

Sound Practice No.11

Development of a Sustainable Environment in Makati City through an Environmental Management Plan

Overview

The City Government of Makati is the first local government unit to draft its EMP. The Department of Environment and Natural Resources-Environmental Management Bureau spearheaded by former DENR Secretary Elisea Gozun, forged a partnership with the city through a Memorandum of Agreement for the development of an Environmental Management Plan in October of 2004. Sec. Gozun envisioned Makati City as the pilot City for the devolution of certain functions of the EMB particularly for the issuance of Environmental Compliance Certificates (ECCs). The City Government on the other would like to increase the capacity and capability of its organization as part of good governance.

The MOA between the DENR and Makati City Government consisted of technical assistance through the conduct of workshops on environmental impact assessment. After the workshop, the participants composed of city government personnel decided to create a technical working group that will draft the EMP. One participant suggested that the drafting of the EMP should undergo a planning process and the TWG be divided into four sectors. The idea was accepted and an urban planning process was used as well as a TWG was divided into four sectors.

A second round of planning workshops series were conducted by the city government for the drafting of the EMP from January to April 2005. A report containing the outputs of the workshops was written and is currently being reviewed by the City Government Consultant.

Significant Background Information

Makati City is known to be a hardliner advocate of environmental protection. It is the first LGU to strictly enforce a “no smoking” ordinance and is one LGU that solicit fear from smokers. Makati is also feared by most drivers for its Ordinance Violation Receipt (OVR) for traffic rules. For solid waste management, Makati City is one of the most compliant LGU to the provisions of the Ecological Solid Waste Management Act or RA 9003. Its Makati City 10 year Solid Waste Management Plan is looked upon as a model for other LGUs to replicate. Currently, certain neighboring LGUs are turning to Makati for assistance to the drafting of their 10 year SWM plans. And last but not the least, Makati is known to have the most efficient and well trained Rescue Team equipped with its modern rescue and disaster response equipment.

The drafting of the EMP is a proactive strategy for the city government in expanding its initiative in the field of environmental management. The city not only drafted its EMP but also developed and installed a planning process that is participative and empowering for city personnel. The EMP integrated the other critical sectors that have direct or indirect impact on hazard and disaster management. The hazard and disaster management sector of the EMP has a comprehensive analysis and recommendation using current studies conducted by the Philippine Institute for Volcanology and Seismicity. It also took into consideration the development trends of land uses and utilization of natural resources in the city and how these trends bring about potential hazards and disasters.

SP Details

The preparation of the Environment Management Plan (EMP) of Makati City started with the conduct of two separate capacity building workshops that aimed to increase the capacity of the city government in managing their environment. The first workshop was conducted by the Department of Environment and Natural Resources and Environmental Management Bureau and the second workshop was conducted by an environmental planner. The first workshop conducted in October 2004 was basically an orientation workshop designed to enhance familiarization and appreciation of Environmental Impact Assessment and the procedures and processes of the Philippine Environmental Impact Assessment System.

The second series of workshop was conducted within the availability of the TWG within the period of January to April 2005. It was participated in by the TWG sectors and entailed the development and installation of an Environmental Management Planning process. The four identified environmental sectors for the TWG were:

- a. Blue Sector or water resources and consumption;
- b. Green Sector or land use and natural resources;
- c. Brown Sector or pollution; and,
- d. Red Sector or hazards and disaster management.

The Blue sector was composed of representatives from the City Health Department, the Department of Engineering and Public Works, Manila Water Inc., Maynilad, Office of the Mayor, National Water Resources Board. The Green Sector was composed of representatives from the Parks and Green Division of the Department of Environmental Services, the Urban Development Department, the Finance and Budget Department, Bagong Ina Foundation (NGO) and CONCEP (consultant for land use planning of the city government). The Brown sector was composed of representatives from the Solid Waste Management Division and Pollution Control Office of the Department of Environmental Services, Liga ng mga Barangay, Ayala Foundation Inc., Makati Environment Foundation Inc. (NGO), Department of Education Makati, Urban Development Department, Makati Social Works Department, Ospital ng Makati and DENR-EMB. The Red sector was composed of representatives from the Makati City Disaster Coordinating Council, Fire Department, Urban Development Department, Liga ng mga Barangay, Office of the Mayor, Department of Engineering and Public Works

and Makati Environment Foundation Inc.

The EMP formulation underwent a planning process that was composed of different planning modules. The modules are presented below:

Module 1: PROFILING AND PROBLEM ANALYSIS

- a. Drafting of Environment Management Profile
- b. Validation of Draft Environmental Management Profile
- c. Analysis of Data Gathered by Sector and Intersector

Module 2: VISIONING

- a. Drafting of City Vision for the Environment using Elements / Descriptor
- b. Analysis of City's Status in Relation to Vision using Vision Reality Gap Matrix.

Module 3: ANALYSIS OF IMPACTS OF DEVELOPMENT PLANS AND POLICIES ON THE ENVIRONMENT

- a. Review of Environment Policies, Development Plans, Land Use Plan and Zoning Ordinance
- b. Impact Analysis of Development Plans on Environment

Module 4: ENVIRONMENT MANAGEMENT PROGRAM DEVELOPMENT AND PRIORITIZATION

- a. Identification of Programs and Projects
- b. Program Prioritization using Goal Achievement Matrix

Module 5: INSTITUTIONAL AND ADMINISTRATION DEVELOPMENT / LEGISLATION

- a. Identification of Organization Development Requirements of EMP
- b. Preparation on Budget Options
- c. Proposed Revisions in Zoning Ordinance
- d. Proposed Environmental Code

Module 1 was the preparation of the Environmental Management Profile and the profile was the main document used in the analyses done. The intra- and inter-sectoral analyses done during Module I using the "Problem-Solution Finding Matrix" led to the identification of various sectoral issues and concerns, their implications and their possible solutions.

Module 2 derived the vision statement. Because the vision statement is a long-term end-state scenario, the EMP goals and targets took a time frame of 5 years only. A useful input to this activity was the result of the vision-reality gap analysis which was

one of the activities undertaken in Module 2. Other inputs such as relevant LGU mandates and the current thrusts of the national and local governments were also considered.

Module 3 exposed the TWG to the different environmental policies/laws, development plans, land use plan and current zoning ordinance enforced in the city. The TWG used a sensitivity matrix that helped identified possible impacts or gaps of current laws/policies, development plans, the land use plan and the approved city zoning ordinance. These in turn help served as principles and values that shall guide the formulation and implementation of sectoral programs and projects.

Module 4 is the development and drafting of programs and projects necessary to realize the objectives and achieve the targets of the four sectors. Priority projects were identified using the Goal Achievement Matrix with priority criteria. The TWG used project briefs, containing among others, details that briefly describe the project such as:

- the name and type of project (generally, “soft” or “hard”)
- the proponent or implementer of the project idea
- description of the project
- the intended beneficiaries (population sectors or geographical areas)
- the components of the projects and accompanying activities
- estimated cost or resource inputs
- target outputs or success indicators

The project briefs were collected and processed as inputs in the preparation of the financial requirements of the EMP.

Module 5 focused on the administrative and legislative requirements of the four sectors in order to fully implement the sectoral programs and projects. Some sectoral policies and programs cannot fully be implemented by means of development projects alone. They may require enactment by the SP of regulatory measures or by the provision of certain incentives to attract private investments.

Relevance to Megacities

How does this SP meet the Principles of Sound Practices in a Megacity?

The planning process developed and installed for the drafting of Makati City’s Environmental Management Plan can be applied by any local government unit if they choose to do so. It utilizes a capacity building approach for local government personnel and will only need a good facilitator to guide them through the process. The process entails making use of existing personnel and the development of a critical mind amongst them. The process gives government personnel the change to increase mental capacity by using the analytical framework provided. The output of the process which is the EMP is just an output that will only be applicable and feasible for the particular city.

The outputs of the EMP integrated the environmental needs of the whole city. The planning process is general in nature and can be applied by any local government unit. The scope of the EMP can be further expanded and elevated to a Metrowide area, regional or provincial level. The process can be applied to include other development sectors for urban development purposes.

The EMP particularly for the red sector first made use of data that will help identify the problems and issues concerning hazards and disaster management in the city and then another analysis was made by intersecting with the other three sectors to identify the gaps and issues that have direct and indirect impact to hazards and disaster management.

The red sector envisioned “the people of Makati City to live in **safe** environment... if the community is **aware** and **prepared** to mitigate, if not prevent, the adverse effects of a disaster”. While it is true that the City has its disaster management plan and is already being implemented, the existing plan needs updating, geographic information system (GIS) technology and a Disaster Management office created, to fully enforce the plan.

The EMP noted that though the City can pride itself as the most equipped LGU in terms of material, equipment and manpower resources for rescue, recovery and relief operations. It still needs to upgrade some equipment including acquisition of specialized equipment to augment the existing ones need to be done. More importantly, specific guidelines and procedures have yet to be established for the optimum and timely utilization of equipment in times of disaster.

The EMP also identified the need to establish a centralized disaster/emergency operations command center to handle communications and warning systems and other disaster preparedness, response and relief operations of the MCDCC. As well as conduct intensified IEC programs, drills and mobilization exercises and other preventive and mitigating measures need further implementation to lessen the adverse effects of a big disaster such as the Model 08 earthquake scenario.

Is this SP SUSTAINABLE, MEASURABLE, ACHIEVABLE, RELEVANT AND TIMELY?

The EMP is sustainable because it involves the pursuit of public-private partnerships for the funding and implementation of identified programs and projects for the four sectors. It does not rely solely on City Government funds which other develop sectors also badly need. It not only encourages and promotes participation from the private sector and civic organizations but also institutionalizes the participative and partnership approach within the city government structure. The programs and projects identified in the EMP will be lined up for fund allocation by the City Government but only a portion of the projected budget need will be submitted for approval. The approved fund will serve as seed fund for the projects and fund sourcing will be done for the rest of the budget needed through establishment of collaborations with national agencies, private sector,

international agencies and organizations.

One component of the planning process is the identification of success indicators using the Vision Reality Gap matrix. Through the matrix, objectives and indicators are identified to make sure that the plan can be measured and assessed in order to quantify the impact or success of the projects. The indicators will help see the extent of achievement in relation to the goals set by the four sectors.

The relevance of the EMP lies on the programs and projects identified to solve the problems identified. It is timely for it is based on current and projected situations and problems.



Knowledge Base Coding Reference:

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VISION REALITY GAP MATRIX

GREEN SECTOR

DESCRIPTOR	SUCCESS INDICATOR	RATING	POLICY OPTION
L I V A B L E	Air quality above standard	2	<ul style="list-style-type: none"> - Strict enforcement of environmental laws and ordinance - Improvement of technical capability of DES - Utilization of renewable energy - Promotion of non-motorized vehicles
	Pedestrianization w/in the city implemented	2	<ul style="list-style-type: none"> - Implementation of pedestrianization projects in close coordination with private sector, NGOs / POs - Sidewalk (easement recovery) - Promotional of non-motorized vehicles
	Presence of urban forestry in identified open spaces	2	<ul style="list-style-type: none"> - Sidewalk easement recovery - Ordinance declaring Pasig River easement and PNR side (Pio del Pilar) as natural reserve / cultural heritage for endemic trees
	Sufficient open spaces for greening & beautification projects allocated / identified	1	<ul style="list-style-type: none"> - Regulate development through Zoning Ordinance - Sidewalk / easement recovery
	A tree for every 4 persons planted. A. Nighttime population (471,379) B. Daytime Population (approximately 2 Million)	3 1	<ul style="list-style-type: none"> - Recovery of easement / sidewalks - Intensify tree planting activities by involving the community - Formulate guidelines in the promotion of green architecture supported by an ordinance - Draft ordinance declaring Pasig River easement and PNR side (Pio del Pilar) as natural reserve / cultural heritage for endemic trees.
	Abundance of Flora and Fauna	1	<ul style="list-style-type: none"> - Establishment of programs for the conservation / preservation of natural environment - Intensify awareness on environmental conservation
	Environmental planning done in the formulation / drafting of the CLUP	1	<ul style="list-style-type: none"> - Include consideration for environmental planning in the revision of CLUP
	New constructed buildings conforming to green architecture standards	N	<ul style="list-style-type: none"> - Formulate guidelines in the formulation in the promotion of green architecture supported by an ordinance
	Existing buildings utilized available open space for urban greening		<ul style="list-style-type: none"> - Draft ordinance requiring existing building to utilize open space for urban greening (e.g. rooftop gardening, hanging gardening)
Alternative source of food supply	1	<ul style="list-style-type: none"> - Promotion of urban gardening in residential areas, public/private schools and government maintained parks and nurseries. - Creation of Environmental Trust Fund to support environmental related projects/programs <p style="text-align: center;">Note: Applies to all success indicators</p>	

BROWN SECTOR

DESCRIPTOR	SUCCESS INDICATOR	RATING	POLICY OPTION
HEALTHY	100% compliance of all waste generators to provisions of RAs 9003, 6969, 8749, Clean Water Act and Other City Ordinance related to environment PD 856, PD 522	2	<ul style="list-style-type: none"> - Install and effective monitoring, evaluation and reporting system. - Organize stakeholders/concerned sectors and clearly define their roles in the implementation of RAs 9003, 6969, 8749 and Clean Water Act. - Make sure that the stakeholders will be involved in planning and solicit their commitments in the implementation of the plan. - Increase the coverage of IEC to include RAs 9003, 6969, 8749 and Clean Water Act at all levels. - Implementation of all local and national environmental laws.
	Low mortality rate caused by environment-related diseases achieved	N	<ul style="list-style-type: none"> - Gather data, analyze and come up with recommendation in coordination and consultation with concerned agencies.
	Litter free surroundings	2	<ul style="list-style-type: none"> - Strict implementation of CO 2003-095 & RA 9003 - IEC campaign - Mobilization of community leaders and other sectors in the implementation of existing ordinance
	Informal settlers freeing areas occupied by IS influx prevented	1	<ul style="list-style-type: none"> - Implementation of RA 7279
	Sustainable efficient transport and traffic system implemented	2	<ul style="list-style-type: none"> - Conduct continuing research for an effective and efficient transport system - Prepare and implement sustainable master plan (i.e. non-motorized transportation and pedestrianization) - Promote the use of environmentally acceptable alternative fuel
	Well equipped with advance technology in monitoring and for compliance to environmental laws	1	<ul style="list-style-type: none"> - Conduct continuing research for applicable technologies to ensure compliance in the existing environmental laws - Recommend applicable technology for adoption - Conduct trainings that will improve technical capabilities - Acquisition and modernization of equipment and facilities
	Absence of stray animals	2	<ul style="list-style-type: none"> - Strict implementation of existing ordinance - IEC campaign - Mobilization of community leaders and other sector in the implementation of existing ordinance

HAZARD SECTOR

DESCRIPTOR	SUCCESS INDICATOR	RATING	POLICY OPTION
P R E P A R E D	City disaster management plan implemented	3	<ul style="list-style-type: none"> - Strengthen MCDCC - Reorganize BDCC - Update existing city disaster management plan - Include GIS in disaster management system - Conduct inventory of available resources (must be strategically located)
	Low mortality rates, cases of serious injuries and damage to property during disaster achieved.	2	<ul style="list-style-type: none"> - Intensify IEC programs especially for communities located in risk areas - Assess social aspect of vulnerability - Conduct drills and mobilization exercises to city personnel and communities - Update / review / implement the MCDCC contingency plans for special types of disaster / calamities
	Counter disaster resources available and utilized	2	<ul style="list-style-type: none"> - Formulation and implementation of specific guidelines and procedure in utilizing resources (in a timely and effective manner) - Review / update the city counter disaster resources - Dissemination of specific guidelines / procedure
	Effective system of communication and warning installed	1	<ul style="list-style-type: none"> - Establishment of disaster / emergency operation center that will handle warning information and other activities in relation to disaster preparedness and response - Generate info that will facilitate communication and quick response - Upgrading of communication facilities and equipment - Assign definite key person to handle specific type of disaster.

BLUE SECTOR

DESCRIPTOR	SUCCESS INDICATOR	RATING	POLICY OPTION
C L E A N	100% potable drinking water supplied by the concessionaires	3	– Active participation in reporting and monitoring of leaks, illegal connections and other water related problems
	100% accessibility of residents to potable and safe drinking water	3	– Close coordination w/ the concessionaires for water related issues (i.e. rehabilitation of pipes, awareness campaign, community service)
	24 hrs. adequate water supply	2	– Strict enforcement of the solid waste management code & bldg
	Waterways and drainage system free of wastes (L&S, chemicals)	1	– Designate monitoring personnel in close coordination w/ the barangays concerned (especially during night time)
	Absence of water-borne diseases (in drinking water)	3	– Inter-city collaboration for trans-boundary wastes
	100% house sewer connection to sewerage line/system	2	– Strengthen multi-partite monitoring team between (i.e. joint sampling) LGU & concessionaires)
	Citywide utilization of recycled water	1	– Forge partnership with concessionaires on sewerage connection and access to STPs waste water effluent
	Existence of Flora and Fauna in waterways	1	– Promote through information campaign the use of recycled water (i.e. Trimedia approach) – Strengthen the regular clean-up, declogging and dredging operations – Establish a local environmental trust fund

INTERSECTORAL ANALYSIS

GREEN – BROWN SECTOR

OBSERVATION	EXPLANATION	IMPLICATION	POLICY OPTION
<p>1. Rapid urbanization overlooks regulation of land uses that generated unregulated wastes that can mitigate pollution</p>	<ul style="list-style-type: none"> - Population growth - Open spaces occupied by informal settlers (including danger zone easement) <ul style="list-style-type: none"> ❖ Lacks enforcement ❖ Poor information drive - Uncontrolled migration / population growth - Increase in economic activities - Previous land use regulation failed to consider factors that will control density w/c Zoning Ordinance 2001 considered - Long term projected urban development of Makati was not considered in previous pre-LGC(Local Government Code) period - Inadequate information, monitoring and enforcement of Land use plan & Zoning before 2001 	<ul style="list-style-type: none"> - Congestion - Presence of pollution due to limited space - Health and sanitation problem - Increase in public hazard (accident, loss of life and property) - Increase in crime rate - Increase cost on basic services - Increase in environmental pressure - Depletion of natural resources 	<ul style="list-style-type: none"> - Enhance monitoring system for all environmental program / project - Improve / develop technical capability of DES employees - Fast track updating and implementation of CLUP taking into consideration impacts of land use - Deputation of envtl. police/ enforcer - Intensify public awareness thru multi-sectoral participation - Strict implementation of all envtl. laws - Strict implementation of Zoning Ordinance - Strict implementation of UDHA - Strengthen inter-agency and multi-sectoral linkages / coordination for implementation and monitoring requirements - Review and integrate specific provision to promote and sustain environmental fund - Strict implementation of Zoning Ordinance - Rationalization of clearance and permitting system between rational and local - Localization of EIS for development project - Strengthen inter-agency and multi-sectoral linkages in gathering of information/data, develop data base system and analysis - Training and capability building in monitoring - Acquisition and modernization of envtl. monitoring equipment and facilities - Establish standard monitoring and reporting system
<p>2. Limited data on amount and type of pollutants in specific areas</p>	<ul style="list-style-type: none"> - The City Government is dependent on the data provided by EMB for lack of technical capability, manpower, equipment and facilities 	<ul style="list-style-type: none"> - No basis for planning and program development - Unaccounted environmental pollution violation - No base line for monitoring - Loss of income opportunity from fines and penalties of violators - Perceived environmental degradation may affect the economic and social life of City 	<ul style="list-style-type: none"> - Acquisition and modernization of envtl. monitoring equipment and facilities - Establish standard monitoring and reporting system

GREEN – BLUE SECTOR

OBSERVATION	EXPLANATION	IMPLICATION	POLICY OPTION
<p>1. Encroachment of informal settlers on tributaries / peddlers flea market waterways.</p> <p>2. Limited access to treated waste water w/c can be used for watering the plants, cleaning purposes.</p>	<ul style="list-style-type: none"> - in migration due to economic activities / opportunities and social benefits - uncontrolled construction of shanties along tributaries / waterways - lack of political will of barangays to control the influx of informal settlers - no permit to access Magallanes STP - Lack of coordination w/ existing STF 	<ul style="list-style-type: none"> - contributes to the rapid degradation of waterways - causes flooding - increase in declogging and dredging expenditures - depletion of Flora and fauna - loss of natural flow of waterways and decreasing width - potable water is being wasted instead of using treated waste water - increase in water bill if untapped 	<ul style="list-style-type: none"> - conduct census of new and existing residents to their respective barangays to prevent / control informal settlers - provide housing program to existing informal settlers - strict implementation of RA 8550 (Fisheries Code) and recovery of easements - recovered easements to be developed as green area - coordinate w/ concerned owners of STF and forge partnership w/ STF owners for utilization of treated waste water.
<p>3. Non-utilization of rain water for watering plants and cleaning purposes</p>	<ul style="list-style-type: none"> - No existing facility for storage - Not the usual adopted practice 	<ul style="list-style-type: none"> - Sam as the above-portable - Increase in water bill if untapped 	<ul style="list-style-type: none"> - Adopt program for the utilization of rain water

GREEN – HAZARD SECTOR

OBSERVATION	EXPLANATION	IMPLICATION	POLICY OPTION
<p>1. Limited open spaces for evacuation areas</p>	<ul style="list-style-type: none"> - Majority land utilized for residential and economic purposes - Presence of informal settlers - Conversion of open spaces for structures / development - Land is maximized for its highest use - Open spaces allocation is least priority 	<ul style="list-style-type: none"> - Limited available open space for evacuation centers - Health hazard / risk - Increase mortality - Occurrence of crime - Increase of crime - Increase expenditure for LGU 	<ul style="list-style-type: none"> - Identify location for open spaces w/ in the identified earthquake prone areas - Recovery of easement / ECA's encroached by informal settlers - Landbanking - Appropriate funds for disaster program - Intensify info dissemination to increase hazard awareness - Classify open space as such and define it as space not including easement / sidewalks
<p>2. identified areas prone to liquefaction is highly dense and limited access</p>	<ul style="list-style-type: none"> - Concentration of population due to employment availability and low market value - Poor planning - Unregulated construction - Presence of informal settlers 	<ul style="list-style-type: none"> - Large no. of affected lives and damage property - Congestion - Difficulty in the enforcement of environmental laws - Difficulty in response operation - Widespread fire - Prone to flooding - Occurrence of health hazard 	<ul style="list-style-type: none"> - Relocation of informal settlers - Conduct hazard awareness program - Recovery of easement - Future vertical development should adhere to LGU standard for identified liquefaction – prone areas
<p>3. limited area for food production that will supply initial requirement during hazard</p>	<ul style="list-style-type: none"> - Open spaces used for beautifications - Residential area w/ open spaces for landscaping - Only public schools allocate space for vegetable gardening 	<ul style="list-style-type: none"> - Food supply will come from outside of city 	<ul style="list-style-type: none"> - Promote urban gardening to residential areas, private schools and government maintained parks / nurseries

BROWN – BLUE SECTOR

OBSERVATION	EXPLANATION	IMPLICATION	POLICY OPTION
<p>1. Indiscriminate dumping of wasters in waterways and drainage system.</p> <p>1. insufficient data that will show the sources, type and volume of waste / pollutants in surface</p>	<ul style="list-style-type: none"> - Informal settlers, HH, Industries and commercial dump their wastes in water ways (L & S) - Limited access to waste water treatment facility - Weak monitoring and enforcement of laws by DENR & LGU due to lack of manpower and resources - Insufficient IEC campaign. - Undisciplined public - Lack of coordination w/ concerned offices (DENR, EMB, NWRB & DOH). - Limited access to available data from the national agency / office 	<ul style="list-style-type: none"> - High risk exposure to water-borne diseases. - Flooding due to clogged drainage - Decrease in livelihood and economic opportunities - BOD level increases and DO level decreases (water pollution) - No basis for planning - Undetermined levels of pollution - Unmonitored violators 	<ul style="list-style-type: none"> - Identify waste generators (both liquid & solid) and the type and volume of pollutants discharge - Enforcement of the Clean Water Act and UDHA law (7279) - Creation of multi-partite monitoring team - Upgrade existing water quality laboratory which will include analysis of wastewater - Intensify IEC campaign - Review and upgrade existing sewerage system for maximum utilization - Strengthen the coordination of water concessionaires and barangays in the maintenance of drainage and sewerage system - Additional requirements for business permit application / renewal the submission of waste management plan and certificate of compliance - Create a multi-partite monitoring team - Capacitate pollution office - Strengthen relationship w/ concerned national agency

BROWN – HAZARD SECTOR

OBSERVATION	EXPLANATION	IMPLICATION	POLICY OPTION
<p>Occurrence of flooding in spite of declogging activities</p>	<ul style="list-style-type: none"> - Indiscriminate dumping - Presence of informal settlers - Lack of collection system for informal settler areas - Upstream sources of pollution - Insufficient drainage system - Weak monitoring 	<ul style="list-style-type: none"> - Health hazard - Economic activity affected - Emergence of alternative source of income (“tulay” tulak boys”) - Traffic congestion - Water contamination - Increase expenditure for Local Government Unit - Increase emission / air pollution - Damage to property 	<ul style="list-style-type: none"> - Implementation of UDHA - Improve collection efficiency in informal settlers area - Intensify IEC - Identify evacuation area / center - Provide physical barriers for upstream pollution - Forge inter-LGU collaboration or joint management - Review and upgrade current drainage system - Multi-sectoral partite monitoring team - Prepare re-routing plan - Acquisition and modernization of food control / equipment

BLUE – HAZARD SECTOR

OBSERVATION	EXPLANATION	IMPLICATION	POLICY OPTION
1. Insufficient information on the inventory of operable & non-operable hydrants for fire suppression operation	<ul style="list-style-type: none"> - Lack of coordination between BFP & the concessionaires - Lack of technical capacity of the BFP to determine the working pressure of existing hydrants 	<ul style="list-style-type: none"> - It entails longer time to extinguish the fire 	<ul style="list-style-type: none"> - Provision of the concessionaires data on the prevailing pressure & specific location of all existing hydrants - Strengthen the partnership between BFP/LGUs & concessionaires on the fire emergency response operation
2. Probable outbreak of diseases due to contamination of water resources after the event of a disaster	<ul style="list-style-type: none"> - Inadequate evacuation areas - Insufficient supply of water at evacuation areas - Inadequate sanitation facilities at evacuation areas - Unsanitary practices after disaster 	<ul style="list-style-type: none"> - Outbreak of diseases - Increase expenditures for health services - Probable increase in crime rates - Contamination of water - Probable increase in mortality 	<ul style="list-style-type: none"> - Decommissioning of affected water lines - Water tankering - Utilization of deepwells & other water sources for sanitation purposes - Determine capacity requirements of specific evacuation areas to avoid congestion (i.e. utilities, medical needs) - Identification of evacuation areas/centers within the barangay

OBSERVATION	EXPLANATION	IMPLICATION	POLICY OPTION
<p>3. Uncontrolled installation of deepwells</p>	<ul style="list-style-type: none"> - Laxity of NWRB in regulating and monitoring of deepwell installation 	<ul style="list-style-type: none"> - May cause damage to properties - Probable loss of lives - Probable occurrence of soil subsidence due to over extraction of groundwater - Probable salt water intrusion 	<ul style="list-style-type: none"> - Adoption of deepwell regulation ordinance and impose penalties - Strengthen coordination among LGU, NWRB and water concessionaires with regards to granting of permits and groundwater quality - Recommend to NWRB those deepwell users with sufficient service water supply to revoke permit - Conduct IEC program on the excessive extraction of groundwater
<p><u>El Nino</u></p> <ul style="list-style-type: none"> - Lack of enforcement of water conservation policies during times of crisis <p><u>La Nina</u></p> <ul style="list-style-type: none"> - Low level of awareness of households located along flood prone areas 	<ul style="list-style-type: none"> - No specific ordinance - Insufficient information dissemination - Lack of coordination of concerned agencies <ul style="list-style-type: none"> - Insufficient IEC campaign - Attitude of residents are not Receptive 	<ul style="list-style-type: none"> - Cannot properly enforce water conservation policies/measures - No delegated police power of proper enforcement <ul style="list-style-type: none"> - The number of vulnerable group located in flood prone areas remains the same 	<ul style="list-style-type: none"> - Adopt ordinance and guidelines on water conservation - Strengthen IEC campaign - Define the specific function of El Nino Task Force for enforcement <ul style="list-style-type: none"> - Intensify IEC campaign