Flooding and the Urban Poor

The example of Metro Manila

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Introduction

Flooding has been a part of humans' life for a long time. It has caused damage but it has also been taken advantage of, as for agriculture in ancient Egypt: the river banks along the Nile being flooded every year and left with well watered and fertile soil (Wikipedia, 2015).

The reasons for flooding are many. Some are out of human control, for example heavy rains or earthquakes. Other are directly connected to human activities, such as waterways being blocked by solid waste or siltation due do deforestation (Råberg, 2013).

A growing problem

Today flooding is a growing problem. This has several reasons. Firstly, climate change is leading to sea level rise and more severe and unpredictable weather. Secondly, factors such as overuse of groundwater leading to land subsidence and deforestation of upland watersheds are contributing to flooding. Thirdly, the population at risk is rapidly growing: 13 out of the world's 20 largest cities are located at the coast and 13 percent of the world's urban population lives in low-lying coastal areas. The most affected are the urban poor living in informal settlements. (World Bank, 2010).

One of these megacities at risk is Metro Manila, Philippines. In this paper the reasons for flooding in Metro Manila and the consequences of a flooding disaster will be explained. This will be done with a focus on the urban poor. Then a

summary of the measures taken today the social aspect of flooding and an ecosystem-approach will be discussed. The last section presents some reflections on the role of architects.

Literature Review

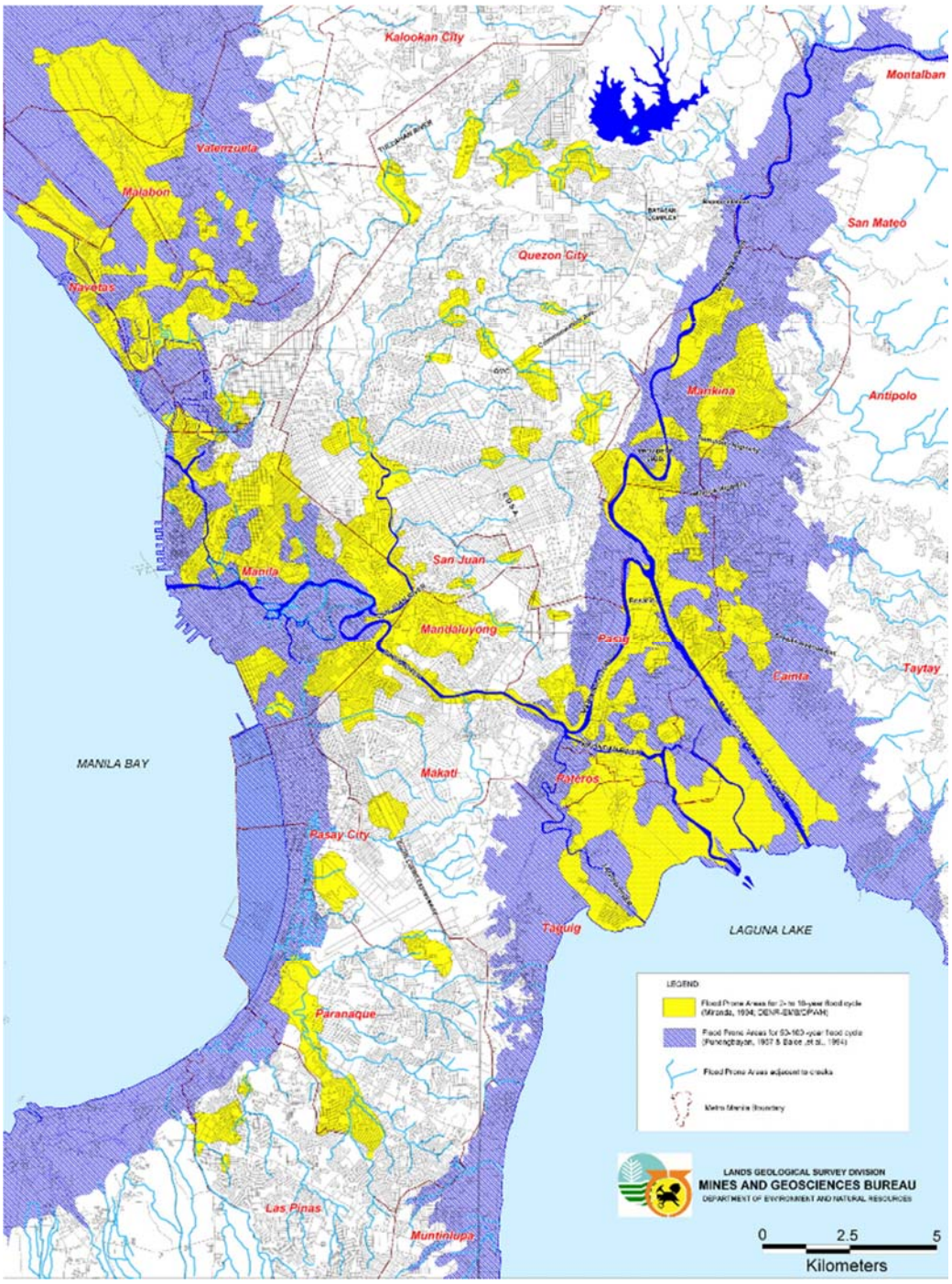

Figure 1. Flood hazard map for Metro Manila, showing areas prone to flood for 2–10-year flood cycle (yellow) and 50–100-year flood cycle (blue).

Background

The impact of an extreme natural event, such as a tropical cyclone, depends not only on its intensity but also on the vulnerability of the society. The risk of becoming the victim of a natural disaster can be calculated by multiplying the vulnerability by the exposure (Mucke, et al., 2014).[1] Situated both on the Pacific ring of fire[2] and astride the typhoon belt, the Philippines is one of the world's most exposed countries to extreme natural events and at the same time they have a high vulnerability. This places the Philippines at second highest disaster risk in the world according to the World Risk Report 2014 (ibid.).

Metro Manila is among the ten provinces most susceptible to flooding in the Philippines (Department of Environment and Natural Resources, 2015). This is due to its location in a low-lying area between the sea and a large lake as well as the two crossing river systems (Muto, et al., 2010). The areas in the city likely to be flooded will increase due to climate change (World Bank, 2010).

At the same time it is the strategic location by Manila Bay and the mouth of the Pasig River that has made Metro Manila continuously to expand, both through large in-migration and rapid population growth (Muto, et al., 2010). Today Metro Manila is one of the world's most populous urban areas with almost 12 million inhabitants (National Statistics Office of the Republic of the Philippines, 2010). Although Metro Manila accounts for 37 percent of the GDP, the wealth is far from evenly distributed among the inhabitants, of which four million lives in slums/informal settlements (Ballesteros, 2011).

The urban poor cannot afford the rising land prices and the cost of housing materials and construction. Instead they have to find shelter on urban fringes or wastelands risky for habitation, such as swampy areas, along waterways or on earthquake fault lines (Muto, et al., 2010) Often the more flood-prone cities and municipalities also have more low-income residents (Bankoff, 2003).

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[1] In this paper the terms *vulnerability* and *exposure* are used as described in the World Risk Report 2014. The term exposure refers to populations, infrastructure etc. being exposed to the impact of natural hazards and vulnerability comprises the "*susceptibility,* depending on infrastructure, food, housing and economic framework conditions, *coping capacities* depending on governance, risk reduction, early warning, healthcare, social and material coverage and *adaptive capacities* related to future natural hazards and the impacts of climate change" (Mucke, et al., 2014, p. 6).

[2] A 40,000 km horseshoe shape in the Pacific Ocean where a large number of earthquakes and volcanic eruptions occur due to plate tectonics.

Reasons for flooding

Metro Manila has two climatic seasons: the dry season from November to April, and the wet season the rest of the year, which is also the season for typhoons (Muto, et al., 2010). Extreme flood events are caused by heavy rains lasting from 1 to 3 days, often associated with typhoons and storm surge, which means strong winds and flash flooding. In addition to this high tide, excess run-off water from rivers and sea level rise are factors contributing to flooding. Other factors increasing the likelihood for flooding are caused by human action. This includes land subsidence, which is caused by groundwater pumping, the loss of natural retention areas, increased run-off concentration and reduced infiltration losses (World Bank, 2010).

Another factor related to urbanisation is the disappearance and decrease in capacity of river channels. The encroachment on waterways through makeshift housing, but also by private and governmental business, blocks access of maintenance and limits water flow capacity. Siltation from deforestation is another reason as well as solid waste being dumped into rivers and canals. The latter is also posing a risk to health (Bankoff, 2003).

Consequences of flooding

The losses following a disaster can be divided into tangible, i.e. possible to measure in monetary terms, such as a damaged building, and intangible, for example deaths and loss of archaeological sites. A division can also be made between direct and indirect impact, the latter being for example losses in production because the workers were not able to get to work. These indirect impacts do not have to occur within the time and space of the flood event (Muto, et al., 2010).

The most vulnerable to flooding in Manila are poor families living in places of high environmental degradation, like intense development areas with high soil subsidence or densely populated swampy areas/wetlands. This is both because of the site conditions but also because they are more susceptible due to low incomes, fragile livelihood bases and gender status of the household head. Poor and female-

headed households living in highly degraded environments suffer the highest damages (Porio, 2014).

The impacts on an urban poor community following a flood include the following:

- scarcity of transport, fuel, food and water
- disruptions in electricity and water distribution as well as in communication services
- garbage and mud blocking the drainage system
- illness
- rising prices of commodities
- damaged homes
- children and parents unable to go to school/work

Schools could be closed for a long time[3] if damaged or used as evacuation centres. Factories might need to be closed or relocated which can result in loss of income for residents (ibid.).

Many living in these areas rely on support from informal networks, such as relatives, friend and neighbours, rather than community officials, during floods, and those without wide networks are "not able to access much support from formal institutions like the health clinic or social work department of the local government unit." (Muto, et al., 2010, pp. 115-116)

Flood responses

Flooding is not a new problem to Manila and projects for flood mitigation have been implemented over the years. One of the biggest is the Mangahan Floodway, constructed in 1985 which diverts flood flows from the Marikina River into Lake Laguna to protect Manila's urban areas from excessive inundation. There is a Flood Protection Master Plan from 1990, whose main focus is on infrastructure projects improving the conveyance of flood waters (World Bank, 2010).

After the big floods in 2009 and 2011, caused by the typhoons Ondoy and Pedring[4], new policies emerged, for example the 2010 National Disaster Risk

[3] In Marikina and Pasig some schools were closed for almost a month after typhoon Ondoy in 2009 (Porio, 2014).

[4] International names Ketsana and Nesat.

Reduction and Management Act and the 2011 National Framework Strategy on Climate Change (Porio, 2014). A five-year 50 billion pesos program for relocation of informal settlement families living in danger areas along waterways in Metro Manila was launched by the President Benigno S. Aquino III (Bonagua, 2014).

According to Porio (2014) the outcome of the new laws is promising, with a focus on local risk reduction and management plans at barangay, city and provincial levels. A risk is that nothing happens after policies have been made up, which has sometimes been the case. Not only is a large outlay of resources needed but also a strong political will.

Discussion

The social aspect

Flood prevention cannot be only a technical question, since the most affected are the urban poor. They are the most affected not only because of their physical location, living in danger areas, but also because of their social location. Thus, flood protection also has to be seen as a social issue. For example, relocations of informal settler families, should not only transfer them to a safer location but also strengthen the community, making it more resilient and through that less vulnerable to flooding.

The problem of flooding has to be addressed at different levels, both from top-down, which is done with policies as the highest political level, but also from bottom-up, meaning including the affected communities.

There is a need for political will going further than only winning the next election, policies have to be implemented with a long-term perspective. There is also a need for coordination among the measures at each level, to avoid contradicting steps. For example in Navotas, the mayor installed a water pump in the community of Bangkulasi, which was appreciated by the residents but at the same time increased the flooding in the neighbouring barangay Bagongbayan South (Muto, et al., 2010).

Top-down interventions do also have to be coordinated with bottom-up measures. When informal settlers are relocated from danger areas, this should be

done in partnership with the community being relocated. If this is not done, it may even not work. This was the case in some areas after the Ondoy floods, when the urban poor returned and rebuilt their damaged homes instead of moving to the less flood-prone areas pointed out by the government (Porio, 2014).

It is stated in the constitution that urban dwellers should not be relocated without "adequate consultation" (Ochoa, 2013) but what adequate consultation consists of is a question of interpretation. Done in a thorough way and combined with for example river rehabilitation programmes, except for creating a sense of community, it can both reduce the risk for flooding and even create livelihood, as will be shown in the next section.

Those families who can afford it strengthen the foundations of their home and add floors in order to escape the next flood. But far from every family has the means to reinforce their home. After the floods caused by Ondoy, the city Marikina stood out with a bigger portion of reinforced houses, which is partly a matter of capacity but could also be an effect the strong urge from the local government to leave ground floor open so that water could flow freely (Porio, 2014). Such an exhortation from the government could be provoking if directed towards households incapable of following it, but if combined with economical and technical assistance, it could strengthen the community both literally and metaphorically.

One of the most urgent responses of the barangay in an emergency flooding situation is evacuation of affected residents. But in some cases even if there is a well-functioning warning system, people can be very reluctant to be evacuated. Afraid losing more by leaving their homes unattended, people would rather climb up onto the roofs or their houses than being moved to an evacuation centre (Porio, 2014). Communication with affected residents before a flooding event should be a way to find a solution to this problem. It will also probably decrease as people are relocated to less flood-prone areas and safer houses.

Other measures taken by the local government include clearing and rebuilding of infrastructure, pumping flood water out of the area, supply of equipment such as rubber boats and fire trucks, defogging of mosquito-infested areas, training/seminars and information campaigns for community groups (Porio, 2014). But there seems to be a gap between the actions of the government and the

poorest segment of society, which are not able to access support from formal institutions like health clinics after a flood. This gap has to be overcome. Muto et. al. (2010) suggest that this could be achieved together with NGOs operating in the area. This can be a good solution when the government itself is not sufficient, as would be the ideal case. It is important, that these information and community-strengthening activities are preventive and being done continuously, so that the community is prepared in case of flooding. Apart from information on how to get help from the government it is important to raise awareness about the health hazards following flooding, as the risk of catching infections, since there seems to be a low consciousness about it (ibid.).

Porio (2014 p. 100) stresses the importance of recognising the "significance of the intersections of environmental and human security issues by identifying place-based and sector-specific flood vulnerabilities and adaptive responses." There is no complete recipe that can be applied in every situation and location. This understanding demands a lot of work of communication and collaboration with affected communities. Maybe also here the NGOs can be the link between the communities and the government.

An ecosystem-based approach

A way to achieve the bottom-up approach to flood prevention is through an ecosystem-based approach. In most of the measures taken and being planned today, there is a focus on hard infrastructure. Measures such as dam constructions, dike rising and improved pumping capacities are suggested (Muto, et al., 2010). These interventions are often necessary but can usefully be combined with an ecosystem-approach. Considering that "[u]rban wetlands provide a range of services, including flood resilience, allowing groundwater recharge and infiltration, and providing a buffer against fluctuations of sea level and storm surges" (World Bank, 2010, p. 78) there is no reason to leave this piece of the puzzle behind.

Areas along the coast that become unusable due to sea level rise can be converted to natural systems like mangroves that will capture sediment and protect against storm surges. In urban areas, land along rivers can be converted into linear parks that can be allowed to inundate during floods (World Bank,

2010). These measures would also help beautify the city and do also have non-flood-related advantages, like improving air quality.

A good example of a river system rehabilitation program can be found just south of Metro Manila, in Cavite. In the Las Pinas and Zapote rivers 30 of the 56 kilometres are being regularly cleaned. This involves daily collection of garbage and an installation of steel garbage traps to filter the waste. Almost ten thousand residents have been trained on ecological solid waste and river management. The project also included replanting of bamboo on the riverbank and a number of social enterprises utilizing materials that threatened the river ecosystem, for example weaving of baskets from water lilies (UNDESA, 2011). This is an example of how the community can be involved in the mitigation of floods.

Urban Shelter Design and the Role of Architects

Since flooding is an increasing problem in the urbanising world, flood resilience is essential in urban planning. However, as shown in this paper, flood vulnerability is not only about the physical environment. Nevertheless, how the physical environment is handled has an impact on the social outcome, and here architects should play a role.

My impression from the study trip to Manila was unfortunately that the role of the architect in cases concerning housing for the urban poor was not very strong. For example in the case with a National Housing Authorities site we visited, which is going to be built with social housing for informal settler families from waterways. Here it was the mayor who decided what should be built, and how, ignoring the professional opinion of the architect in charge (as well as the regulations). As the architect in charge of the project described it, he tried to at least have some little impact, making each project if not good, a bit less bad. In many cases this has to be the role of the architect, to have the knowledge how things should be done and even if not having a lot of power, argue for it again and again.

At the other hand, when there is political will, architects can have a valuable role in NGOs, for example planning resettlements together with the affected

families. Here the architect should of course contribute with knowledge about flood resilient housing, but also stress the importance of the ecosystem-approach. Every new housing program should not only be flood resilient on its own, but if possible decrease the flooding risk in the city as well.

With this said, the social aspect of flooding disasters is a very complex problem, which will not be solved solely by good urban shelter design. The huge inequality forcing the urban poor to settle in danger areas is a political question. But hopefully conscious planning can provide both better flood resilience as well as conditions for development and political change.

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Images

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