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It Is Time to Factor Natural Disasters into Macroeconomic Scenarios

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Over the recent year, humanity has faced natural disasters of unprecedented magnitude and impact. However, governments and international aid organizations do not systematically plan for preventing and mitigating the effects of natural disasters, and macroeconomic scenarios seldom take into account the results of their increasing incidence, damages, and costs. Using evaluative lessons from the World Bank's and others' experience, this note highlights the urgent need to invest in climate change mitigation, disaster preparedness, early response, and postdisaster reconstruction.

In the past year, the world has suffered natural disasters of extraordinary magnitude and impact. Devastating earthquakes in Japan, Haiti and Chile, and floods in Pakistan, West Africa, Sri Lanka, Brazil, and Australia have caused enormous human suffering and losses. Some 2.6 billion people have been affected by natural catastrophes over the past 10 years, compared with 1.6 billion in the previous decade. According to the International Monetary Fund, the costs of damages are now 15 times higher than they were in the 1950s (IEG 2006a). One estimate suggests that the economic losses of the earthquake in Japan will reach some 15 trillion yen (\$183.7 billion) or 3 percent of Japan's GDP.

Despite the recurring nature of natural disasters, governments and international aid organizations do not systematically plan for preventing and mitigating their effects. For example, almost half of the countries borrowing from the World Bank for disaster response did not mention disaster prevention in their development plans. Macroeconomic scenarios, even in countries that are regularly hit by natural catastrophes, seldom

take into account the effects of their increasing incidence, damages, and costs. Meanwhile, evaluative lessons from the World Bank's and others' experience confirm the urgent need to invest in climate change mitigation, disaster preparedness, early response, and postdisaster reconstruction.

Climate Change Mitigation

The frequency of hydro-meteorological disasters—especially floods and droughts—has dramatically increased over the last two decades. Compared with some 150 disasters per year in the 1980s, that number increased to more than 370 in the late 2000s. The floods in Australia, China, Pakistan, Sri Lanka, and West Africa and the heat waves in the Russian Federation during 2010–11 wreaked havoc on lives and livelihoods. The World Bank estimated that \$1 billion worth of crops were lost in Pakistan, which paralyzed the country.

Remarkably, using the same measurement criteria, the number of nonclimatic—mainly geophysical—disasters reported has not increased much during the same time. This notable

difference in trends does not seem to be the result of better reporting of floods today. One would expect any underreporting to affect mainly the less severe disasters. However, the proportion of less severe flooding events (10–100 deaths) reported within the total number of flooding events has remained practically constant during 1985–2008, at about 55 percent.

A Canadian study in the journal *Nature* analyzed the increase in heavy rainfall globally from 1951 to 1999 and for the first time matched observations with climate simulations, while also including the effects of man-made greenhouse gas emissions (Min and others 2011). Another paper, also published in *Nature*, forged a link between man-made climate change and extreme floods in Britain in 2000, suggesting a doubling of risk (Pall and others 2011). Stott, Stone, and Allen (2004) reviewed data since 1851 and found that human influence has at least doubled the risk of a heat wave as bad as the deadly European heat wave of 2003, which was at the time the hottest summer in at least 500 years.

The growing evidence of the link between climate change and natural disasters stresses the need to address the root causes of climate change. In this environment, approaches and solutions offered by economists can be highly influential. But mainstream economic advice must stop seeing environmental protection as a cost to growth and see it instead as an aid to sustained growth. Growth models are also silent on subsidies purportedly used to speed growth, which include farm subsidies of some \$150 billion a year and subsidies to fossil fuels of \$650 billion a year worldwide, all of which encourage energy intensity, emissions, and waste.

Lessening the Impact

Particular attention needs to be paid to environmental restoration. Environmental degradation is a man-made problem that requires urgent action, both by policy makers and international aid organizations. For instance, wetlands provide a buffer against disasters, but 50 percent of wetlands worldwide have disappeared over the past century. Similarly, forests, which are important in preventing flash flooding and landslides, are shrinking.

The World Bank has implemented a number of projects that target environmental restoration. A good example is the Vietnam Coastal Wetlands Protection Project. The Independent Evaluation Group's (IEG) evaluation found that the project successfully balanced reforestation with the livelihood needs of the affected communities, which led to a reduction in coastal zone erosion by 40 percent and increased the coastline accretion area by 20 percent. In total, 370 million trees have been replanted along 460 kilometers of coast (IEG 2010a).

Special attention should also be paid to the allocation of human settlements and construction of higher-quality, durable buildings. Population growth and the tendency of people to live close to economic centers exacerbate the effects of natural disasters by raising the numbers of casualties and victims. Thus,

governments need to adopt policies that reward people living in places that are less prone to disasters. Having poorly constructed housing further jeopardizes people's safety. For instance, earthen houses fail after floods because they absorb water and dissolve. Building houses with reinforced concrete, cinder block, or fired brick can protect walls from dissolving.

Investing in early warning systems and actively using data generated from such systems are critical to lessening and preventing the effects of natural disasters. In Tajikistan, many people live in areas particularly vulnerable to natural disasters. One such area is around Lake Sarez, where inhabitants struggle with landslides and floods. It is estimated that flooding caused by landslides could affect up to 5 million people living in surrounding areas. In 2000, the World Bank financed the Lake Sarez Risk Mitigation Project, which was designed to prepare and protect vulnerable settlements in the event of floods, mudslides, rock falls, and avalanches. The project installed a monitoring system and an early warning system, which are essential to prevent a catastrophe. The system collects hydrological, meteorological, and seismological data in the lake area and enables the monitoring of the most rock slide-prone bank and of the dam on the lake. Because it is an automatic system, it reduces response time and enables appropriate decisions and timely alerts to be made in the event of an emergency (IEG 2010a).

Early Response

Providing early response during an emergency is critical. However, recent natural disasters have shown that development agencies and governments are not fully prepared to face these disasters or ensure effective emergency response. In Haiti, Chile, and other countries, potable water could not be provided to victims in a reasonable time, and emergency medical facilities dropped offline just when they were needed most (Thomas 2010b). This includes responding to basic needs, providing access to financial resources, and involving local communities and leadership.

Responding to Basic Needs

In the immediate aftermath of disasters, relief efforts should focus on responding to victims' basic needs, such as providing food, water, and safety. Access to emergency supplies, potable water, and safe shelters is key to restoring country capacity and helping victims. For an orderly distribution of emergency aid, it is important to involve local communities and governments, ensure there are no gaps in coverage, and enhance social cohesion.

Very basic help such as providing access to shelters and ensuring the safety of the affected population are vital and can have a major impact on the recovery process. IEG's evaluation of the World Bank's support to natural disasters found that the Bank has taken several approaches to providing shelter in emergencies, from building shelters and relocating victims to safer

areas, to facilitating self-help construction of temporary shelter while simultaneously preparing to house the homeless with housing reconstruction components. One of the lessons learned from that evaluation is that, where possible, projects should avoid setting up expensive temporary shelters, because people can help build shelters from the debris for a nominal fee. Also, using disaster-resistant construction techniques while building the shelters can be not only safer for the displaced people, but may also set up a best practice that in the long term can affect people's construction choices (IEG 2006b).

Another key factor during early response is the ability to deploy experienced relief staff as early as possible. Historically, there has been no clear procedure for ensuring that the right staff are assigned to lead such operations. The World Bank has recently begun to develop a cadre of experienced disaster professionals. Additionally, it is important to ensure country ownership over projects that target disaster relief and mitigation, in order to stimulate local governments and organizations to enhance their capacity to implement such projects.

Setting a Realistic Time Frame for Recovery and Relief Efforts

Governments, donors, and international relief agencies need to be realistic about the time it may take in any given country to alleviate the initial effects of a disaster. It is not uncommon to reconsider the time frames initially envisioned for projects and programs, specifically if they stipulate postdisaster, long-term measures. For instance, during the response to the Gujarat earthquake, the United Kingdom's Disasters Emergency Committee increased the fund disbursement period from six months to the maximum of nine. Even then, the committee's evaluation criticized this period as being too short and suggested a doubling to 18 months (ALNAP 2008). One successful example of a long-term mitigation project is the China Loess Plateau Project, which aimed to reduce vulnerability after the flood by building check dams, planting trees and greenery, controlling gullies, constructing terraces, and so forth. This was a successful project, but it took eight years to complete (World Bank 2003).

Providing Access to Financial Resources

During the disaster recovery process, providing financial resources for affected people can positively affect their livelihoods and improve the overall economic situation of the affected area. Cash support, emergency loans, and credits allow people to solve their immediate problems, survive the initial days and months after the disaster, and have a sense of safety and security. However, it is important that providing access to financial resources does not negatively affect poor households in the long term by heavily indebting them. IEG's evaluation found that the Bank project that aimed to help the victims of the Marmara earthquake in Turkey proved successful because it mainly provided cash transfers for rent support, death compensation, and business compensation (IEG 2005).

Another way to provide victims with access to financial resources is to put in place income generation schemes through employment initiatives, revising trade policies, or supplying seeds and planting material. In Bangladesh after the 1998 floods, the Bank's project to give farmers vegetable seeds and tree seedlings helped restore the livelihoods of the survivors.

Strengthening Local Capacity

The manner in which relief distributions are managed either enhances community involvement in reconstruction or constrains it, fostering dependency and other undesirable consequences, such as the use of force, looting, rioting, and the firing of weapons, which are much harder to quell after the fact than to prevent in the first place.

Using local communities to manage early response and the postdisaster rehabilitation process has been effective. Besides providing access to cash and credit lines to affected people, it is important to involve the communities in rebuilding to ensure that local governments take responsibility for reconstruction efforts. A Harvard University study found that when relief is handled in a developmental manner, that is, building on local capacities, it has a significant positive impact on the reconstruction process that follows (Anderson and Woodrow 1989).

IEG's evaluation found that allowing homeowners to rebuild their own homes rather than engaging contractors works better. Positive outcomes of this approach were observed in World Bank projects in India and Turkey. In India, most of the people who received funds to restore their houses after the floods were able to economize to build new ones on their own. Also, the houses that they built were well adapted to each family's requirements. Evaluation also found that projects that dealt with postdisaster housing were effectively and economically supervised by builders and masons rather than engineers, at least regarding owner-built structures (IEG 2010b).

Postdisaster Operations

Postdisaster projects and operations need to include measures that reduce long-term vulnerability. Ensuring that governments think through and put in place effective mitigation plans is important for future responses. Evaluative lessons show that it is critical to reach an agreement on mitigation measures within the first three months, because the situation is still on the political agenda. It is also better if the financing mechanism for such measures is defined and locked in during the early negotiations stage (IEG 2010b).

Another important postdisaster effort involves solving land ownership issues. Where possible, land titles should be regularized, and where such measures are not possible, alternative means need to be put in place to ensure that land claims are not misused. The Bank's 2001 El Salvador Earth-

quake Reconstruction Project encouraged writing the names of both men and women on land titles. A beneficiary survey of that project, conducted by IEG in 2006, found some communities where 50 percent of respondents reported that a woman was one of the legal homeowners and that, overall, 37 percent of the homes were wholly owned by women (IEG 2006b).

In Pakistan, the 2010 floods opened the door for land reform. IEG's evaluative note highlights that the government of Pakistan has a unique opportunity to consider reforms in the existing land rights system and address the relationship between landowners and the *patwari*, the local revenue official who maintains land records at the village level (often the only records) and the land and water rights nexus around landlords and tenants (IEG 2010c).

Conclusion

With the worsening effects of natural disasters, countries are paying a high price financially and in human suffering. Thus, finding solutions to climate change effects and establishing disaster mitigation plans should be seen as a part of growth policies, not as an added cost. It is becoming crucial to focus not only on how to provide relief efforts in the immediate aftermath of a disaster, but also on understanding how to make the early response more effective, how to include long-term reconstruction plans in disaster relief efforts, and how to streamline prevention and mitigation measures in national policies.

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