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Weather and climate-related disasters: the cost of inaction

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Introduction

Typhoons, floods, landslides, droughts, and other weather and climate-related natural disasters occur on a regular basis in the Philippines because of its geographical location.[1] The country is an exposed archipelago facing the Pacific Ocean, within the typhoon belt, and close to the equator which makes it highly susceptible to this type of natural disasters. It comes as no surprise that among Southeast Asian nations, the Philippines has the highest multiple climate hazard index[2] (Figure 1).

Number and type of disasters

With climate change now an accepted worldwide phenomenon, the disasters caused by weather and climate-related events are expected to significantly increase. In fact, in the last two decades, this has already happened in the Philippines. The available data show that, although fluctuating annually, the number of disasters generally increased from 1990 to 2009 (Figure 2). The average annual growth rate in disasters was higher in the 2000s (13.2%) than in the 1990s (9.6%) and there were significantly more disasters (132) in the latter decade than in the former (96). By type of disaster, the most prevalent in recent years have been storms and floods. From 2005 to 2009, storms

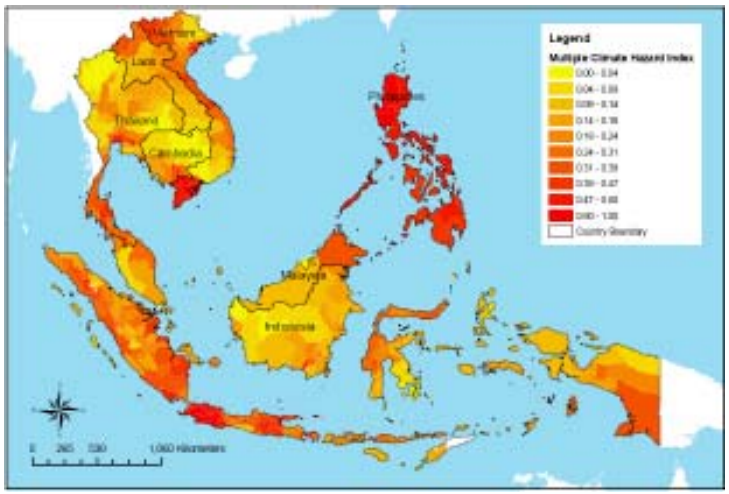
[1] Weather is the state of the atmosphere over a short period of time, e.g., less than a year, while climate is the state over a long period, e.g., years. In this paper, natural disasters specifically include drought, extreme temperature, flood, mass movement wet, storm, and wildfire. Mass movement wet includes rockfall, landslide, avalanche, and subsidence.

[2] The multiple climate hazard index is an average of five standardized climate-related hazards, particularly typhoons, floods, droughts, landslides, and inundation, over a given period.

PIDS Policy Notes are observations/analyses written by PIDS researchers on certain policy issues. The treatise is holistic in approach and aims to provide useful inputs for decisionmaking.

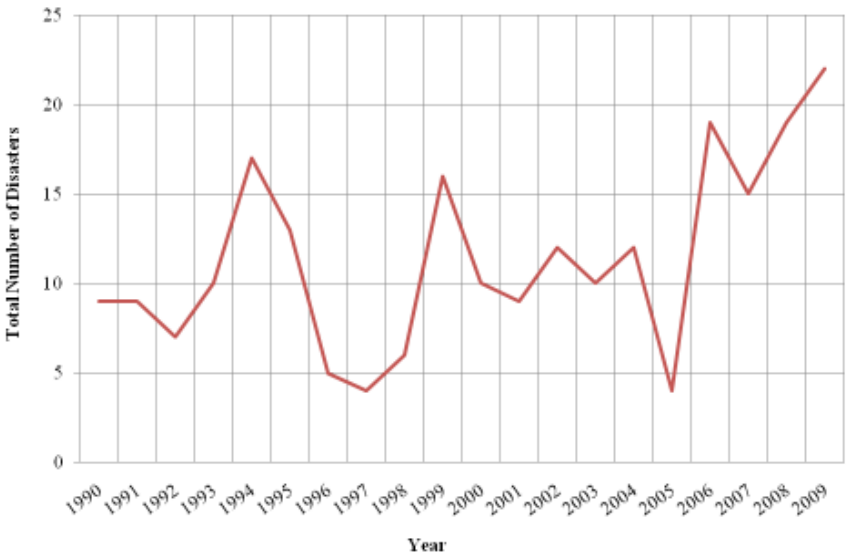
The author is Senior Research Fellow at the Institute. The views expressed are those of the author and do not necessarily reflect those of PIDS or any of the study's sponsors.

Figure 1. Multiple climate hazard index of Southeast Asia



Source: PreventionWeb

Figure 2. Number of weather and climate-related disasters in the Philippines, 1990–2009



Period	Total Disasters	Average Annual Disasters
1990–1999	96	9.6
2000–2009	132	13.2
1990–2009	228	11.4

Source of data: EM-DAT, The OFDA/CRED International Disaster Database

and floods formed 58 percent and 37 percent of the total disasters, respectively, while the rest of the disasters were mass movement wet at 4 percent and drought at 1 percent (Figure 3).

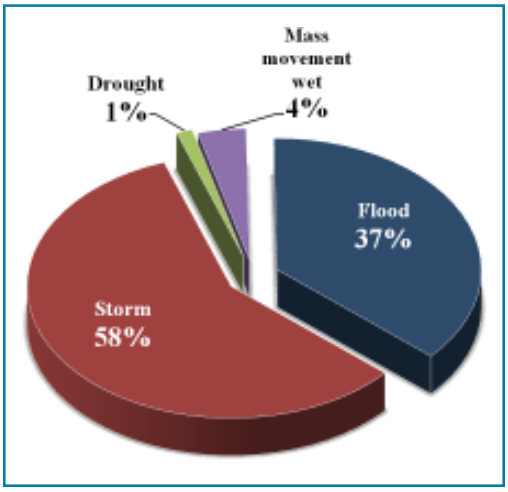
Number of persons affected

As in the case of number of weather and climate-related natural disasters, the number of persons affected by the disasters has also increased in the last two decades. The available data indicate that from 1990 to 2009, the number of persons affected by disasters in the country, while fluctuating annually, generally rose (Figure 4). The average annual growth rate in number of persons affected was higher in the 2000s (5.0%) than in the 1990s (3.5%) and there were significantly more people affected (49.8 million) in the latter decade than in the former (35.2 million).

Value of damages of disasters

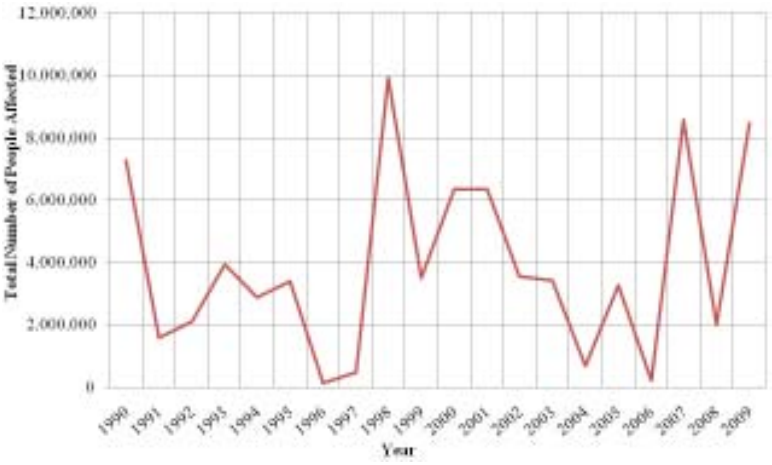
There are several economic sectors in the Philippines which have been mainly affected by weather and climate-related natural disasters, including agriculture, forestry, fishery, transportation, telecommunications, mining and quarrying, manufacturing, energy, construction, and tourism. The

Figure 3. Type of weather and climate-related disasters in the Philippines, 2005–2009



Source of data: EM-DAT, The OFDA/CRED International Disaster Database

Figure 4. Number of persons affected by weather and climate-related disasters in the Philippines, 1990–2009



Period	Total People Affected (millions)	Average Yearly People Affected (millions)
1990–1999	35.2	3.5
2000–2009	49.8	5.0
1990–2009	85.0	4.25

Source of data: EM-DAT: The OFDA/CRED International Disaster Database

economic damages[3] caused by the disasters on the aforementioned economic sectors include lost earnings, disrupted operations, damaged and destroyed property, and other related economic costs. On the other hand, the social sectors that have been mainly affected by disasters include human settlement, health, education, and water, and the negative impacts include impaired or lost lives and property, diminished access to social services, and other related social costs.

In addition to the aforementioned negative impacts of weather and climate-related disasters on the affected economic and social sectors, there are indirect damages on other sectors. For instance, damages in agriculture may impact on the other sectors of the economy through increases in the prices of agricultural goods and services. These indirect damages, whenever possible, will also have to be accounted for. However, the available secondary data on economic damages available at present only reflect direct damages and thus the figures presented below are only the conservative estimates of total damages.

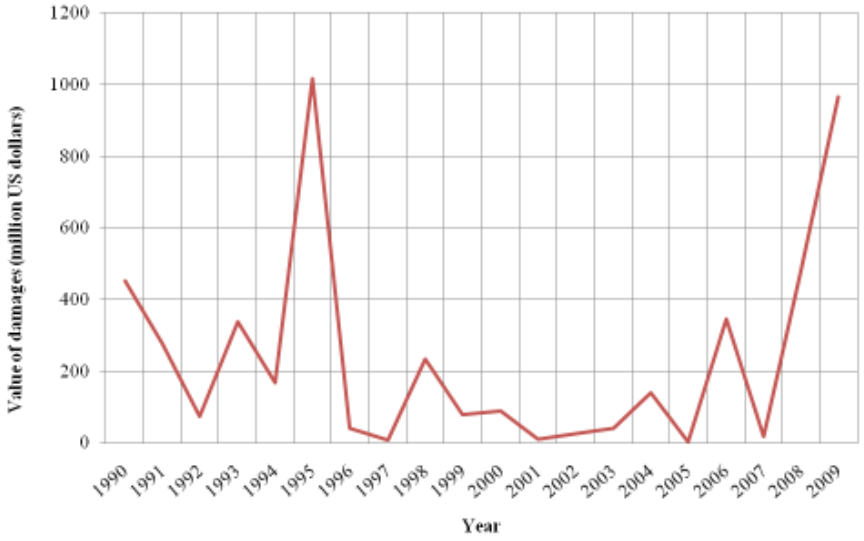
From 1990 to 2009, value of damages due to weather and climate-related disasters totaled $4,813 million or an average of $240.7

[3] The economic damages due to weather and climate-related disasters are defined here as the monetary value of the direct negative impacts of the disasters on the affected economic and social sectors of the Philippines.

million per year (Figure 5). In the 2000s, total damages were $2,121 million which were lower than the total damages of $2,602 million in the 1990s. Therefore, based on direct damages alone, while the occurrence of weather and climate-related disasters in the Philippines increased from the 1990s to the 2000s, it did not bring about a corresponding rise in the value of the damages.

It should, however, be pointed out again that the above-cited value of damages includes only direct damages of weather and climate-related disasters and would rise if the indirect damages are considered. Still, even with just the current results, the economic damages are clearly substantial and should be a cause of concern. In particular, the value of average annual economic damages of $240.7 million for the 1990–2009 period translates to about P11,193 million at the current dollar to peso exchange rate, which is clearly a significant amount.

Figure 5. Estimated value of damages due to weather and climate-related natural disasters in the Philippines, 1990–2009 (US million dollars)



Period	Total Value of Damages	Average Annual Value of Damages
1990–1999	2,692	269.2
2000–2009	2,121	212.1
1990–2009	4,813	240.7

Source of data: EM-DAT, The OFDA/CRED International Disaster Database

Improving NMHS services

An important way of reducing the negative impacts of weather and climate-related disasters is to make more accurate and timely weather forecasting and weather information dissemination. This will allow the population to access the much-needed data and information that will effectively help them prepare for and respond to incoming disasters. Better preparedness and responsiveness will in turn reduce the chance of physical damages from disasters and help minimize the accompanying monetary damages.

Recently conducted studies have shown the merits of improving the national meteorological and hydrological services (NMHS) of certain countries. For instance, in the case of Southeastern Europe, it was shown that investments in NMHS have very low cost-benefit

(C/B) ratios or high B/C ratios (Table 1). Except for one country, Montenegro, the C/B ratios of these countries ranged from 1:4 to 1:26. Furthermore, most of the C/B ratios were equal to or better than the 1:7 minimum ratio set by the World Meteorological Organization (WMO). These studies further showed that because of the transboundary nature of some weather and climate-related events, regional integration and strong cooperation would likely make NMHS systems among neighboring countries more efficient and effective.

Table 1. Estimated cost-benefit ratios of strengthening meteorological and hydrological services in Southeastern Europe

Country	Benefit-Cost Ratio
Albania	1:10 to13
Bosnia-Herzegovina	1:4 to 9
Croatia	1:17 to 22
FYR Macedonia	1:5 to 19
Moldova	1:6 to 13
Montenegro	1:1 to 3
Serbia	1:17 to 26

Source of data: Tammelin 2007

Conclusion and recommendations

It has been shown above that the occurrence of weather and climate-related natural disasters in the Philippines in the last two decades has increased and the monetized direct damages caused by them have been substantial. Necessary actions, therefore, have to be taken so that the country can better forecast the occurrence of natural disasters and quickly disseminate the data and information generated. This would allow the government and population to effectively respond to weather and climate-related natural disasters and minimize their otherwise highly significant negative impacts. Along this line, the following are the recommended courses of actions that may be undertaken by the Philippine government:

- Investment in the necessary equipment, facilities, and technology to effectively monitor, analyze, transmit, and disseminate NMHS data and information;
- Recruitment and training of the necessary personnel for the generation, computation, transmission, and dissemination of NMHS data and information;
- Active involvement of all stakeholders, including the local government units (LGUs), private sector, and citizenry for a holistic and multisectoral NMHS;
- Involvement of pertinent international agencies and nongovernment organizations (NGOs) in the cofinancing of certain types of NMHS improvements;
- Improvement in data collection and the methodology for estimating the monetary value of damages based on current theoretical and empirical developments in economic valuation;
- Inclusion of all possible forms of damages in the computation, including both direct and indirect economic, social, environmental, and other forms of damages; and
- Mainstreaming of weather and climate-related issues into national and local economic development planning and implementation.

Occasional floodings are a big headache of the population of Metro Manila.

In addition, since some types of disasters such as typhoons have transboundary implications, it would serve the Philippine government well if it would cooperate and coordinate with neighbors in the ASEAN region and come up with a subregional and integrated approach for weather forecasting. This way, these countries would benefit from data and information sharing, and other forms of cooperation and subsequently decrease their individual costs of NMHS improvements.

Finally, the Senate Economic Planning Office (SEPO) has included in its preliminary list of proposed legislative reforms the passing of the PAGASA Modernization Act. This potential law will seek to appropriate funds for the purchase of new equipment and staff training and education, among others. It is most welcome and should be given priority by legislators as inaction will just ensure the occurrence of another significant disaster anytime soon. Furthermore, since serious disasters can still occur even with accurate forecasts, as recently shown by typhoon Juan, it would serve the country well if overall disaster management during and after the actual event of disaster is greatly improved.

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