolitan Authority wants to protect economic assets and population. When the economic growth drivers are shifting, the direction of interests, institutions, and solutions hardly coincide. We fear for another flood in Bangkok that could happen at anytime.

While observing the decision making process, JICA is conducting a science based study together with University of Tokyo and Thai Universities on adaptation that includes socio-economic aspects. This squarely takes into consideration future climate uncertainties in the hope that it will be an indispensable piece of information when the plans are executed.

Figure 8: Risk Reduction Proposals



Source: JICA

Concluding Remarks

In this essay, I have identified the major difficulties of implementing adaptation. The two case studies suggested that bringing risk reduction into reality is a challenge, even in megacities in Southeast Asia with substantial capacities. Moreover, chronic vulnerabilities tend to be persistent. These together will likely lead to inequalities through failures in adaptation.

At the same time, there is serious scarcity among development partners in the capacity to provide advice on effective risk reduction, ex-ante. Even the UNDRR strategy is not short of reactive, not-so-systematic adaptation.

From a global perspective, accelerating adaptation hinges on how we can improve the capacities of the countries from planning through execution, while at the same time wisely allocate the scarce resources of the development partners. This is why JICA's technical assistance is focusing on the realization of target (e) from the Sendai Framework, namely national and local DRR planning. The idea is to make local DRR plans a central tool to involve multiple layers of authorities (municipalities, national government, communities). At the same time, JICA supports the capacity of newly established DRR

agencies that serve as focal points of this quintessential coordination. When it comes to execution of projects, JICA is seriously constrained in terms of number of countries that it can partner with at the same time.

Then, how do we scale up in response to Greta's call? We need a paradigm shift in partnerships and resource mobilization. We cannot remain complacent with using only early warning systems. There should be schemes to accelerate planning and massively execute real risk-reduction, including nature based solutions. Past leadership efforts for this purpose has been Sendai Framework action plans at the global level, World Bank's GFDRR at the multilateral level, and Netherland's Delta Plan in Bangladesh at the country level, so why not build a scaling-up coalition between these levels. Risk reduction requires leadership, capacities to mobilize nuts and bolts, and shared compassion with a true sense of urgency.

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