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Disaster impacts and financing: local insights from the Philippines

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Policy report

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This policy paper is intended to inform decision-makers in the public, private and third sectors. It has been reviewed by internal and external referees before publication.

Contents

Summary

Main messages

- Managers responsible for disaster risk in particularly poor provinces of the Philippines do not feel adequately prepared for typhoon impacts.
- Managers' experience of disasters appears to influence their risk perception and preparedness: those who have experienced fewer but more severe storm events feel the least prepared for future events.
- Financial aid may not be allocated across provinces proportionately to damages suffered and tends to be heavily focused on response rather than preparedness and resilience.
- More work is needed to build capacity in local governments, tailored to their needs, experiences and specific vulnerabilities.

The Philippines is a country with high exposure to natural hazards and with limited resources for dealing with them. It is therefore vital that available funding for disaster preparedness and relief is allocated based on accurate forecasts and evidence.

Disaster Risk Managers play an integral role in the delivery of disaster preparedness and relief. A 2016–17 survey of Disaster Risk Managers identified important differences in how Managers perceive risk and their levels of preparedness across the country in light of differing storm impacts since 2009. Now, to aid policymaking, more comprehensive and up-to-date data are needed.

Pre-disaster preparedness receives less funding than post-disaster relief. Greater financing for preparedness, based on an improved understanding of Disaster Risk Managers' perceptions and needs and better communication of future climate risk, is needed in order to help vulnerable communities more effectively before a disaster occurs.

Next steps for policymakers in the Philippines

- **Capacity-building and data improvements:** Local Disaster Risk Managers should be provided with improved robust climate projections and evidence-based disaster impact estimates that they can understand and rely on. This is needed particularly in regions that experience less frequent but more damaging hazards.
- **Enhanced national-to-local dialogue and coordination:** Managers' subjective experience and perceptions should not be disregarded as they provide important indicators of local resilience. National government should take into account Managers' local knowledge and encourage co-development of disaster management strategies.
- **Scaling up disaster preparedness:** National and local governments should place a heightened focus on pre-disaster preparedness, in addition to response and management. That enhancing preparedness may be more effective than solely managing and responding to disasters has been made even clearer by the ongoing COVID-19 crisis. The pandemic could fundamentally change the international political system and donor investment priorities, so it is timely to reinforce the importance of pre-disaster investments to build resilience to future shocks.

For overseas aid agencies and donors we recommend:

- **Support to disaster preparedness and response:** Overseas aid agencies and donors, including the UK Department for International Development, should continue to support both disaster preparedness and disaster response in the Philippines. More overseas investment is required in disaster risk reduction and climate change adaptation to limit the potential future damage to lives and livelihoods from typhoons that affect the Philippines.

1. Introduction

The Philippines, a country of 109 million people across 7,000 islands, is considered one of the most hazard-exposed countries in the world (World Bank Climate Change Knowledge Portal, n.d.; Philippine Statistics Authority, 2010). Since 1990, the islands have experienced at least 432 natural disaster events, from earthquakes and volcanic activity to storms, floods and droughts[1] (EM-DAT, 2020). Such events have 'affected' at least 186 million people (equating to the number estimated to have required immediate assistance such as food, shelter or medical needs), and have resulted in more than 40,000 deaths and an estimated US$23.5 billion in economic damages. The Philippines' economy is especially vulnerable to natural hazards due to its dependency on climate-reliant activities such as agriculture and on coastal and marine resources.

This report investigates why further disaster risk policy intervention may be required at the local level in the Philippines and provides guidance to policymakers on the focus for providing improved interventions. It analyses potential inconsistencies in investment in disaster preparedness at the local level, which may be associated with the observed variations in perceived and actual exposure of localities to natural hazards and their associated impacts, the level of preparedness and ability to cope with the hazards, and the support localities receive from the national government and international funding sources.

Background: storms in the Philippines

Out of all natural hazards, storms or tropical cyclones (typhoons) have resulted in by far the greatest impacts, making up almost half of all disasters in the country and causing about US$20 billion in damages since 1990. To provide some context of the spatial distribution of impacts across the Philippines, Figure 1 highlights the frequency and impacts of typhoon events at the provincial level between 2009 and 2017. Based on data for this period, within which two of the most significant storm events in terms of people affected in the Philippines occurred, we note that storms occurred most commonly in the northern provinces (see 'Number of typhoon events'). Over the same period, the central and southern provinces experienced typhoons less frequently but those that did occur proved more devastating than those in the North.

In 2012 Typhoon Bopha (known locally as Pablo) made landfall in the southern islands of the Philippines. Bopha caused more than 1,900 deaths, affected 6 million people, and created around US$898 million in damages (EM-DAT, 2020). Based on wind speeds, Bopha remains the strongest storm to have affected the southern island of Mindanao in the past few decades (NOAA, 2020). In 2013, Typhoon Haiyan (locally known as Yolanda) made landfall in the central Philippines, killing at least 7,300 people, affecting more than 16 million and causing an estimated US$5–15 billion in damages – as much as 5 per cent of GDP. Major losses were suffered to agriculture and fishing, associated livelihoods, and critical infrastructure, including airports. This storm remains one of the world's strongest typhoons by wind speed on record (Tsang and Luisa, 2013; Means, 2020; Lagmay et al., 2015).

Box 1. How we are using key terms

Preparedness:

The ability to respond to a disaster at the speed and level required. Actions to improve preparedness include immediate preparations such as sandbags and evacuations, but also longer-term planning, more resilient infrastructure, better communication of risk and improved awareness of climate information.

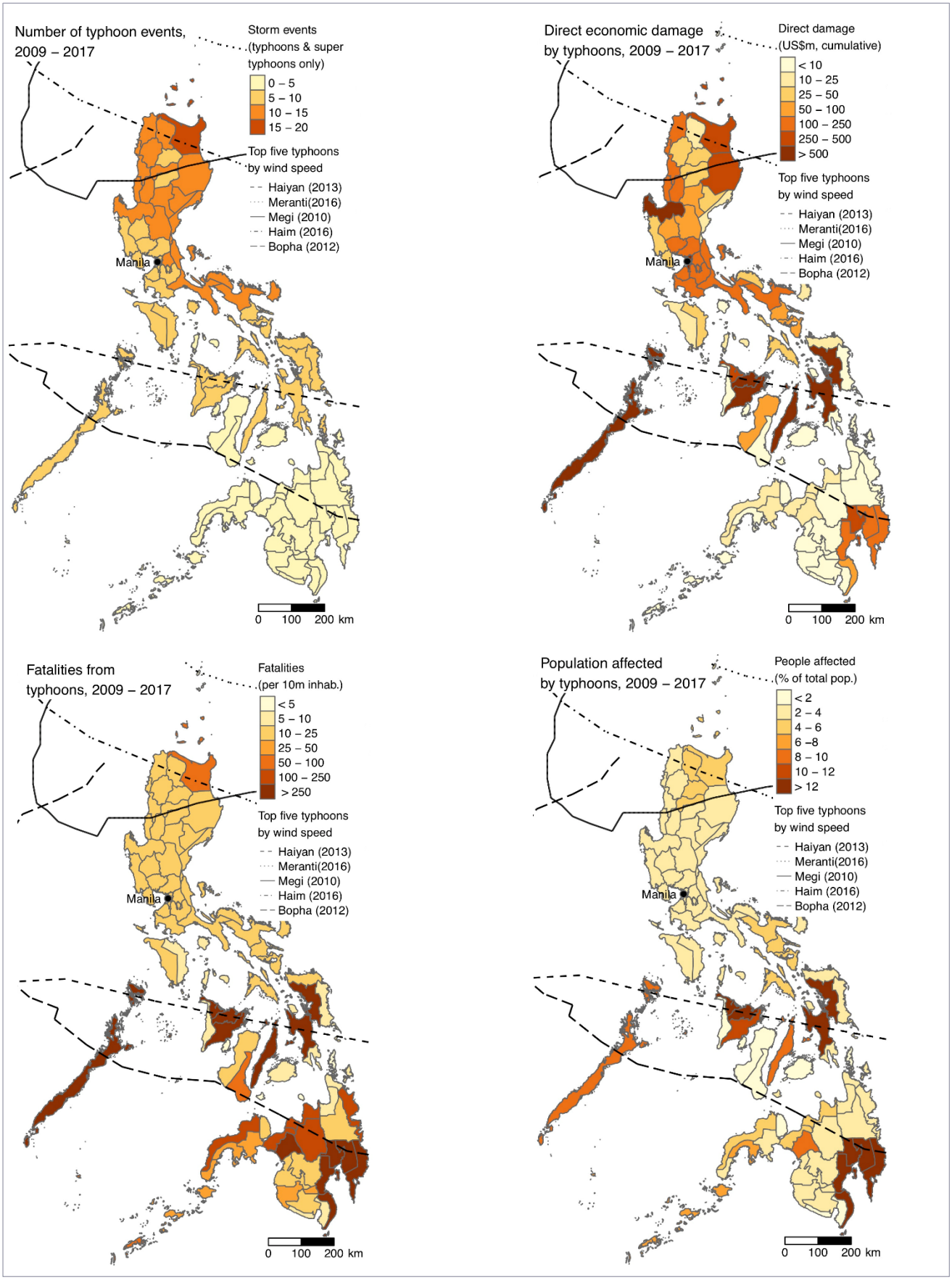
Impact:

The direct consequences of a hazardous event (such as a flood or a typhoon) on assets and people. Impacts are expressed in absolute terms (number of people affected, financial cost of damage) or relative terms (e.g. damage expressed as a percentage of GDP).

See the Appendix for definitions of terms used by EM-DAT.

[1] As of the last update to the EM-DAT database on 30 January 2020. Table 1 in the Appendix summarises the different types of natural disaster and the impacts that have been experienced in the Philippines since 1990. The Appendix also provides definitions of terms such as 'economic damages'.

Figure 1. Overview of frequency and impacts of typhoon events in the Philippines, 2009–17



Notes: The Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) defines typhoons as tropical cyclones with maximum wind speed of 118 to 220 kph and super typhoons as exceeding 220 kph. Detailed definitions of economic damages, deaths and people affected, as used by EM-DAT, are provided in the Appendix. Source: Authors' analysis of JTWC best track and EM-DAT data.

The role of local government in managing disaster risk

With the potential for preventing devastating death tolls and economic costs, disaster risk reduction is considered as vital for safeguarding sustainable development. There is a growing recognition globally of the role of local government at the forefront of disaster risk reduction and management and hence the importance of strong local institutions.

In 2010 the Philippines passed a new Disaster Risk Reduction and Management Act (Republic Act No. 10121, 2010[2]), which provided updated mandates for national and local disaster risk reduction and management (DRRM) authorities, with a greater focus on preparedness than before. It tasked Local DRRM Offices (LDRRMOs) with taking the lead in responding to and recovering from disasters in their provinces. LDRRMOs are headed by Disaster Risk Managers who have responsibility for disaster preparation and recovery within their localities.

Local government units (LGUs) are mandated to set aside 5 per cent of their estimated revenue into Local DRRM Funds. Thirty per cent of this is reserved for quick response in case of a disaster and the rest can be used either for disaster response or disaster prevention, mitigation and preparedness.

However, despite this ambitious legislation, research suggests more needs to be done to enable greater devolution of power and finance to LDRRMOs and Managers to prepare for and deal with disasters, including through better resourcing and helping build the capacity to absorb finance (Blanco, 2015). For example, the Philippines Commission on Audit has consistently found that DRRM funds are underutilised (Commission on Audit, 2014–18), primarily for bureaucratic reasons (Domingo and Manejar, 2018).

2. Investigating local responses in the Philippines: our approach

We have analysed data collected as part of the 2016–17 Survey of Disaster Risk Managers (see Box 2 and Appendix). This broad survey interviewed LDRRMO heads – known as Disaster Risk Managers (and referred to throughout as 'Managers') – to understand and benchmark how local governments view and respond to natural hazard-based disasters. Our research focused specifically on the responses of Managers relating to local disasters associated with storms or tropical cyclones.

We analysed perceived and actual impacts of storm events and how spending is allocated. Our intention was to investigate how the experience and perceptions of Managers could contribute to decisions about DRRM spending allocation.

Box 2. The 2016–17 Survey of Disaster Risk Managers

This paper utilises results from the 2016–17 Survey of Disaster Risk Managers. The first survey of its kind in the Philippines, it was conducted by researchers supported by the University of the Philippines System to explore how local government units have responded to disasters caused by natural hazards between 2009 and the time of interview (Ravago et al., 2018). Survey respondents were based in LDRRMOs within 193 municipalities and cities drawn from 47 out of 81 provinces in the Philippines as a nationally representative sample.

This was a one-off survey and has not been repeated since. An updated survey could better inform policy development, which would no doubt benefit the Philippines and complement our findings.

Further information about the survey and a description of how we analysed storm impacts and national-to-local finance transfers is provided in the Appendix.

[2] See https://climate-laws.org/cclow/geographies/philippines/laws/philippine-disaster-reduction-and-management-act-ra-10121 for an overview and text of the Act.

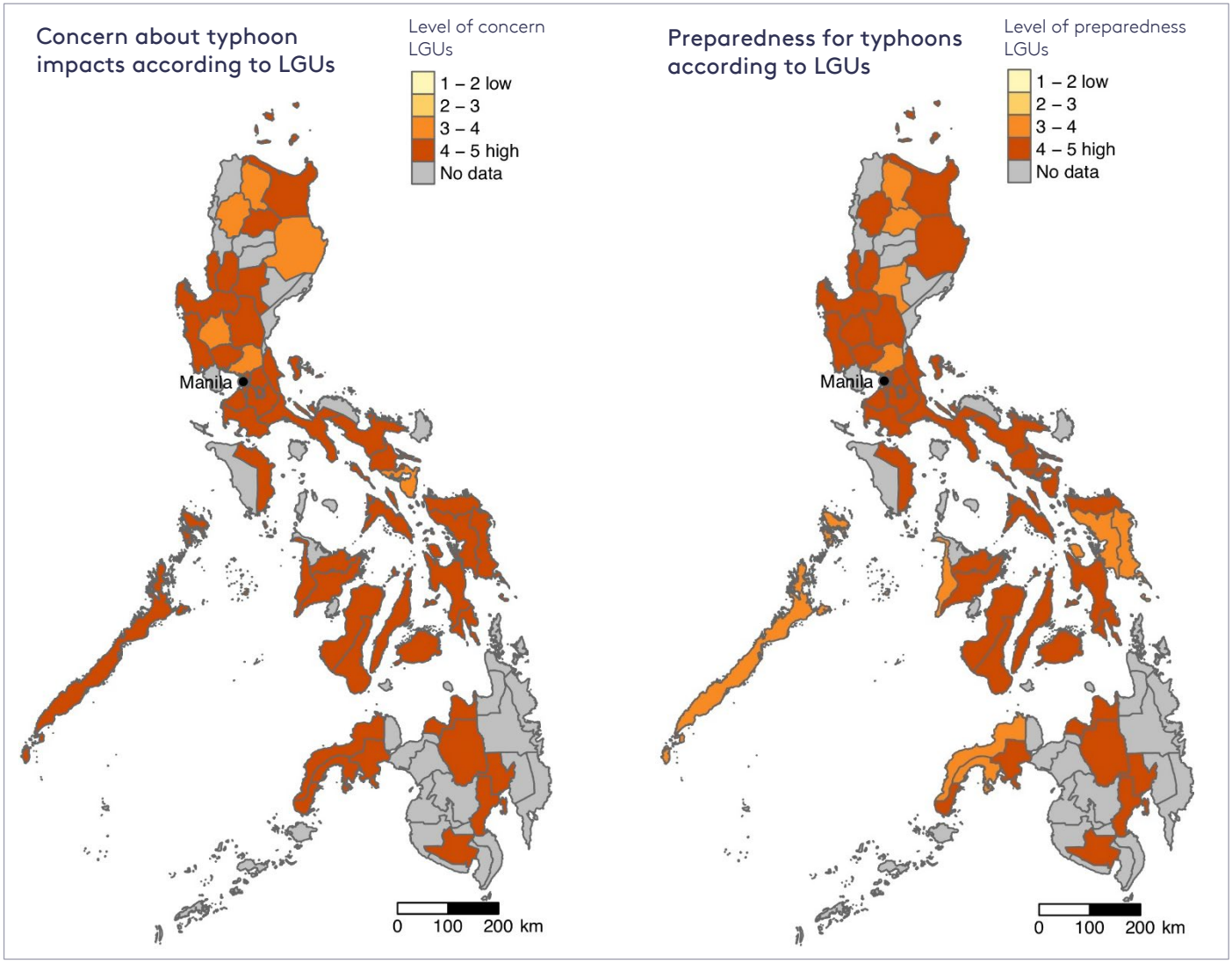
3. Findings

We have identified three types of challenges for decision-makers in the Philippines, including those at the local level and in other relevant bodies. These are described below.

Challenge 1: Varying experiences of Disaster Risk Managers

Based on their recollection of events that occurred between 2009 and the time the survey was carried out in 2016 and '17, Managers were asked to rate their level of concern and their perception of the level of preparedness of their local area to a range of different future hazards, on a scale from 1 to 5. Focusing on responses relating to storms, we found that Managers expressed high levels of *concern* across the country, but that there were more Managers in the Central and Southern part of the country that had a relatively lower level of *preparedness* than might be expected given their level of concern (see Figure 2). This is particularly true for those in locations along the pathways of typhoons Haiyan and Bopha.

Figure 2. Managers' concern and preparedness to typhoon events, Philippines, 2009–17



Notes: LGU = local government unit. The levels of concern and preparedness are based on weighted average of responses (on a scale from 1 to 5) across respondents.
Source: Authors' analysis of 2016–17 Survey of Disaster Risk Managers (Ravago, et al., 2018).

These observations are important for four key reasons:

- *Perception matters:* Firstly, subjective information about how prepared Managers *perceive* themselves to be is an important indicator of *actual* preparedness. Managers' concern (perception of the future risk they face, including the likelihood of a disaster event and their ability to cope with it) is also a key component of the psychological, social and cultural factors that contribute to preparedness in a region. In addition to risk perception, these factors can include "sense of place, beliefs and culture, social norms, social cohesion, power and marginalisation, and cultural identity" (Jones and Tanner, 2015: 8-9).
- *Proximity to events:* Second, people are likely to have higher levels of concern immediately after an extreme event, but this tends to diminish over time (Lechowska, 2018). The Survey of Disaster Risk Managers was undertaken after Typhoons Bopha (2012) and Haiyan (2013) had devastated Southern and Central regions of the Philippines, which were not used to storms of this magnitude; this is a potentially significant driver behind the high perception of risk among Managers outside the North.

  A 2018 survey of households in the Philippines undertaken by Harvard University found comparatively lower risk perception by households in Southern regions in 2018 compared with Disaster Risk Managers in 2016–17, while risk perception in Northern households remained high (Bollettino et al., 2018). These surveys are not directly comparable as the 2018 survey does not capture the views of Managers. However, the 2018 results do lend credence to the possibility of reduced risk perception in less frequently impacted regions over time, which warrants investigation.
- *Prior experience:* Third, and related to the previous point, there is evidence that prior experience of disasters also influences the level of disaster preparedness in the Philippines (Hoffman and Muttarak, 2017). The fact that Managers in the North of the country felt more prepared than those in the South supports this assertion, and also merits further investigation. However, there are other important factors: for example, less economically advantaged areas tended also to report lower levels of preparedness.
- *Gaps in climate information and understanding:* Fourth, it appears that there is limited access to, and understanding of, climate information to supplement Managers' reliance on their experience of storm-related events. For example, while climate research and monitoring centres such as the Manila Observatory and the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) have been producing climate risk projections, capacity among LDRRMOs and other agencies to understand and use this information is limited, and broader challenges of data availability also remain.

An improved and current understanding of Managers' perceptions of risk and perceived levels of preparedness, balanced alongside considerations such as economic development, is important for developing a picture of comparative levels of resilience across the country. The Managers are the primary planners and decision-makers for disaster risk reduction and management within their localities. An up-to-date survey and improved engagement with Managers could therefore help inform how best to allocate disaster relief and preparedness across each region and also direct capacity-building efforts to enable Managers to best manage resources at the local level.

Challenge 2: Geographical allocation of funds

Using data from the Bureau of Local Government Finance (BLGF) of the Philippine Department of Finance (BLGF, 2020) and EM-DAT for the period 2009–16[3], we examined how the national government has been allocating disaster aid spending across provinces.

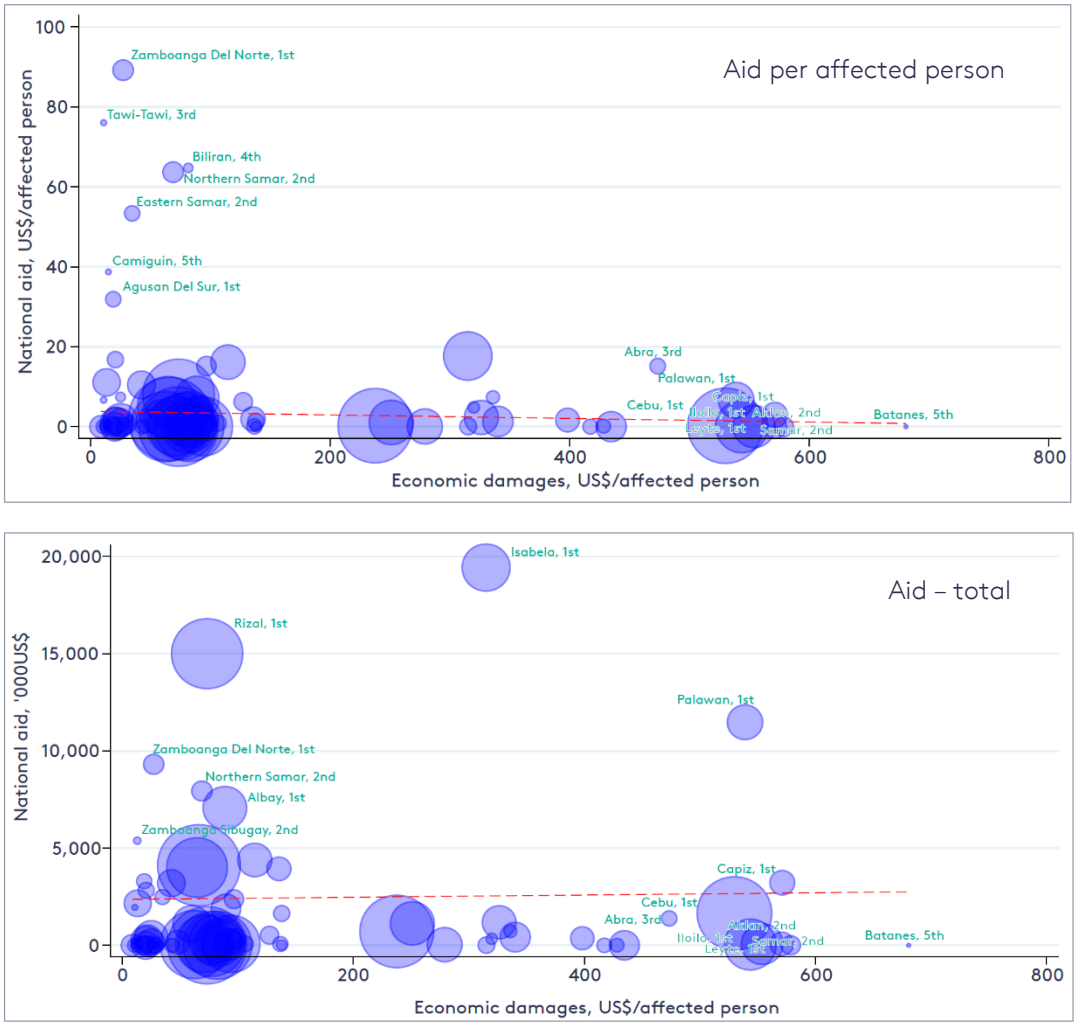
We find that there is limited disaster relief finance available generally – on average the amount of direct economic damage sustained by each person affected ($161.40) is more than eight times greater than the support provided by the national government ($19.36).

[3] The period for which data were available.

Our analysis suggests that allocations of national funds are not proportionate to storm impacts. Figure 3 shows on a per-person basis that areas with relatively higher cumulative damages for the period 2009–16 are not receiving financial aid from the national government in proportion to these damages. Over the same period, certain areas in the Centre and South received significantly higher amounts of national aid compared with areas that experienced worse impacts over the same period. These regions are less frequently impacted by storms and have incurred less cumulative damages per person since 2009, but were affected by super-typhoons Bopha in 2012 and Haiyan in 2013.

Given the limited availability of national funds, an efficient allocation of national funds to provinces should ideally incorporate evidence of both exposure to disaster impact and vulnerability to hazards according to physical, social, economic and environmental factors (see, for example, Abrigo and Brucal, 2019). Some provinces in the Centre and South of the country are extremely poor (and may therefore also have less finance available in their own Local DRRM Funds) and Managers in these regions responding to the survey showed lower levels of subjective preparedness. However, it is unclear if the government is making allocations by balancing these factors alongside disaster impacts and other important considerations of exposure and vulnerability, or if the allocations are based solely on relative income level. Given that most disaster spending in the Philippines is dedicated to relief rather than preparedness (see *Challenge 3*), there is very little indication that the more frequent storm events experienced by the North have been considered in aid allocations (Isabela, Rizal and Albay provinces are exceptions). Further analysis of the drivers underpinning government aid allocation and greater transparency on the part of the government would assist in assessing whether or not the government's limited resources are being allocated as effectively as possible.

Figure 3. Relationship between national aid allocation and storm economic damages in the Philippines, 2009–16



Notes: 'Aid', which refers to the national-to-local 'extraordinary receipts/ grants/ donations/aids' in the statement of receipts and expenditures (SRE) and economic damages is expressed in US$ per affected person. Aid includes disbursements up to 2016. The dashed red line illustrates the direction of the relationship. The size of each data point corresponds to the 2015 population level. Income classification is from the 1st income group (highest) to 5th income group (lowest).
Source: Statement of receipts and expenditures from the Bureau of Local Government Finance in the Government of the Philippines' Department of Finance and EM-DAT, 2009–2016

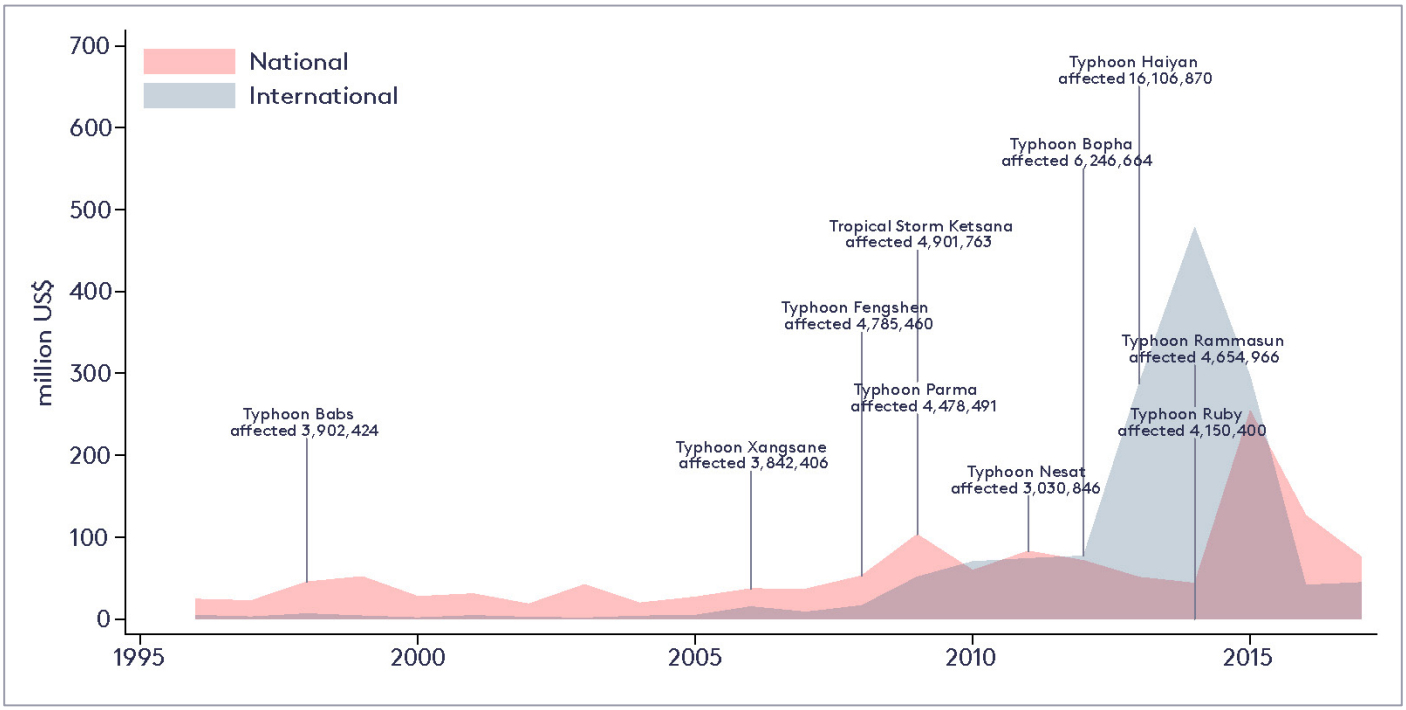
Challenge 3: Limited funding to disaster preparedness

Over the period 2007–18[4], the Philippines received an average of US$143.8 million per year in international humanitarian assistance. Of this, the national government directed US$64.3 million (44.7 per cent) to emergency response (including material relief, emergency food assistance, and relief coordination and support services), and US$56.2 million (39 per cent) to reconstruction relief and rehabilitation, immediately after emergencies ('ex-post' spending). An average of US$23.4 million (just 16 per cent of all humanitarian aid) was earmarked for disaster prevention and preparedness efforts (OECD, 2020a).

Greater preparedness ('ex-ante') finance can reduce the need for post-disaster relief and ensure that allocated funds are able to reach further. Globally there is evidence to suggest that every dollar invested in preparedness not only saves lives but also reduces the finance needed for disaster response by at least US$4–11. Therefore, the allocation seen in the Philippines that favours ex-post spending would seem to do so disproportionately and ill-advisedly (UNDRR, 2019).

Much of the current international and national level financing for natural hazards in the Philippines seems largely to be in reaction to 2013's Typhoon Haiyan. The Philippines received about US$493 million in total emergency aid over 2013–14, and US$498 million in 2014 for post-emergency rehabilitation (OECD, 2020a), potentially in part due to high media attention (Becerra et al., 2012). As shown in Figure 4 below, aid received after Haiyan was disproportionately larger than was received after other high-impact events, including Typhoons Babs/Loleng (1998), Fengshen/Frank (2008), Ondoy/Ketsana and Pepeng/Parma (2009), all of which were incredibly destructive, though not on the same scale as Haiyan.

Figure 4. National and international aid (ex-ante and ex-post) to the Philippines, 1996–2017 (million US$), in response to named typhoons, and population affected



Note: In constant 2016 US$. Sources: National and local aid/transfers – Abrigo and Brucal (2019); Tropical cyclone and population affected – EM-DAT (2020); National aid – data extracted from statement of receipts and expenditures (SRE) from the Bureau of Local Government Finance in the Government of the Philippines' Department of Finance (BLGF, 2020) [the SRE provides information on both local or internally generated revenues and external sources of funds, including grants and donations]; International aid – OECD (2020b)

[4] The period for which data were available.

Moreover, while preparedness financing is already comparatively lower than response financing, in the years since Typhoon Haiyan both these funding streams have decreased further: the Philippines received an all-time high of US$44.6 million in preparedness funds in 2014, an amount that had steadily decreased to US$12.5 million by 2018. What disaster funding is available has been found to be ineffective in speeding up the rate of recovery (Abrigo and Brucal, 2019), with an average of just US$40 available per person.

Thus the challenge associated with finance flows from the international and national levels is three-fold:

1. There is not enough finance available for post-disaster relief.
2. The finance that is made available is not consistent, as some post-disaster situations receive disproportionately more than others.
3. There is a lack of preparedness funding. If the latter were to be increased, it would help protect vulnerable people and reduce the need for disaster relief in the first place.

4. Recommendations for policymakers

We have highlighted three challenges in aligning spending with the particular needs, experiences and vulnerabilities of local governments in the Philippines.

Based on our analysis and findings, **next steps for policymakers in the Philippines could include:**

- **Capacity-building and data improvements:** Local Disaster Risk Managers should be provided with improved awareness of climate information as well as robust climate projections and evidence-based disaster impact estimates to supplement their subjective experience of disaster events and improve their preparedness. Data gaps should be filled through timely, reliable and relevant downscaled climate information, localised estimations of damages, data about impacts, risk exposure, vulnerability and related socio-economic indicators, and a needs assessment of the impacts of various hazards at the local level. Critically, such data should be technically transformed or translated to ensure that they are well-understood and locally appropriate for effective utilisation by Managers, particularly those in regions that experience less frequent but more damaging hazards.
- **Enhanced national–local dialogue and coordination:** While it is useful to supplement Managers' subjective experience with objective observations and projections, their perceptions should not be disregarded as they provide important indicators of local resilience. National government should take into account Managers' local knowledge and encourage co-development of disaster management strategies at both the national and local levels, improving local buy-in and helping to use scarce resources more efficiently.
- **Scaling up disaster preparedness:** National and local governments should place a heightened focus on pre-disaster preparedness, in addition to response and management. The ongoing COVID-19 crisis has made the world painfully aware of the challenges of managing severe and widespread risks, and it is clear that enhancing preparedness may be more effective than solely managing and responding to disasters. The COVID-19 pandemic could fundamentally change the international political system and donor investment priorities, so it is timely to reinforce the importance of pre-disaster investments to build resilience to future shocks.

For overseas aid agencies and donors we recommend:

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5. Future research

This report is the first step towards a larger research project. Future research will seek to improve the understanding of the distribution of storm occurrence and frequency, as well as human and economic impacts, across provinces of the Philippines over a longer time period. A methodology that focuses on economic damages through the use of observational data in a spatial context could help complement existing research using modelled output. Such results could improve awareness of observed impacts, which could synergise with the notions of perception of concern and preparedness as brought out in surveys, and be a fundamental part of assisting LGUs in their impact and risk assessments. Research could include more systematic analysis of the factors determining local Disaster Risk Managers' perceptions and actions in response to disaster events. In addition, work on awareness and the availability of timely, reliable and relevant climate information at both the national and local levels could assist an understanding of critical data gaps.

Results from these further planned analyses could be used to inform the design of local preparedness interventions and to ensure that funding is allocated to where it is needed the most. Climate information and data on socio-economic impacts need to be better connected and integrated in order to offer more comprehensive analysis and utility for policy decisions and to address the challenges we have described in this report. Further, such research could offer insights into wider ranging discussions about the challenges of disasters in the Philippines in the context of development and poverty reduction, climate change and resilience, as well as understanding the role and support of public–private partnerships.

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Appendix: Data sources

The 2016-17 Survey of Disaster Risk Managers

Between 2016 and 2017, a team of researchers supported by the University of the Philippines System conducted a novel survey to explore how local governments respond to disasters caused by natural hazards, including hydro-meteorological and geological hazards (Ravago et al., 2018). Survey respondents were based in Local Disaster Risk Reduction and Management Offices (LDRRMOs) within 193 carefully selected municipalities and cities drawn from 47 out of 81 provinces in the Philippines.

Some survey responses required a response along a Likert scale, a rating scale which typically measures how people feel about something. Respondents were asked to reflect on disasters since 2009 up to the year of the interview.

The survey instrument consisted of several 'blocks' or sections:

- Block A reviewed the profile and characteristics of the Local Disaster Risk Reduction and Management Office (LDRRMO) officers and their respective local government units (LGUs).
- Block B asked questions about the incidence of shocks, related damages, and state of recovery.
- Blocks C, D and E covered the risk management strategies corresponding to potential actions taken. These strategies include controls or ex-ante reduction of exposure, early warning and response, ex-post reduction of exposure, and coping strategies.
- Block F reviewed respondents' perceptions of the likelihood of the shock happening again in the future, their level of concern about the shock and the preparedness of the locality based on the perspective of the particular LDRRMO.
- Block G was focused on agriculture.

To the best of our knowledge, the survey was the first of its kind conducted in the Philippines geared towards 1) collecting disaster-related primary data from local government units; and 2) developing a general conceptual framework on disaster risk management.

For more information about the survey, see Ravago M, Mapa D, Sunglao J, Aycardo A (2019) *Coping Strategies to Disasters Caused by Natural Hazards (A Survey of Local Government Units DRRM Office)*, UP School of Statistics Working Paper 2019-01, http://stat.upd.edu.ph/working_papers/7

National-to-local aid and transfers

Data on disaster-induced aid that went to provinces affected by past storm events are very difficult to obtain (Abrigo and Brucal, 2019). However, we were able to use data from a study by Abrigo and Brucal (2019), which utilised the Statement of Receipts and Expenditures (SRE) database from the Bureau of Local Government Finance (BLGF) of the Philippine Department of Finance (BLGF, 2020). The dataset, which covers the period 2009–2016, contains information on external sources of funds, including aid and transfers from the national government.

EM-DAT data

Data on disaster impacts are extracted from the International Disaster Database, EM-DAT. This is a global database on natural and technological disasters, containing essential core data on the occurrence and effects of more than 21,000 disasters in the world, from 1900 to present (see www.emdat.be/). EM-DAT is maintained by the Centre for Research on the Epidemiology of Disasters (CRED) at the School of Public Health of the Université Catholique de Louvain, in Brussels, Belgium.

The main objectives of the database are to:

- Assist humanitarian action at both national and international levels
- Rationalise decision-making for disaster preparedness
- Provide an objective basis for vulnerability assessment and priority-setting.

Given limited alternatives of a comprehensive and validated dataset, EM-DAT offers a viable source of data across time and space. However, there are certain notes and caveats about the database that must be considered.

Firstly, there are several disaster criteria, at least one of which must be met before an event is added to the database: 10 or more people dead, 100 or more people affected, the declaration of a state of emergency, or a call for international assistance.

It is also noted that the database is made up of information from various sources, including UN agencies, non-governmental organisations, insurance companies, research institutes and press agencies, which are consolidated, reviewed for inconsistencies and accuracy, and updated by CRED on a daily basis.

Below are the EM-DAT definitions of terms used within this paper. We note that these terms may be differently defined by EM-DAT in previous database updates, and/or differently used by other agencies:

- *Affected*: People requiring immediate assistance during a period of emergency, i.e. having basic survival needs such as food, water, shelter, sanitation and immediate medical assistance. It is noted that this figure does not necessarily indicate whether these persons requiring assistance actually received assistance. We also note that a person can be affected by more than one disaster, and will be counted each time they are affected.
- *Disaster event*: A disaster meeting the EM-DAT criteria, and which is recorded in EM-DAT.
- *Estimated damage*: The amount of damage to property, crops and livestock, given in US$ ('000). For each disaster, the registered figure corresponds to the damage value at the moment of the event, i.e. the figures are shown true to the year of the event.
- *Hazard:* A threatening event, or probability of occurrence of a potentially damaging phenomenon within a given time period and area.
- *Homeless*: Number of people whose home is destroyed or heavily damaged and therefore need shelter after an event.
- *Injured:* People suffering from physical injuries, trauma or an illness requiring immediate medical assistance as a direct result of a disaster.
- *Total affected:* The sum of all people injured, affected and left homeless after a disaster.
- *Total deaths:* The sum of deaths and people missing.

Table 1. Summary of natural disaster group events in the Philippines, 1990 to January 2020

Disaster type	*Events count*	*Total deaths*	*Total affected*	*Total damage (US$ m)*
Drought	6	8	3,051,969	148.85
Earthquake	25	2,966	6,037,909	511.74
Epidemic	18	2,535	357,714	-
Flood	123	2,269	28,685,696	3,529.50
Insect infestation	1	-	200	-
Landslide	22	2,026	316,262	33.28
Mass movement (dry)	1	11	-	-
Storm	217	29,410	145,915,777	19,791.07
Volcanic activity	18	719	2,056,408	219.85
Wildfire	1	2	300	-
Total	**432**	**39,946**	**186,422,235**	**24,234.29**

Source: EM-DAT (2020), based on most recent database update (30 January 2020)