

Vulnerability Assessment of the Urban Water Supply System of Davao City, Southern Philippines

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Present treasurer of HELP Davao Network, and a member since 2000. Finished post graduate courses in Participatory Development and Environmental Management at DMSF Philippines and Ceddet Foundation Spain respectively. Granted a Fellowship in International Atomic Energy Agency in Vienna, Austria for Isotopic Hydrology and Urban Water and Sanitation in Lund University Sweden.

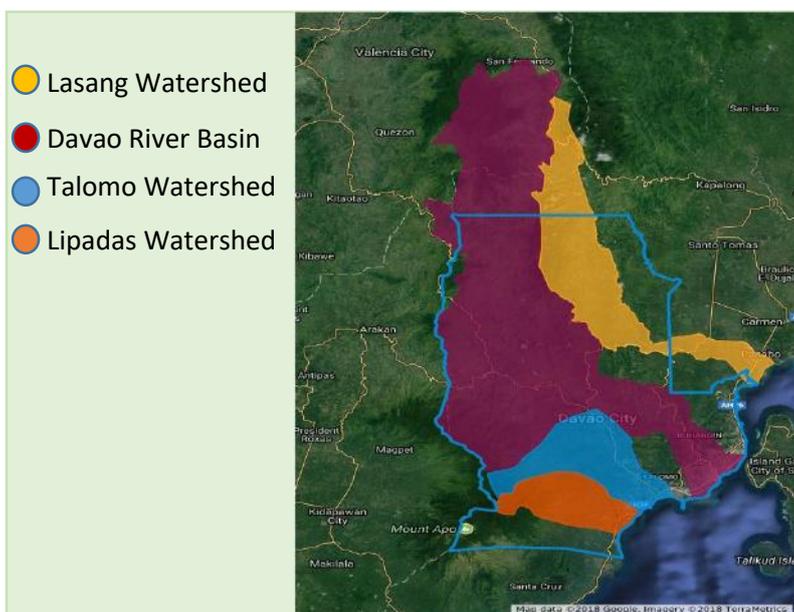
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Geographic and demographic information



Country	Philippines
Province	Davao del Sur
District	Davao City
Size of geographical area	2,444 km ²
Number of indirect beneficiaries	1,100,270 persons
Dominant ethnicity	Filipino



Size of project area	2595.4km ²
Number of direct beneficiaries	1,100,270 persons
Geographic coordinates (longitude and latitude)	7° 11' 56.4036" N and 125° 27' 17.7876" E
Dominant ethnicity	Filipino

Ecosystem Types

X	Forest	Grassland	X	Agricultural	X	In-land water
	Coastal	Dryland		Mountain	X	Urban/peri-urban

General introduction

The urban water system (UWS), which includes water supply, wastewater and storm water, has been identified to be particularly at risk to climate change. If the UWS is at risk, then impacts on the system infrastructure are anticipated. Particularly for the water supply system (WSS), vulnerability assessment to climate change impacts, such as flooding, is necessary to determine the system's resilience.

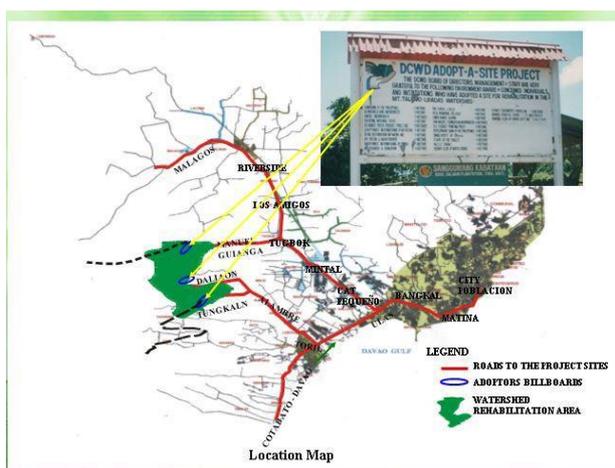
In Davao City, Level III WSS is served by the Davao City Water District (DCWD). Of the 182 barangays comprising Davao City, 110 are served by DCWD. The remaining 72 barangays are served by Levels I and II water systems that are sourced from springs, deep wells and shallow wells. For DCWD, 99.9% of production comes from groundwater sources extracted through production wells.

It is likely that climate change may result to increased risk of flooding. Based on the projections of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), the increase in precipitation during the months of December to February may cause rivers to overflow and impact on Davao City communities and infrastructures. Thus, this study assessed and mapped vulnerabilities of the WSS *vis-à-vis* vulnerabilities of the communities to 100-year return floods, in 67 riverine and floodplain barangays located in 4 of 8 watersheds in Davao City.

Indicators for exposure, sensitivity and adaptive capacity were selected based on best available data. Database development and data integration used the Geographic Information System; geographical areas prone to floods at least 1.5 m high are overlaid with other datasets to show where vulnerable people and WSS infrastructure are in relation to the flood-prone barangays.

Result of the study showed the very high vulnerability to 100-year return floods of some of the DCWD pipe bridge crossings and reservoirs, including the communities in 4 barangays. DCWD WSS is resilient in 3 aspects namely functional redundancy, flexibility and responsiveness. In conclusion, there are three (3) areas that need intervention. First. Regular maintenance of all DCWD pipelines and the timely rehabilitation of replacement of ageing pipelines must be assured. Second. Environmental sanitation must be improved, particularly by proper management of wastes at all levels. Third. Environmental preparedness need to be increased, by providing the barangays with access to functional early warning systems and by putting the Barangay Disaster Risk Reduction Management (BDRRM) Council into full functional use. Interventions have been done like Adopt-a-Site Project and Rehabilitation of Community Learning Center so as to mitigate possible effects of heavy floods in the city.

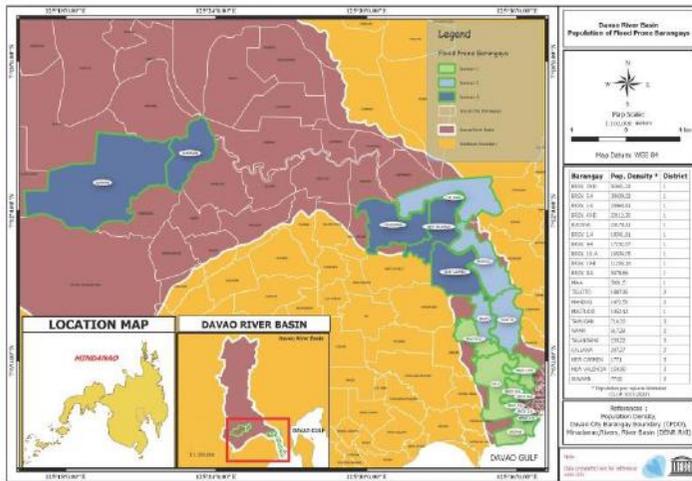
This is a collaborative research of five institutions in Davao City



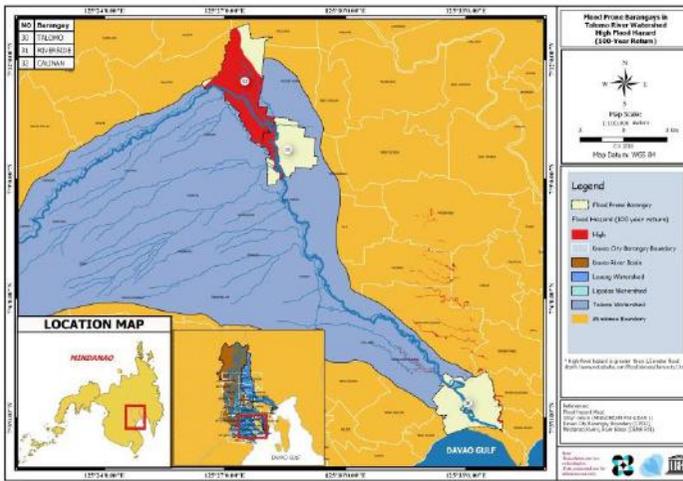
DCWD Adopt-A-Site Project



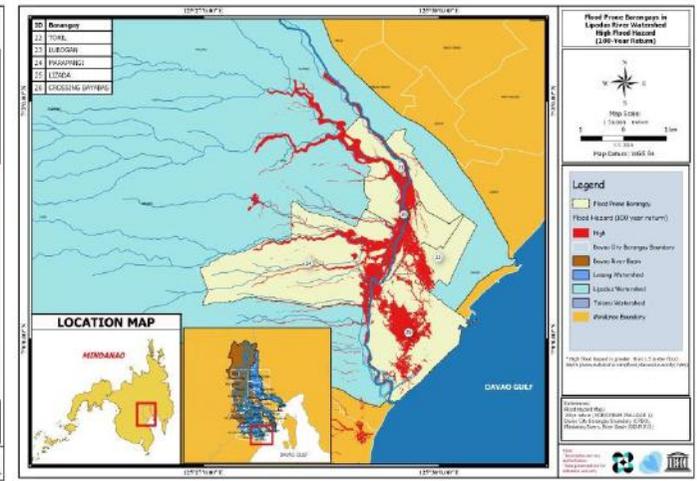
Disaster Preparedness Training at the Community Learning Center



Davao River Watershed Flood Prone Areas



Talomo Watershed Flood Prone Areas



Lipadas Watershed Flood Prone Areas

Contribution to Aichi Biodiversity Targets' Strategic Goal D

	Breakdown Target	How did you measure the outcome?	Result
Strategic Goal D	<p>TARGET 14</p> <p>Ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded ...</p> <p>... taking into account the needs of women, indigenous and local communities, and the poor and vulnerable</p>	<p>No. of Hectares Adopted</p> <p>No. of Community Learning Center Rehabilitated</p> <p>No. of Adopters</p> <p>No. of Service Connections (Residential/Commercial)</p> <p>No. of Flood Prone Maps Generated Using LIDAR Technology</p> <p>No. of Disaster Preparedness Plan for the city</p>	<p>183 Hectares</p> <p>1 Rehabilitated Community Learning Center</p> <p>101 Adopters</p> <p>220,054 Service Connections</p> <p>34 Flood Prone Maps</p> <p>1 Disaster Preparedness Plan</p>
	<p>TARGET 15</p> <p>Ecosystem resilience and the contribution of biodiversity to carbon stocks have been enhanced through conservation and restoration</p> <p>At least 15 per cent of degraded ecosystems are restored, contributing to climate change mitigation and adaptation, and to combating desertification</p>		
	<p>TARGET 16</p> <p>The Nagoya Protocol is in force</p>		
	<p>The Nagoya Protocol is operational, consistent with national legislation</p>		

Relations to other Aichi Biodiversity Target & SDGs

Please indicate the Aichi Biodiversity Targets other than the targets your working group focuses and SDGs that your activities contribute to if any. Use “●” and “■” to indicate the “direct” or “indirect” contributions to the targets.

CBD Aichi Biodiversity Targets (<https://www.cbd.int/sp/targets/>)

Strategic Goal A				Strategic Goal B					
●		●		●		●			
Strategic Goal C			Strategic Goal D			Strategic Goal E			
			●	●			■	●	

UN Sustainable Development Goals (SDGs) (<https://sustainabledevelopment.un.org/sdgs>)

		■		■	●		■	
	●		●		●	■	●	

Any difficulties you found during your assessment

Assigning scores for vulnerability using indicators on exposure, sensitivity and adaptive capacity and securing secondary data from institutions that are needed in the study. There is also a lack of vertical and horizontal integration of the city’s Disaster Preparedness Plan.

Key messages for the CBD in planning for the post-2020 Targets

Ecologically sustainable development is the environmental component of sustainable development. I strongly believe that if there are threats of serious irreversible environmental damage one has to use the precautionary principle, lack of full scientific certainty should not be a reason for postponing measure to prevent environmental degradation. Strengthening science based researches as a critical tool for decision making and policy adaption should be a priority. We also need to make strong the technical and institutional capacities if our IPSI members. Communication strategies to the people, participatory approach, regular monitoring, review and accountability are still some of the important factors for a sustainable happy mother earth.