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Key messages

- Dialogues among neighbouring local government units as facilitated by the Partners for Resilience (PfR) programme can be used to address disaster risk reduction (DRR) and climate change adaptation holistically, especially for transboundary concerns such as river basin management.
- The involvement of various levels of government – from national to subnational and even including village leaders – will yield more positive results. Participation of multiple stakeholders with varying exposure to and understanding of particular issues, such as flooding, can generate action.
- Climate and weather forecasts and other related information issued by the national meteorological agency should be customised and localised for better understanding, access and use by communities.

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Understanding and addressing risks of flooding in the city: The case of Barangay Potrero, Metro Manila

Malabon City is in Metro Manila, the National Capital Region of the Philippines. It is part of a sub-region called CAMANAVA (composed of the cities of CALoocan, MALabon, NAVotas and VALenzuela) located in the northern part of Metro Manila Bay and situated in the estuary of several river deltas. Malabon is one of the most densely populated cities in the country and its low-lying, flat terrain makes it prone to frequent flooding, especially during high tides, heavy rains and when river and dams overflow. The four cities in CAMANAVA are commonly affected by interconnected rivers, one of which is the Tullahan River.

The river system used to be navigable and fishing was the major livelihood activity in the area. The river used to be wider, deeper, had better quality water and was a regular source of different species of fish, which were an important food source for local residents. Also, trees and crops like palay (rice) and vegetables used to be grown along the riverbanks. However, these agricultural plots have been replaced by industrial yards, which also became home to thousands of informal settlers who built makeshift dwellings without legal claim to the land.

In recent years, floods have worsened, occurring more frequently and reaching levels of several feet deep. Most affected are families in the communities that are along or near the riverbanks. The river has become narrower and shallower over the years, and its capacity to hold water has decreased. With more frequent, intense rains, the riverbanks flood regularly and flooding reaches farther into low-lying and densely populated areas of the city.

Malabon City is known for its frequent flooding. Television footage has often shown the city with above-ankle flood water due to high tides – even when skies are clear. During typhoon seasons the situation worsens considerably. When

Typhoon Ketsana (Ondoy) struck in 2009, residents of the Potrero *barangay*¹ in Malabon were startled when the water rose much faster than usual, eventually reaching the second floor of some homes. Over 6,000 families were

Rain or shine, there are floods in Malabon.

– Local saying

affected, some of whom were trapped inside buildings, and needed rescue support and emergency provisions. Three years later, in August 2012, the same communities again suffered flooding due to heavy monsoon rains that lasted for several days.²

Of Malabon's 21 *barangays*, the largest and most flood-affected is Potrero.³ Sections of the *barangay* lie along the Tullahan River, which stretches from Quezon City to Valenzuela City. Several industries such as paper and dye factories are also located along the river. Run-off starting from the La Mesa Dam upstream in Quezon City, the frequent occurrence of high tides and the heavily silted and clogged Tullahan River further contribute to the frequent floods in the area.

In 2011, the Partners for Resilience (PfR)⁴ programme started to use an integrated and holistic resilience building approach to disaster risk reduction (DRR), climate change adaptation, and ecosystem management and restoration. Its main objective is to help people understand how things work and how best they can address their levels of vulnerability. It does this using tools that clearly explain the connection between and importance of: geographical landscapes; climate information across different timescales; and how best to act before, during and after a disaster in order to reduce people's risk.

Implementing the PfR programme in Malabon City

In Potrero *barangay*, the PfR programme focused on raising awareness and building capacity among people and institutions to identify the real causes of flooding, while examining how best these can be addressed before implementing steps to do so.

Customised approaches to understanding risk

Finding out how best people can understand risk in an urban setting – its causes, impact over time and mitigation – was among the essential components of PfR. By conducting parallel and customised initiatives with target groups of people, risk perceptions were addressed. For most of the community members, film showings, *purok* (a cell within a *barangay*) meetings, and other forms of public awareness activities were conducted. These activities captured the attention of the youth as well as different gender and sector groups; their participation contributed to their increased level of awareness of the different risk factors, warnings and, more importantly, what actions they can take as individuals, families and as a community. In addition, flood risk maps that show specific high-risk areas have been printed on large-format tarpaulins and posted at strategic locations to serve as daily reminders of the risk and need for action.

For the local chief executives, on the other hand, PfR conducted capacity-building activities on community-based disaster risk management and disaster preparedness, along with workshops on ways to improve contingency plans

that take into account risk reduction measures. The project also held training sessions on ways to integrate these plans into communities' overall development plans, and ensure that climate- and ecosystem-smart risk are part of the main agenda.

PfR initiated discussions between the local government unit and the Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA), the national meteorological office. This was not only to make sure that official scientific findings were directly shared with the population but also, more importantly, to start building a working partnership with them that will last beyond the project's lifetime. During these exchanges, PAGASA showed evidence that rains have become more intense in recent years and that projections for the next 20–50 years indicate heavier rains during wet months and an increased occurrence of extreme weather events.

Understanding that early warning is more than just warnings

PfR aimed to change people's mindsets about the warnings issued by PAGASA, emphasising that there is more to early warning than typhoon signals and rainfall level colour codes. Using PfR's enhanced risk assessment tools for climate adaptation and ecosystem management and restoration – community members could view early warning in a new way. They were better able to place hazards in the context of historical scientific data about forecasts and projections; identify the most at-risk areas; and develop 'no-regrets' actions based on thresholds and forecast-

based DRR activities and information. With the new understanding, *barangay* officials, other local leaders and some residents shifted their mindsets away from a passive acceptance of flooding as a normal occurrence in Potrero and started identifying action points to change this norm. Localised warnings were developed for different areas to generate the most appropriate actions at specific times. PfR also placed the evacuation plan under review to allow representatives from all high risk areas of the *barangay* – community organisations’ leaders and some residents – to participate in planning and draw up improved procedures. Other factors that can mitigate flooding, such as solid waste management and other activities will need to be addressed through coordinated efforts in other programmes beyond PfR’s remit and budget, such as replanting patches of thriving mangroves within the city and along the nearby coast; forest enrichment in the upstream area; and clearing of waterways.

Localising early warning information and systems

One of the advantages of living in the city is that people have access to diverse sources of information and initiatives coming from a variety of groups, donors and even government and private-sector partners. Weather forecast and warning information are provided through all forms of media: television, radio, social media, mobile phones, etc. Often, these sources tend to bombard people with too much information, causing confusion. Through the partnership between PfR and the *Barangay* Local Government (BLG), the local government unit identified the

need to adapt this information to the local context for better understanding – and, ultimately, stronger community responses to warnings. The local government committed resources from their local disaster risk reduction and management fund as well as personnel to this task. They ensured that PAGASA provided simpler, clearer and more context-specific warning information to help community members respond more proactively to the warnings instead of simply reacting to the disaster.

Enhanced early warning systems through the application of climate information and environmental approaches

Improving the Potrero early warning system (EWS) meant taking into consideration the source of the flood waters and the capacity of the Tullahan River to absorb them. In the case of heavy rains, the source is often overflow from the La Mesa Dam or run-off from the river where it begins in Quezon City. The river passes through Caloocan, Malabon and Navotas picking up more run off as it goes and exits at Manila Bay. High tide in the bay slows down the water flow, causing it to back up and increases flooding upstream.

This approach requires data on the amount of rainfall, the resulting rise in water levels, and the timing of the tides. Monitoring water levels is especially important in flood-prone areas of the *barangay*. Taken together over a period of time, the data can be used to establish the lead time to warn residents to move out of harm’s way. Over the long term, this information can help the community with their urban development plans.

Currently there are eight early warning devices installed to observe the amount of rainfall in the Tullahan River area. Four of these automatically feed into the PAGASA hydrometeorology centre, and their data can be readily accessed by Potrero. However, the other four were installed by the Advanced Science and Technology Institute (ASTI), which like PAGASA, is also a bureau within the Department of Science and Technology. Potrero formally requested access to ASTI’s rain gauge data and is now able to access and record the information. With these, the reference points for the level of flood water rise in these high-risk locations should provide more detailed and precise information that will help guide the community’s actions in the future.

In September 2013, PfR led a consultation among local government units to facilitate the process of harmonising the early warning system (EWS) of the communities in the Tullahan River Basin: meaning proper coordination of the five cities regarding the EWS for floods and a common set of protocols. The units agreed to share information and make efforts to improve the EWS across the river basin. A field survey of the river basin has been completed. It provides an overview of the river basin’s geographical coverage, an understanding of the EWS’s current status, and other points of action for various stakeholders, including possible mitigation measures.

The process of completing the requirements for an improved EWS is ongoing and is expected to be functional by 2015. The information being collected and recorded will become

more useful when linked with the actual level of flood waters in different flood-prone sections of Potrero during past, present and future flooding episodes in the area. The objective is to establish the thresholds that will become the *barangay's* basis for issuing localised alerts and warning advisories to the most at-risk households. Coupled with sufficient public awareness efforts, these households should better understand warning information and be able to act upon it more quickly.

Addressing problems holistically and systematically

To address the risk of flooding and its effects more broadly, the *Barangay Disaster Risk Reduction and Management Committee (BDRRMC)* prepared contingency and risk reduction plans. Because of the river's present condition and the presence of settlements along its banks, floods do not subside quickly. Sometimes, flooding occurs despite a lack of rain in the locality because of intense rain in areas upstream. Although residents have access to forecast information and warning, the information is often not issued quickly enough to give people enough time to evacuate.

The BDRRMC was organised even before PfR started working with Potrero. PfR supported the Committee through the review and refinement of its structure, including each task and function. PfR also helped the communities integrate their experiences into their respective plans, focusing especially on their response to the most severe floods. The contingency plan was improved by including a better assessment of the risk situation, increased access to

weather and climate information, more applicable tasks and functions of the BDRRMC, and stronger participation of community-based organisations. The *barangay* is geared towards sustaining this development and has conducted its flood evacuation drill.

Social capital

PfR invested much time and funding and many staff to ensure that the programme contributed to better relationships among the different groups in the community: *barangay* officials and staff, different local organisations, teachers, youth and others. Resilience-building in the urban setting cannot be simply about activities and outputs. PfR helped local communities connect with local authorities and brought more services to Potrero. For example, PfR facilitated the services of PAGASA, which is now providing technical assistance to the *barangay* for the improvement of their flood EWS. PAGASA conducted training on the Community Based Early Warning System. They were also able to access one rain gauge from the Department of Science and Technology.

Most of the residents came to this historically flood-prone area as a result of economic pressures and find it difficult to move away. But with more concerted efforts, they are now more confident that their communities are capable and committed to deal with challenges such as flooding. Community engagement, socialisations and partnerships are crucial – even in urban areas. Even with the preoccupations and faster pace of city life, residents are interested in building a better community. Although it may take a long time before communities and their leaders understand climate-

related risks, once they do, future interventions can be easily woven into the programme. What is important is their acceptance of climate-related risks, the things they can do to prepare for possible emergency events, what mitigation actions can be taken and how they can participate in these different efforts.

Enabling factors

Openness of local chief executives

As with any risk reduction project, one of the keys to success is the willingness of local chief executives and community leaders to recognise and deal with the situation. Paradigm shifts are difficult to bring about, especially in an urban setting where there are so many competing priorities. Even if the community has shown a high level of resilience and adaptive capacity as it continues to experience flooding year in and year out, the local leaders still see that they should invest in resilience building. Instead of becoming complacent, the PfR project local leaders sat down and learned how to deal with the problem systematically and holistically.

Access to information, news and funds

When people have access to three things – information, news and funds – they have more options and thus can make better decisions. These three elements are more accessible to people in urban areas such as Malabon because they live at the centre of the country's governance operations and business districts in Metro Manila.

These populations also have greater access to broadcast and social media; during flooding events, constituents can often compare their situation with others in adjacent areas, and this enables them to demand improved risk governance from their leaders. This demonstrates how people in urban areas are empowered once they comprehend the risks and the setting within which events are taking place, allowing them to identify and address problems more directly. Also, with donor groups situated within or just outside these neighbourhoods, accessing funds to further support the city's DRR and climate change adaptation programmes is easier, as donors can immediately see the impacts of their funding. This opens doors to better risk-informed decision-making and management from government leaders, private sector groups and community members.

Partnerships

The strong relationships among the members of the PfR programme; the Potrero *barangay* council and its committees; national government and line agencies; and even partnerships with contiguous Local Government Units within the same river basin contributed to the successes of this project. The community recognised the contributions of PfR and other partners and made maximum use of the benefits for its services and risk reduction efforts. In return, it brought into the partnership its renewed capacities, resources, a willingness for continued learning and even enthusiasm to share their lessons learned with other communities.

National policies and guidelines

The existence of national policies on DRR, climate change adaptation and even environmental concerns served as enabling factors for the programme's success, both in rural and urban areas, but much more so for those in cities. These were the very policies on which the programme anchored itself and it emphasised to the local government units the need to follow and apply them. Such national-level policies reinforced the importance of DRR, climate adaptation, and ecosystem management and restoration and the need for immediate action in the minds of local populations.

Challenges

Resilience in the city is about survival of the fittest

For the most vulnerable groups in the city (informal settler communities) there is a strong and urgent need to think seriously about, learn and act to reduce environmental and climate-induced risks and disasters. Such knowledge can provide the formula for how best to survive in the city and not lose the limited amount of resources – not to mention work opportunities. Competition is stiff among cities, which aim to build up their resources and sharpen their competitive edge. Nonetheless, cities need to work together especially if they share a common risk and common ecosystems. Also, since disasters have direct impacts on Local Government Units' development gains, progress is directly affected for local governments that do not implement DRR actions.

Sharing information across political boundaries

In tightly squeezed areas like Metro Manila, where cities' political boundaries are small landmarks or streets, encouraging local leaders to sit down and discuss issues was challenging. It was not until the floods started becoming more pronounced and PfR came into the picture that these Local Government Units and their respective mayors started to discuss their respective EWS strategies and how best to deal with the problem. The ongoing process allows for challenges to be addressed. PfR participation has provided a venue for these stakeholders to share information about their separate efforts and agree on the common ground to be covered. It is advantageous that PAGASA carries out flood mitigation through a river basin approach and encourages stakeholders to adopt this as well.

Implications for decision-makers and practitioners

Improved risk understanding

One of the most observable positive changes this project saw was in the attitude of local officials, especially at the *barangay* level. Now, they are able to identify specific activities they once thought were lacking but realised were important factors to address flooding problems in the city. The increased level of understanding helped officials who had grown accustomed to flooding since childhood to overcome their complacent attitudes and even indifference. Now, these leaders have

become more proactive in the way they analyse the situation and find ways to address the problem.

Holistic and integrated approach to resilience building

Applying climate science and ecosystem management and restoration in DRR activities to an urban area is possible. But it needs: a proper mindset; inclusive and transformative partnerships with key stakeholders from different tiers of governance; political leadership; and the effective use of science. In collaboration with stakeholders, PfR continues to stimulate an atmosphere that encourages these key factors.

Endnotes

- 1 A *barangay* is the smallest administrative division in the Philippines and is the Filipino term for a village. The word *barangay* originated from *balangay*, a kind of boat used by a group of Austronesian peoples when they migrated to the Philippines. Municipalities and cities are composed of *barangays*, and they may be further subdivided into smaller areas called *purok* (zone), and *sitio*, which is a territorial enclave inside a *barangay*, especially in rural areas. As of September 30, 2012, there were a total of 42,028 *barangays* throughout the Philippines. (*Wikipedia*)
- 2 The information was gathered during the community risk assessment for *Barangay Potrero* and subsequent discussions with participants. ACCORD facilitated the risk assessment. The risk assessment is part of the community's contingency plan, drafted in 2013.

- 3 Community Risk Assessment of *Barangay Potrero*.
- 4 PfR is a collaboration of CARE Netherlands, Cordaid, the Netherlands Red Cross, the Red Cross/Red Crescent Climate Centre, Wetlands International and 30 civil society partners in the global South and is using the integrated DRR–climate change adaptation–ecosystem management and restoration approach to build resilient communities. In the Philippines, the PfR alliance is working in northern Luzon, northern Mindanao and Metro Manila. In Metro Manila, one of the urban areas where PfR has been operating since 2011 is Malabon City.



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