

APPENDIX 1 SITE PHOTOS



Photo-1 Sta. Clara Pumping Station (Metro Manila)



Photo-2 Pandacan Pumping Station (Metro Manila)



Photo-3 Flood Gate, Pandacan Pumping Station (Metro Manila)



Photo-4 Makati Pumping Station (Metro Manila)



Photo-5 Lupang Arenda at Mangahan Floodway
(Temporary evacuee due to TY Ondoy)



Photo-6 Damaged Structure during Ondoy due to Clogging of Road Drain Pipes at
Left-side of Mangahan Floodway



Photo-7 Marcos Bridge (upstream side view, Marikina River)



Photo-8 Marikina Bridge
(Sto. Niño Water Level Station, Marikina River)



Photo-9 Nangka River (downstream view, Nangka River)



Photo-10 Nangka River
(upstream view, Nangka River)



Photo-11 San Mateo Bridge
(downstream view, Marikina River)



Photo-12 San Mateo Bridge
(downstream view, Marikina River)



Photo-13 Tumana Bridge (downstream view, Marikina River)



Photo-14 Tumana Bridge (downstream side view, Marikina River)



Photo-15 Montalban Bridge (downstream side view, Marikina River)



Photo-16 Montalban Bridge
(upstream side view, Marikina River)



Photo-17 Landslide by Pepeng at Sto. Nino, Bgy. Ambassador
Tublay, Benguet (CAR Region)



Photo-18 Landslide by Pepeng in Bgy. Loacan
Itogon, Benguet (CAR Region)



Photo-19 Landslide by Pepeng at Sitio Dalikno, Bgy. Ampucaao
Itogon, Benguet (CAR Region)



Photo-20 Translation slide by Pepeng in Bgy. Ucab,
Itogon, Benguet (CAR Region)



Photo-21 Landslide by Pepeng Sitio Kiangon, Bgy. Ucab,
Itogon, Benguet (CAR Region)



Photo-22 Landslide by Pepeng in Sitio Dalikno,
Bgy. Ampucao, Itogon, Benguet (CAR Region)



Photo-23 Landslide by Pepeng in United Residence Dominican Hill, Bgy. Upper Q. M. Baguio City (CAR Region)



Photo-24 Landslide by Pepeng in Little Kibungan, La Trinidad, Benguet (CAR Region)



Photo-25 Landslide by Pepeng Sitio Little Kibungan
La Trinidad, Benguet (CAR Region)



Photo-26 Landslide by Pepeng Sitio Buyagan, Poblacion,
La Trinidad, Benguet (CAR Region)

APPENDIX 2 QUESTIONNAIRE AND RESULTS

Japan International Cooperation Agency (JICA)

**Questionnaire on
Disaster and Disaster Risk Management in the Typhoon No.16 (Ondoy) and No.17 (Pepeng)**

Province:/City_____

Name of Respondent: _____ Sex: _____

Agency/Office: _____

Position:_____

Tel No.: _____ Fax No.: _____ E-mail:_____

1. Severe Damages caused by the Typhoon No.16 (Ondoy) and No.17 (Pepeng) in September 26 and October 3, 2009

1-1 Disasters caused by the typhoons

We would like to ask you filling out the following tables with information concerning the disaster that occurred in the province/municipality on 26 of September and 3 of October 2009. And also we would like to ask you attaching detailed damage descriptions and maps of damaged areas (if any) at the end of this questionnaire?

a) Ondoy and/or Pepeng	b) Name of River Basin/River:
c) Disaster area	Are maps of disaster areas available <input type="checkbox"/> Yes <input type="checkbox"/> No
d) Type of disaster (Please check)	<input type="checkbox"/> Flood <input type="checkbox"/> Flash flood <input type="checkbox"/> Debris / Mud flow <input type="checkbox"/> Storm surge <input type="checkbox"/> Landslide <input type="checkbox"/> Coastal erosion <input type="checkbox"/> Others (Pls. Specify): _____
e) Causes of the disaster	<input type="checkbox"/> Typhoon <input type="checkbox"/> Heavy rain <input type="checkbox"/> Others (Pls. specify): _____
f) Major damages (Check those applicable)	<input type="checkbox"/> Casualties <input type="checkbox"/> House and assets <input type="checkbox"/> Public facilities <input type="checkbox"/> Road & Transportation facilities <input type="checkbox"/> Water supply system <input type="checkbox"/> Power supply system <input type="checkbox"/> Communications infrastructure

	<input type="checkbox"/> Agricultural products <input type="checkbox"/> Fisheries including fishpond <input type="checkbox"/> Industrial products <input type="checkbox"/> Disease: _____ <input type="checkbox"/> Others (Pls. specify): _____
<p>g) Required mitigation and rehabilitation for disaster risk reduction (Check all possible)</p>	<input type="checkbox"/> Increase discharge capacity of river channels <input type="checkbox"/> Flood control facilities <input type="checkbox"/> Structural measures against landslide and mudflows <input type="checkbox"/> Proper river management <input type="checkbox"/> Proper watersheds management <input type="checkbox"/> Dredging heavy sedimentation in river bed <input type="checkbox"/> Reforestation in the watersheds <input type="checkbox"/> Removal of existing informal structures/people in the river channel <input type="checkbox"/> <input type="checkbox"/> Others (Pls. specify): _____
<p>h) Required Mitigation and Preparedness against the disaster (Check all possible)</p>	<input type="checkbox"/> Emergency responses including evacuation <input type="checkbox"/> Establishment of community based disaster management organization <input type="checkbox"/> Preparation of community based hazard maps <input type="checkbox"/> Establishment of community based early warning and forecasting system <input type="checkbox"/> Community based information system <input type="checkbox"/> Evacuation route <input type="checkbox"/> Shelters <input type="checkbox"/> Information and public awareness <input type="checkbox"/> Others (Pls. specify): _____
<p>1) Required emergency response for the disaster</p>	<input type="checkbox"/> Early warning <input type="checkbox"/> Information <input type="checkbox"/> Evacuation order <input type="checkbox"/> Safe evacuation <input type="checkbox"/> Rescue <input type="checkbox"/> Shelter <input type="checkbox"/> Food and water supply for refugees <input type="checkbox"/> Others (Pls. specify): _____

2. Pre-Event: Preparedness for Disaster Risks Reduction against Typhoon Ondoy and/or Pepeng

Looking back to the time when the last severely damaging disaster occurred, please answer the following questions about your experiences regarding the response measures that you adopted and preparedness required.

2.1 Preparedness

2.1.1 Information and Awareness

a) For those who experienced a severe damages from flood, debris flow/mud flow and landslide:

Are you aware of the fact that the Province/Municipality is:

- flood-prone area: No Yes
- Sediment-prone area: No Yes
- Typhoon-prone area: No Yes

Do you think that people in the Province/Municipality are aware of the disaster prone areas?

- flood-prone area: No Yes Very much
- sediment-prone area: No Yes Very much
- typhoon-prone areas? No Yes Very much

2.1.2 Preparedness (related to questions 2.1.1:

a) Are there any preparedness measures you are undertaking? Yes No

b) If Yes, what are these? Please mention 5 major preparedness you have been adopting in the province/municipality. Please explain briefly each of the measures.

1. _____
2. _____
3. _____
4. _____
5. _____

c) What other preparedness measures do you think are necessary in addition to the ones you mentioned in item b)? Please mention the first five most important ones.

1. _____
2. _____
3. _____
4. _____
5. _____

d) Do you think that there are constraints to the successful adaptation of the existing preparedness measures you mentioned above (item b)? Yes No

If Yes, what are these?

- e) Do you think that there will be constraints to the successful implementation of the additional mitigation measures that you have mentioned in item d)? Yes No

If Yes, what are these?

2.2 Structural and Non-structural Mitigation Measures to Reduce Risk

- a) Are there any existing structural and nonstructural disaster risk mitigation measures in the province/city ?

Yes No

- b) If Yes, what are these existing disaster risk mitigation measures?

1. _____
2. _____
3. _____
4. _____
5. _____

Example of disaster risk mitigation measures:

Structural: Flood control facilities

Sediment and landslide control facilities.

Strengthening of infrastructure facilities against floods and landslides

Non-structural: Real-time observation stations for rainfall and water level

Hazard mapping

Forecasting and warning system

Re-forestation

- c) Do you think that there are any constraints in the successful disaster mitigation you mentioned above (item a)? Yes No

If Yes, what are these?

d) In your idea, what are the necessary actions to improve the existing disaster mitigation in the province? Please mention the first five major ones.

1. _____
2. _____
3. _____
4. _____
5. _____

2.3 Early Warning and Evacuation

2.3.1 When did you evacuate people from disaster areas?

- | | |
|---|--|
| <input type="checkbox"/> Early evacuation (before disaster) | <input type="checkbox"/> Just before the disaster occurs |
| <input type="checkbox"/> During the occurrence of disaster | <input type="checkbox"/> No evacuation |

2.3.2 Which office or group determines the evacuation timing?

2.3.3 Are there any information system from the province/municipality to the people?

- Yes No

2.3.4 Which office or group disseminates the warning to the people? _____

Early Evacuation Before Disaster Happens

a) Is there any evacuation system? Yes No

b) Is the early evacuation being conducted effective? Yes No

c) If No, what are the reasons why early evacuation could not be conducted effectively? Please mention the 5 most major ones.

1. _____
2. _____
3. _____
4. _____
5. _____

d) What are the measures necessary in order to improve the conduct of early evacuation? Please mention the 5 most major ones.

1. _____

- 2. _____
- 3. _____
- 4. _____
- 5. _____

d) Generally, are there good communication lines between and among the PDCC, MDCC and BDCC during early evacuation? Yes No

e) If No, what are the main reasons for the poor communication lines between and among PDCC, MDCC and BDCC during early evacuation? Please mention the 5 most major reasons.

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____

2-4 Emergency Responses During Disaster Stage (i.e., rescuing victims etc.)

a) Were there any constraints to conduct the emergency responses during the occurrence of the disaster?

- Yes No

If Yes, what are these constraints? Please mention the 5 most major ones.

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____

b) What are the actions necessary to improve the emergency response measures during disasters? Please mention the 5 most major ones.

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____

c) Generally, are there good communication systems between and among the PDCC, MDCC and BDCC during the response stage? Yes No

e) If No, what are the main reasons for the poor communication systems between and among PDCC, MDCC and BDCC during the response stage? Please mention the 5 most major reasons.

1. _____
2. _____
3. _____
4. _____
5. _____

2. 5 Post-Event Stage (Rehabilitation such as reconstruction of facilities and responses)

a) Are there constraints to the effective implementation of rehabilitation of disaster mitigation facilities during the post-disaster stage? Yes No

If Yes, what are these constraints? Please mention the 5 most major ones.

1. _____
2. _____
3. _____
4. _____
5. _____

b) What are the measures necessary in order to improve the implementation of rehabilitation measures? Please mention the 5 most major ones.

1. _____
2. _____
3. _____
4. _____
5. _____

3. Data and Hazard Map Requirements for Disaster Management

In order to facilitate the improvement of disaster risk reduction management, data requirement and hazard map requirements are likewise given focus in this study. Please answer the following questions based on your knowledge about the present status of disaster risk reduction management in the province.

3.1 Data Requirements

3.1.1 Availability of Baseline Information

- Topographic maps: Scale: _____ , Year _____
Scale: _____ , Year _____
Scale: _____ , Year _____
- Aerial photographs: Scale: _____ , Year _____
- Geological maps: Scale: _____ , Year _____
- Land Use Map: Scale: _____ , Year _____
- Meteorological data: Number of existing stations under operation _____
- Hydrological data: Number of existing stations under operation _____
- Socio-Economic Data/Profile: Year _____ (most recent)
- Other data (Please specify): _____ Year: _____

3.1.2 Which types of data do you think need to be strengthened/enhanced in order to improve disaster risk management in the province?

1. _____
2. _____
3. _____
4. _____
5. _____

3.1.3 Do you see any problems or constraints to such data strengthening/enhancement?

- Yes No

If Yes, what are these problems or constraints. Please describe.

3.2 Hazard Map Requirements

1) Have any hazard maps been developed before? Yes No

If No, what are the reasons why the hazard maps have not been created?

-
- 2) Is there any evacuation place identified in the province? Yes No
 - 4) Is there any evacuation route identified in the province? Yes No
 - 5) Are there any maps indicating the evacuation places and routes? Yes No

If Yes, please attach the maps at the end of this questionnaire.

- 6a) Have the evacuation places functioned effectively during the last occurrence of the most severely damaging disaster? Yes No

If No, what do you think are the reasons why they have not functioned effectively?

- 6b) Have the evacuation routes functioned effectively during the last occurrence of the most severely damaging disaster? Yes No

If No, what do you think are the reasons why they have not functioned effectively?

- 7a) Do people know the location of evacuation places? Yes No

- 7b) Do people know the location of evacuation routes? Yes No

- 8) In what ways can people be informed about the location of evacuation places and routes?

- 9) Are the risks of natural disasters such as floods, mudflows and landslides or hazard maps considered in the land use plan and urban development plan? Yes No

If Yes, what type of disaster are considered in the urban land use plan?

4. Burden of Disaster Rehabilitation

We would like to know the burden of disaster rehabilitation on the provincial budget and expenditure during the last 5 years since the start of disaster risk management in the province.

Item	Year				
1) Total Provincial Budget (In Million Pesos)					
a) Budget for construction and investment					
b) Budget for operation and maintenance					
c) Budget for rehabilitation of the damage					
d) Budget for disaster management					
2) Total Provincial Expenditure (Actual) (In Million Pesos)					
a) Expenditure for construction and investment					
b) Expenditure for operations and maintenance					
c) Expenditure for rehabilitation of the damage					
d) Expenditure for others					

5. Opinions and Suggestions for Adaptation Initiatives for Disaster Risk Reduction Management in climate change

Please describe the problems of the province regarding Disaster Risk Reduction Management, if you know of any. Also, give your suggestions on how it can be improved, if you have any.

Thank you for your cooperation!

NA Results of Questionnaires

LGU and barangay survey results

Using the questionnaire prepared by JICA study team, an interview survey was conducted to supplement the investigation on the emergency responses taken during disaster caused by Tropical Storm Ondoy and the conditions in the stricken areas, including the activities arranged for pre-disaster mitigation and preparedness. Five teams conducted the interviews between November 16 to 18, 2009. The respondents were LGU and barangay officers involved in disaster management. The survey was conducted in the 17 cities and municipalities of Metro Manila, as well as the five (5) nearby municipalities of Rizal, and their most affected barangays, as listed in the following table.

Respondent Cities, Municipalities and Barangays

Surveyed LGUs	Surveyed Barangays	Surveyed LGUs	Surveyed Barangays
Caloocan	Brgy. 160	Muntinlupa	Tunasan
Malabon	Dampalit	Taytay, Rizal	San Juan
Navotas	Northbay Blvd. South	Pasig	
Valenzuela	Marulas	Cainta, Rizal	
Manila		Pateros	Santa Ana
Pasay		Taguig	
Makati	Magallanes	Quezon City	Batasan Hills
Mandaluyong	Brgy. 897	Marikina	Nangka
San Juan	Kabayanan	San Mateo, Rizal	Maly
Parañaque	San Dionisio	Rodriguez, Rizal	Burgos
Las Pinas	Zapote	Antipolo City, Rizal	San Jose

The salient results of the survey are the following:

- Preparedness phase should comprise of building awareness, mobilizing community actions, security political support, developing early warning systems, conduct of drills and exercises and issuance of standard operation procedures. The LGUs and barangays have not been ready yet for preparedness against flood disasters, and need developing preparedness for flood disaster risk management and non structural measures like community based flood disaster risk management including flood hazard mapping, hazard analysis, early flood warning and emergency response plans and they need assistance because they are lack of experience.

- Almost all the required mitigation and preparedness for flood disaster risk reduction or management might be considered by the respondents, the required mitigation and preparedness against the flood disaster might be also considered, as well as the required emergency responses for the disaster.
- On the timing of evacuation, there is a mix of responses on early evacuation, just before the disaster occurs and during the occurrence of disaster, while the entity deciding the timing of evacuation is usually by the DCCs members.
- Almost all the respondents are aware of the presence of information system, and the entity deciding the warning are the public information of city/barangay DCCs.
- Only Makati and Malabon have available topographic maps, Malabon and Navotas have aerial photography, Makaty and Malabon have geologic maps.

Based on the survey, the actions taken before, during and after the disasters are the following:

1) Issues and concerned raised by respondents

(a) **Constraints on structural and non-structural mitigation measures**

- Lack of funds (Caloocan, Pateros, Pasig, Quezon City)
- Most of the items mentioned are not in the regular budget (Paranaque)
- Inadequate training (Malabon)
- Illegal structures along Tullahan River (Quezon City)
- Improper disposal of garbage (Manila)
- Illegal settlers (Muntinlupa)

(b) **Constraints on early warning and evacuation**

- During Typhoon Ondoy, they were not able to exercise the siren/alarm system (Marikina)
- Unreliability of typhoon forecast (Malabon)
- Poor forecasting particularly on the amount of rainfall (Makati)
- Insufficient communication equipment (Malabon, Caloocan)
- Poor communication system on alerting/warning of communities (Makati)
- Lack of training (Malabon)
- Budget constraint (Malabon)
- Roads are narrow and flooded (Malabon, Makati)
- Stubbornness/resistance of affected people (Malabon, Pateros, Taguig, Antipolo, Manila, Las Pinas)
- Lack of vehicles for evacuation (Malabon, Makati)

- Unavailability of evacuation sites (Malabon)
- Unreliability of typhoon forecast (Malabon)

(c) Constraints on emergency responses during disaster stage

- Lack of communication equipment (Malabon)
- Lack of rescue vehicles (Malabon, Caloocan, Pateros)
- Fund constraints (Pateros)
- Lack of saving equipment such as rubber boats, life vests and ropes (Valenzuela, Makati, Pasig, Rodriguez, Caloocan, San Mateo, Parañaque)
- Lack of training (Malabon)
- Barangay officials need more training and rescuers (Quezon City)
- Unpassable/inaccessible roads (Valenzuela, Makati)
- Communities not prepared and unable to help themselves (Makati)
- Manpower not enough (Pasig)
- Area covered is too large (Pasig)
- People are hesitant to leave their houses/properties (Rodriguez, Marikina)
- No access to affected areas due to high water level (Quezon City)
- Insufficient resources for barangay (Quezon City)
- No equipment and trained personnel for the purpose (Manila)

(d) Constraints After the Disaster

- Availability of immediate fund/budget for rehabilitation and reconstruction (Malabon, Caloocan, Makati, Pateros, Pasig, Cainta, Antipolo, Rodriguez, Paranaque, Marikina)
- Insufficient and unavailability of materials for rehabilitation and reconstruction (Makati)
- No established warehouse for storage of materials (Makati)
- No established networking with NGOs and government agencies (Makati)
- Documentation on the severity of damage (Malabon)
- Improper coordination (Malabon)
- Availability of relief, food and medicines (Pateros)
- Livelihood projects after disasters (Pateros)
- Lack of technical expertise on mitigation improvement (Marikina)
- Fast turn-over of government officials (Marikina, Quezon City)
- People in high risk areas, especially near the river banks do not want to be resettled elsewhere (Parañaque)
- Evacuees stay long at evacuation centers (Muntinlupa)

2) Recommendations/suggestions raised by respondents

On the necessary improvements of disaster preparedness, the following suggestions were made by the respondents from the surveyed barangays, cities and municipalities.

(1) Need planning at national level:

- Establish Reliable weather/typhoon forecasts (Malabon, Valenzuela)
- Early/timely release of budget (Malabon, Valenzuela)
- Coordination with national agencies (Malabon)

(2) Need planning at LGU and community level:

- Preparation/improvement/implementation of disaster management plan (Malabon, Las Piñas, Marikina)
- Need hazard maps based on the past floods' flood prone area map (Makati, Marikina)
- Need establishment of early warning device (Las Pinas)
- Need better information dissemination system (Caloocan)
- Transportation to and from the areas affected to the evacuation centers (Parañaque)
- Management/security of evacuation centers (Parañaque, Malabon)
- Additional evacuation centers and livelihood of evacuees (Muntinlupa)
- Provision of passage to affected areas (Makati)
- Evacuation plan and drills especially in flood prone areas (Parañaque)
- Investment on equipment for weather monitoring, tracking and analysis (Makati)
- Establishment of a central office for communication and disaster operation (Makati)
- Identification and development of alternative access roads for remote areas (Makati)
- Hazard awareness and information programs (Makati)
- Availability of funds (Malabon, Pateros, Quezon City, Parañaque)
- Implementation of contingency planning for barangay (Makati)
- Traffic control during calamities (Parañaque)
- Strengthening linkages and partnership with NGOs (Makati)
- Identification of areas for the provision of warehouses in stockpiling of materials before the occurrence of disaster (Makati)
- Calamity fund allotment (Makati)
- Damage data should be immediately available to determine priority rehabilitation measures (Parañaque)

- Funds for rehabilitation including resettlement should be identified/available (Parañaque)

(3) Need drainage and flood mitigation facilities:

- Continuity of KAMANAVA Megadike Flood Control Project (Malabon)
- Improvement of drainage/creek in all affected flood prone areas (Parañaque)
- Additional pumping stations (Navotas)
- Repair of flood control facilities (Malabon)

(4) Need emergency equipment:

- trucks/vehicles and rescue equipment, such as banca/rubber boat, life vest, rope harness, life savers (Caloocan, Navotas, Valenzuela, Las Pinas, Muntinlupa, Rodriguez, Pateros, Pasig, San Mateo, San Juan)
- Tools and equipment for rescue during disasters (Taytay, San Mateo)
- Provision of community equipment needs (Makati)
- Available of construction materials for the reconstruction of damaged houses, including relocation sites (Antipolo)
- Need rescue equipment allotment vs need quality (Malabon)
- Small rafts for the barangay and also motor boats (Parañaque)
- Provision of enough vehicles and equipment (Malabon)
- Investment on additional evacuation and rescue equipment (Makati)

(5) Need relocation of inhabitants (Caloocan) in hazard areas:

- Need to relocate the families living in the landslide/flashflood prone area to the safe place in Montalban (Antipolo)
- Facilities and livelihood opportunities in the resettlement areas (Parañaque)
- Some residents should be advised to go back to their provinces, as per DSWD program on “Balik-Probinsiya”, and provided with livelihood programs (Muntinlupa)

(6) Need to provide trainings:

- Holding of disaster preparedness seminars for BDCC members (Muntinlupa)
- Improvement of barangay self training (Mandaluyong)
- Need information, education and communication (IEC) campaign (Las Pinas)
- Improvement of barangay self training (Mandaluyong)
- Need team training on disaster management (Las Pinas)
- Improvement of barangay self training (Mandaluyong)

- Training/seminar/orientation of BDCC members (Taytay, San Mateo, Malabon, Navotas)
- Capacity building for communities on disaster management (Makati)
- Convincing power of local officials (Malabon)
- Community education (Makati)
- There must be basic equipment on hand to be operated by properly trained rescuers (Manila)
- Rescue equipment on standby for use during emergency response (Parañaque)
- Activation of barangay DCCs (Parañaque)
- Training of volunteer rescuers in the community level (Parañaque)
- Private sector assistance (Malabon)

(7) Need disaster preparedness for the affected residents by providing adequate food and water supply for the evacuees (Muntinlupa)

- Stocking of some easy to cook meals, drinking water, mats, blankets and other various supplies that are handy in time of calamities (San Juan)
- Stockpiles ready for disposal to affected areas (Parañaque)
- Provision of food, medicines and drinks (Malabon)

