

ANALYSIS OF DISASTER MANAGEMENT PLANS TOWARDS FLOODING RESILIENCE OF URBAN WATER SYSTEM IN DAVAO CITY

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ABSTRACT

Climate change related disasters like flooding may affect the urban water system (UWS) of Davao City that includes its potable water. This underscores the importance of having Disaster Risk Reduction and Management Plans (DRRMP). Component 2 of the UNESCO-HELP Davao Network Project reviewed DRRM Plans and analyzed dynamics as to vertical and horizontal integration of various initiatives towards resilience of the UWS. Focus Group Discussion and Key Informant Interview were used to determine if there is cascading of plans to. Results of the study showed that DRRM Plans are mainly focused on peoples' safety and do not address the management of UWS during disasters. In terms of vertical integration of plans, the DRRMP at the region and city levels follow the same template with similar targets for outcome, output and activities but at the barangay level there are limited outcomes. As to horizontal integration, there appears to be some gaps in coordination between and among regional government offices and the city local government unit with minimal participation of the former in the City DRRM Council and at the barangay level. Over all, the plan review, FGD, and KII suggest that DRRMPs should include the management of UWS during disasters.

Keywords: disaster, resilience, urban water system

INTRODUCTION

Some areas in Davao City are considered vulnerable to flooding and other climate change related disasters. This is aggravated by the increasing growth in population and the fast urbanization that put much pressure on the resources and ecosystem services provided by Davao River and other major river systems. The flood-prone areas are along the riverbanks and some tributaries affecting the 84 barangays in Davao City. The flashfloods are usually attributed to excessive run-off from the rivers, housing and infrastructure development that constrict natural river flows, and inadequate and clogged drainage systems (DRBMDP, 2015). These have affected the total urban water cycle that includes the city's potable water, septage and sewerage systems, which in turn impact on the vulnerable population as the focal concern. Thus, this underscores the importance of having disaster risk reduction and mitigation (DRRM) plans as well as zoning regulations and more importantly, a plan for urban water system resiliency that would be enforced by various stakeholders and to be spearheaded by the Local Government Units (LGUs). This project gathered insights from concern agencies and community to develop a plan for the management of Urban Water Systems (UWS) and demonstrate technologies to enhance resiliency of the Davao City water system. The expected outputs are geared towards attainment of the project's objective, which is strengthening integrated planning and coordination to enhance resilience in the management of urban water systems. Along this context, the focus of design for data gathering and analysis is on management and organizational resilience at various levels (e.g regional, city, barangays). In order to further qualify organizational resilience, criteria were set according to the DRRM Framework.

EXPERIMENTAL/METHODS

In order to determine whether there is integrated planning and strong coordination, both horizontally and vertically, amongst various organizations working on DRRM and management of urban water systems, Component 2 used both the secondary and primary data. The latter was gathered through qualitative research tools such as the Focused Group Discussion (FGD) and Key Informant Interview (KII). The FGD and KII data could also determine the extent of plan operationalization at the community level.

2.1 Secondary Data Gathering Thru Review of Plans

The secondary data gathering was done by requesting the DRRM and Contingency Plans from the Office of Civil Defense (OCD), Davao City DRRM Office (DCDRMO), City Planning and Development Office (CPDO), the Davao City Water District (DCWD), and Barangay LGUs. The plans were reviewed as to its various outcomes in relation to integrated planning, coordination, and management of urban water systems. Other plans that were reviewed for water management initiatives are Davao River Basin Master Plan, Davao Gulf Development Plan, Climate Change Action Plan and the IWRM Customized Guidelines. Some of the secondary data, from line agencies, such as IRA, disaster response, building standards, codes and enforcement, flood inundation, hazard mitigation and hazard vulnerability maps were accessed from Component 1 of the project.

2.2 Focused Group Discussion (FGD)

The Focused Group Discussion is a qualitative research methodology which is often used to gain in-depth knowledge and understanding on the relationship between certain processes and activities related to DRRM and management of urban water system. The FGD was conducted with agencies that have stake over the urban water systems and have mandate over disaster risk reduction and management.

RESULTS AND DISCUSSION

The framework for analyzing the results, from secondary data gathering, the FGD and the KII, is anchored on the objective of the project component. This is to determine if there is integrated planning and coordination for management of disaster risk and urban water system. Two perspectives, particularly vertical and horizontal integration, are considered in the analysis. Further, the results of the KII would validate if there is cascading of the plans and if implementation is in place on ground.

3.1 Review of Regional / City / Barangay DRRMP and DCWD's Contingency Plan

Initial review of the various DRRM plans suggest that these are more focused on peoples' safety rather than on urban water system. Out of the 24 outcomes indicated in the plan, only 1 (Outcome 17) is related to water and sanitation. While in terms of coordination among stakeholders, only Outcome 11 emphasizes strengthened coordination but is not applied to UWS management (Table 1). It was also found out that the involvement of agencies in the DRRM is anchored on their institutional mandates. The review for the individual plans follows as:

Regional DRRMP 2013-2016

The Regional DRRMP outlines the activities in strengthening capacity of regional and local government units with partner stakeholders. It targets 24 outcomes under the DRRM Framework. The lead agencies responsible for the various outcomes include OCD, DENR, DPWH, BOT, DOST, PIA, DILG, DSWD, DOH, and NEDA. The RDRRMP (2013-2016) is currently updated and OCD provides a new matrix for DRRM. There was an impression that the plan is very much focused on people and not on UWS. In fact, only Outcome 17 in the DRRMP includes water and sanitation. Outputs and activities under the basic health services (Outcome 17) include medical consultation, assessment of water quality and repair of damage, list of patients, water borne diseases, list of clinics/hospitals, as well as restoration of lifelines.

On the other hand, Outcome 11 is on strengthening of coordination but is not much applied to UWS. There was an observation that the involvement of agencies in the DRRMP is anchored on their mandate. The good side of coordination is the creation of the OCD-TWG (composed of various agencies), which conducts quarterly meeting.

City DRRMP 2013-2016

The City DRRMP is formulated by the Davao City Disaster Risk Reduction and Management Office with the City DRRM Council. In terms of format and the inclusion of outcomes, the City DRRMP is very much patterned from that of the Regional DRRMP. However, the lead agencies involved are inclusive within the City LGU such as the DRRMO, City ENRO, City Engineer's Office, City Budget Office, City Information Office, Association of Barangay Captains, Central 911, CSSDO, CHO, and CEO. Similar to the RDRRMP, activities for Outcome 17, headed by CHO, is on assessment of water quality and conduct of damage repairs while for Outcome 11, it is on the creation of database and formulation of guidelines for partnership with DRRMO as the lead group.

DCWD Contingency Plan

The DCWD Contingency Plan is designed to serve as a guide in emergencies that may occur during a disaster and affect the water supply systems. Presently, the plan is undergoing review and updating. Among its objectives is to protect public health from contaminated water, to notify concerned agencies for assistance, and to quickly respond and repair damages to minimize system downtime. Severe flooding is included in the plan and is recognized as among the hazards that can adversely affect all urban water systems including damages to the system components or contamination from water service disruption. The different components of the urban water systems, e.g. transmission lines, pipe crossing, reservoirs, etc., are assessed for vulnerability, and mitigating actions or improvements for structural resilience is also included. In addition, the monitoring of physical, chemical, and microbial contamination throughout the system is thoroughly defined and classified. One of the highlights of the plan is the provision of safe water from alternative water sources during emergencies.

Barangay DRRMP

Much like the Regional and City DRRMP, the DRRM in the barangay level has limited programs in terms of water management during disasters. One of the programs relating to water quality is the training on water safety, which mainly discusses about the health impacts of contaminated water and the control measures needed to treat the water at a household level. A number of programs indirectly related to urban water systems, but integral nonetheless, are the provision of maps as guide for resource management, and the provision of basic subsistence (food and water) during disasters. Lastly, there are a number of orientation trainings in the enhancement and awareness of climate change and its impacts, which was provided by the city DRRMP for barangays. Participants include the DRRMC team leaders and members, Purok Leaders, and Barangay Staff.

3.2 Focused Group Discussion

The FGD conducted amongst various agencies was directed towards UWS management. The urban water systems are, predominantly, affected by urbanization and population growth, and (in most cases) are the only factors considered in its planning and design (Walsh et al 2013). However, the impacts of extreme climatic events to UWS are now being considered since the effects can result to physical damage, systems failure, population risk due to contamination, and financial loss.

As mentioned in the introductory part of this report, the focus of data gathering and analysis is organizational resiliency. In a nutshell, resiliency, within the context of man-made systems such as UWS, can be viewed as the capacity of human 'engineers' to respond to immediate external stressors, i.e. natural or anthropogenic disasters (source). The DCWD addresses the vulnerability of its water supply systems through its comprehensive vulnerability assessment as described in the DCWD Contingency Plan. In addition, the utility has the means and capacity of mobilizing its resources when a disaster affects its water supply. This makes the barangays supplied by the company, or barangays with Level 3 system, more resilient to the impacts of climate change. It is the Levels 1 and 2 that are less resilient, where the UWS are operated and maintained by either the community or the barangays. Thus, the human element or human system plays a major role in the resiliency of Level 1 and 2 UWS, and the resilience criteria of UWS Management as presented in the KII questionnaire as the major focus. As described by Gallopín (2006, p. 300), adaptive capacity of human systems can refer to its capacity to respond to perturbation (disasters), to adjust to its impacts, to take advantage of opportunities, and to cope with the consequences.

3.2.1. Prevention and Mitigation: Knowledge of the Environment and Resources

It is of no surprise that the DCWD knows more about the UWS of Davao than any other agencies, at least the Level 3. There are also a number of initiatives and programs spearheaded by the company to protect the recharge zones, and an intensive monitoring program for its newer water supply systems. However, the agency has no current data on the age and condition of its older pipelines, particularly those that were laid in the 80s and 90s. As for the rest of the agencies, they are familiar that groundwater is the main source of drinking water supplied by the DCWD, but are not familiar of its location among other things. Aside from the DCWD, the DILG has a program directly related to the provision of drinking water to LGUs, i.e. provides financial support for Level 1 water supply systems.

3.2.2. Disaster Preparedness: Anticipation of Perturbation and Level of Preparation

One of the best practices for disaster preparedness highlighted in the study is the creation of the Davao City Task Force Drainage, a group represented by different government agencies in the planning and coordination of managing water supply. Each agency has its own plan in relation to disaster preparedness, but the data integrated to it, e.g. flood prone areas and geo-hazard maps, is based on outdated information. Thus, there is a need to update these plans and for each agency to incorporate data that are accurate and up-to-date.

Another significant gap highlighted in the FGD is the absence of early warning systems (EWS) by DCWD and DPWH, which heavily rely on PAG-ASA and 911. The CDRRM is the only agency that provided examples of its EWS such as sirens, radio communication, weather monitoring systems, and indigenous methods for far flung areas. It is important to note that DOST, although do not have EWS itself, is mandated in providing EWS technology to agencies that require it.

There are disasters that are not included in the study but put a significant risk to the city's UWS. The barangays in and around the recharge zones have indicated that drought has an adverse impact to its surroundings. In addition, the issue of saltwater intrusion due to sea-level rise has gained the most consensus as the climate effect that can affect UWS infrastructure and coastal wells (Burian et al 2013, pp. 92-93). Drought and saltwater intrusion are not reflected in the draft contingency plan, but the plan is still for review when this study is being conducted.

3.2.3 Disaster Response: Capacity to Deploy Resources & Address Immediate Needs like Water and Sanitation.

During disasters, the DCWD has the capacity to immediately repair and rehabilitate its affected infrastructure, as well as deliver water to affected areas through bottled water, water tanks, and the utilization of a mobile water treatment system, or desalination truck, that can treat and supply 20,000 liters of safe water per day (the system is scheduled to be purchased in 2017). The provision of water is also extended to non-DCWD customers, but the repair and rehabilitation of Levels 1 and 2 UWS is not within the responsibility of DCWD. However, the agency has donation programs to poor and far-flung barangays. A major actor in water management during disasters is the CPDO, which has a facility in water provision. There were no identified gaps or issues disclosed by the agencies for these criteria (disaster response) during the FGD.

3.2.4. Rehabilitation and Recovery: Capacity to Recover and Degree of Adaptation

The major actors in the capacity and recovery of Level 3 UWS are DCWD and DPWH. The former has programs in place to reassess and reinforce the urban water infrastructures, while the latter has been conducting inventories, in coordination with the city, on its drainage structures, which is valuable information for DCWD in measuring the resilience of its pipelines and other infrastructure. There were no identified gaps or issues disclosed by the agencies for these criteria (rehabilitation and recovery) during the FGD, but it is clear that the recovery of affected Levels 1 and 2 UWS requires special focus since these types of water systems are the least resilient.

Common issues for the upstream and downstream barangays are the denuded forest, the incidence of flood and drought while for downstream and midstream barangays is the problem of water-borne disease during disasters.

3.3 UWS Management Analysis after FGD

The finding that there is weak horizontal and vertical integration of DRRMPs at various levels may be attributed to the fact that the involvement of government agencies in DRRM is anchored on their individual mandates. Meaning their engagement in DRRM are within some institutional limitations on budget, manpower, and targets as well as time. Furthermore, it was found out that the plans are more focused on people and not on UWS management. These findings are reinforced by the results of the FGD and KII, particularly on the expression of the FGD participants from various government agencies that UWS is not given prime importance in the crafting of the DRRMP as well as the admission that the FGD conducted by the UNESCO-HELP Davao Network project was the first ever venue for the agencies at the region and city level to interact and learn from each other's programs/activities and issues for UWS in relation to disasters. The major issues and gaps like no water balance study, no septage management program, lack of drainage systems, encroachment of forestland/recharge zones, inadequate data for planning and early warning system were noted by the participating agencies. On the other hand, the response of the community members during KII suggested that focal persons for UWS are few for some barangays and non-existent in most barangays. As a matter of fact, the focus of DRRM capability building in most barangays is on disaster drills and life-saving and none for water system maintenance and monitoring.

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