

RESULTS OF THE MGB LANDSLIDE AND FLOOD ASSESSMENT (1:10,000 SCALE) OF PARTS OF MONKAYO IN COMPOSTELA VALLEY PROVINCE

The Mines and Geosciences Bureau-Department of Environment and Natural Resources Regional Office No. 11 (MGB-DENR XI) conducted a landslide assessment and mapping (1:10,000 scale) of areas within the municipality of Monkayo, Compostela Valley Province on May 14, 2012 until June 8, 2012. The assessment is in line with the government's efforts aimed at reducing, if not, totally mitigating the destructive effects and impacts of natural hazards on the populace. Comprising the geohazard assessment team are Ms. Beverly Mae M. Brebante and Ms. Abigail June L. Agus, geologists from the MGB regional office.

The MGB-DENR particularly covered the following areas:

- 24 puroks in Brgy. Mt. Diwata, Puroks 1-23;
- 25 puroks in Brgy. Poblacion, Puroks 1-15;
- Puroks Santan and Lumbia in Brgy. Union;
- Puroks 3 and 6 in Brgy. Olaycon;
- Puroks Dao, Yakal, Ceboley, Lawaan, Mangga, Narra, Guijo, 4, Santol, Bosquit and Apatong in Brgy. Banlag;
- Puroks 2, 5 and 7 in Brgy. San Jose;
- Puroks 1, 5 and 6A in Brgy. Inambatan;
- Puroks 2, 3, 1B and 1A in Brgy. Macopa;
- Puroks 1-7 in Brgy. Mamonga;
- Puroks 1, 1A, 3, 4, 5, 6, 7 and 11 in Brgy. Tubo-tubo;
- Puroks 1,3 and 5 in Brgy. Naboc;
- Puroks 1-6 in Brgy. Babag;
- Puroks 1, 1A, 2, 3, 4, 6, 10, 12 and 13 in Brgy. Pasion;
- Puroks 1, 2, 3, 5, and 6 in Brgy. Rizal
- Puroks 1, 2, and 3 in Brgy. Haguimitan
- Purok Depot in Brgy. Upper Ulip; and

The assessed areas were rated as having low, moderate, high or very high (critical) susceptibility to landslide. The same areas were also evaluated and rated as low, moderate or high susceptibility to flooding.

The landslide susceptibility rating parameters are as follows:

Very high: Areas usually with steep to very steep slopes and underlain by weak materials. Recent landslides, escarpments and tension cracks are present. Human initiated effects could be an aggravating factor.

High: Areas usually with steep to very steep slopes and underlain by weak materials. Areas with numerous old/inactive landslides.

Moderate: Areas with moderately steep slopes. Soil creep and other indications for possible landslide occurrence are present.

Low: Gently sloping areas with no identified landslides.

When appropriate, the barangay official/s were presented with a *Landslide/Flood Threat Advisory*. This advisory informs them of their area's susceptibility to landslides and contains the corresponding recommendations.

Below summarizes the results of the landslide assessment of the covered areas:

Table 1. Results of Landslide Assessment at Barangay Mt. Diwata

	Location	Landslide Susceptibility Rating	Remarks/ Recommendations
1A	Resettlement	Moderate to Very High	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities; Observed for saturated ground/seeps and sunken or displaced road surfaces; Report situation to MGB office and the municipal/city authorities; Develop an early warning device (e.g. signages) (for critical areas near school site); Constant communication and updates with the barangay officials on geohazard situation;
1B	Resettlement	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities
2	Summit	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities;
3	Australia	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities;
4	Nang	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities; Observed for saturated ground/seeps and sunken or displaced road surfaces; Report situation to MGB office and the municipal/city authorities; Develop an early warning device (e.g. signages) (for critical areas only); Constant communication and updates with the barangay officials on geohazard situation; For relocation/evacuation of residents in close to the landslide area along the road going to Bluecor Plant.

5	Lower Balite	High	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities; Report situation to MGB office and the municipal/city authorities;
6	Pag-ibig	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities;
7	Kabarasan	High	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities;
8	Balite	High	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities; Monitor landslides located upslope of the purok area.
9	Bardown	High to Very High	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities; Report situation to MGB office and the municipal/city authorities; Develop an early warning device (e.g. signages) (for critical areas only); Constant communication and updates with the barangay officials on geohazard situation;
10	Patindol	High	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities;
11	Busay Dos	Very High	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities; Observed for saturated ground/seeps or displaced road surfaces; Report situation to MGB office and the municipal/city authorities; Develop an early warning device (e.g. signages) (for critical areas only); Constant communication and updates with the barangay officials on geohazard situation;

12	Busay Uno	High	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities; Observed for saturated ground/seeps; Report situation to MGB office and the municipal/city authorities;
13	Busay Uno	High	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities; Observed for saturated ground/; Report situation to MGB office and the municipal/city authorities;
14	Spar Buenas	High	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities; Observed for saturated ground/; Report situation to MGB office and the municipal/city authorities;
15	Buenas	High to Very High	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities; Observed for saturated ground/; Report situation to MGB office and the municipal/city authorities;
16	Upper Buenas	High	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities; Observed for saturated ground/; Report situation to MGB office and the municipal/city authorities;
17	Tinago	High	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities; Observed for saturated ground/; Report situation to MGB office and the municipal/city authorities;
18	Centro Tinago	High	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities; Observed for saturated ground/; Report situation to MGB office and the municipal/city authorities;
19	Paraiso	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities;

20	Pag-asa	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities;
21	Lower Depot	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities;
22	Lower Balesong	High	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities; Observed for saturated ground/; Report situation to MGB office and the municipal/city authorities;
23	Yugo	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities;

Table 3. Results of Landslide Assessment at Barangay Upper Ulip

	Location	Landslide Susceptibility Rating	Remarks/ Recommendations
21	Po. Depot	High	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities; Observed for saturated ground/; Report situation to MGB office and the municipal/city authorities;

Table 3. Results of Landslide Assessment at Barangay Banlag

	Location	Landslide Susceptibility Rating	Remarks/ Recommendations
	Po. Ceboley	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities;
	Po. Lawaan	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities

	Po. Mangga	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities;
	Po. Narra	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities;
	Po. Guijo	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities;
	Po. Santol	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities;
	Po. Bosquit	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities;

Table 4. Results of Landslide Assessment at Barangay San Jose

	Location	Landslide Susceptibility Rating	Remarks/ Recommendations
7		Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities;

Table 5. Results of Landslide Assessment at Barangay Pasian

	Location	Landslide Susceptibility Rating	Remarks/ Recommendations
1		Low	
1A		Low	
2		Low	
3	Pagkain ng Bayan	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities

4		Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities
6		Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities
10		Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities
12	Odiongan	Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities
13		Low	

Table 6. Results of Landslide Assessment at Barangay Rizal

	Location	Landslide Susceptibility Rating	Remarks/ Recommendations
1		Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities
2		Low	
3		Low	Identified relocation area.
5		Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities
6		Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities

Table 7. Results of Landslide Assessment at Barangay Haguimitan

	Location	Landslide Susceptibility Rating	Remarks/ Recommendations
1	Bagong Taas	Low	
2	San Roque	Low	
3		Moderate	Observe for and/or monitor for presence of mass movement (e.g. landslide, tension cracks); Report situation to MGB office and the municipal/city authorities

Below summarizes the results of the flood susceptibility assessment conducted using the following parameters:

High Areas likely to experience flood heights of greater than 1 meter and/or flood duration of more than 3 days. These areas are immediately flooded during heavy rains of several hours; include landforms of topographic lows such as active river channels, abandoned river channels and areas along river banks; also prone to flashfloods.

Moderate Areas likely to experience flood heights of 0.5 to 1 meter and/or flood duration of 1 to 3 days. These areas are subject to widespread inundation during prolonged and extensive heavy rainfall or extreme weather condition. Fluvial terraces, alluvial fans, and infilled valleys are areas moderately subjected to flooding.

Low Areas likely to experience flood heights of less than 0.5 meter and/or flood duration of less than 1 day. These areas include low hills and gentle slopes. They also have sparse to moderate drainage density

Table 8. Results of Flood Assessment at Barangay Poblacion

	Location	Flood Susceptibility Rating	Remarks/ Recommendations
1	Crossing	High	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Develop an early warning device/system (e.g. signages) and communication network with upland barangays; Constant communication and updates with the barangay officials on geohazard situation; Report situation to MGB office and the municipal/city authorities
2	Samuag	None	High susceptibility in areas near Samuag and Maoao Creeks.
2B	Gallera	High	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Develop an early warning device/system (e.g. signages) and communication network with upland barangays; Constant communication and updates with the barangay officials on geohazard situation; Report situation to MGB office and the municipal/city authorities

2C	Libuton	High	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Develop an early warning device/system (e.g. signages) and communication network with upland barangays; Constant communication and updates with the barangay officials on geohazard situation; Report situation to MGB office and the municipal/city authorities
2D	Resettlement	High	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Develop an early warning device/system (e.g. signages) and communication network with upland barangays; Constant communication and updates with the barangay officials on geohazard situation; Report situation to MGB office and the municipal/city authorities
3		Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
3A		Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
3B		Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
4		Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
4A		Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
5	Market	Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
5A		Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.

6		None	High susceptibility in areas near Agusan River.
7		Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
7A		Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
9	Golden Plains Subdivision	Moderate	Especially in areas near Puroks 7 and 7A. Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
11	Bliss	Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
12	Cervantes	Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
14		None	High susceptibility in area near Ulip and Agusan Rivers.
15	Amakan Village	None	High susceptibility in area near Libuton Creek.
2A 8 8A 10 13	Lopez Area	None	

Table 9. Results of Flood Assessment at Barangay Union

	Location	Flood Susceptibility Rating	Remarks/ Recommendations
	Po. Lumbia	Low	Monitor rapid increase/decrease in creek/river water levels; Constant communication and updates with the barangay officials on geohazard situation.

	Po. Santan	Low	Monitor rapid increase/decrease in creek/river water levels; Constant communication and updates with the barangay officials on geohazard situation.
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Table 10. Results of Flood Assessment at Barangay Olaycon

	Location	Flood Susceptibility Rating	Remarks/ Recommendations
3		High	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Develop an early warning device/system (e.g. signages) and communication network with upland barangays; Constant communication and updates with the barangay officials on geohazard situation; Report situation to MGB office and the municipal/city authorities
6		None	High susceptibility in area near Manat River. Monitor rapid increase/decrease in creek/river water levels; Constant communication and updates with the barangay officials on geohazard situation.

Table 11. Results of Flood Assessment at Barangay Banlag

	Location	Flood Susceptibility Rating	Remarks/ Recommendations
	Po. Dao	None	High susceptibility in area near Manat River. Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content).
	Po. Yakal	None	High susceptibility in area near Manat and Agusan Rivers. Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content).
	Po. Ceboley	None	High susceptibility in area near Agusan River. Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content).
	Po. Lawaan	None	High susceptibility in area near Agusan River. Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content).

Table 12. Results of Flood Assessment at Barangay San Jose

	Location	Flood Susceptibility Rating	Remarks/ Recommendations
2 5 7		None	High susceptibility in area near Agusan River. Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content).

Table 13. Results of Flood Assessment at Barangay Inambatan

	Location	Flood Susceptibility Rating	Remarks/ Recommendations
5		High	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Develop an early warning device/system (e.g. signages) and communication network with upland barangays; Constant communication and updates with the barangay officials on geohazard situation; Report situation to MGB office and the municipal/city authorities

Table 14. Results of Flood Assessment at Barangay Mamonga

	Location	Flood Susceptibility Rating	Remarks/ Recommendations
2		Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
1 3-7		None	High susceptibility in area near Agusan and Mamonga Rivers. Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content).

Table 15. Results of Flood Assessment at Barangay Tubo-Tubo

	Location	Flood Susceptibility Rating	Remarks/ Recommendations
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1		Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
1A		Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
3		Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
4		Low	High susceptibility in area near Mamonga River. Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content).
5		High	Monitor rapid increase/decrease in creek/river water levels as well as irrigation canals close to the area; Develop an early warning device/system (e.g. signages) and communication network with upland barangays; Constant communication and updates with the barangay officials on geohazard situation;
6		High	Monitor rapid increase/decrease in creek/river water levels as well as irrigation canals close to the area; Develop an early warning device/system (e.g. signages) and communication network with upland barangays; Constant communication and updates with the barangay officials on geohazard situation;
7		High	Monitor rapid increase/decrease in creek/river water levels as well as irrigation canals close to the area; Develop an early warning device/system (e.g. signages) and communication network with upland barangays; Constant communication and updates with the barangay officials on geohazard situation;
11		Low	

Table 16. Results of Flood Assessment at Barangay Naboc

	Location	Flood Susceptibility Rating	Remarks/ Recommendations
5		High	Monitor rapid increase/decrease in creek/river water levels as well as irrigation canals close to the area; Develop an early warning device/system (e.g. signages) and communication network with upland barangays;

			Constant communication and updates with the barangay officials on geohazard situation;
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Table 17. Results of Flood Assessment at Barangay Babag

	Location	Flood Susceptibility Rating	Remarks/ Recommendations
4		High	Monitor rapid increase/decrease in creek/river water levels as well as irrigation canals close to the area; Develop an early warning device/system (e.g. signages) and communication network with upland barangays; Constant communication and updates with the barangay officials on geohazard situation;
5		High	Monitor rapid increase/decrease in creek/river water levels as well as irrigation canals close to the area; Develop an early warning device/system (e.g. signages) and communication network with upland barangays; Constant communication and updates with the barangay officials on geohazard situation;
6		None	High susceptibility in area near Agusan River. Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content).

Table 18. Results of Flood Assessment at Barangay Pasian

	Location	Flood Susceptibility Rating	Remarks/ Recommendations
1A		High	Monitor rapid increase/decrease in creek/river water levels as well as irrigation canals close to the area; Develop an early warning device/system (e.g. signages) and communication network with upland barangays; Constant communication and updates with the barangay officials on geohazard situation; For relocation of residents located very close to the main river channel.
10		Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.

12		Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
13		Moderate	Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.
1 2 3 4		None	High susceptibility in area near Agusan River. Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content).

Table 19. Results of Flood Assessment at Barangay Haguimitan


	Location	Flood Susceptibility Rating	Remarks/ Recommendations
3	Bagong Taas	Moderate	High susceptibility in area near Agusan River. Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content); Constant communication and updates with the barangay officials on geohazard situation.

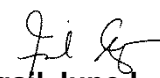
Table 20. Results of Flood Assessment at Barangay Macopa

	Location	Flood Susceptibility Rating	Remarks/ Recommendations
1A 2		None	High susceptibility in area near Agusan River. Monitor rapid increase/decrease in creek/river water levels, possibly accompanied by increase turbidity (soil content).

It should be noted that these susceptibility ratings were arrived at as of this field assessment. However, the rating could advance (e.g., from low to moderate, and moderate to high). Hence, the MGB constantly recommends strict and continuous monitoring by the barangays.

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PHOTOS

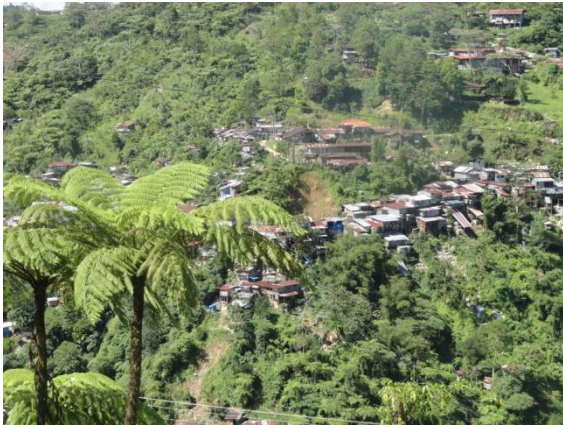


Photo 1. Landslide scar of the December 2011 landslide in Po. Nang, Brgy. Mt. Diwata



Photo 2. Landslide debris in Po. Bardown, Brgy. Mt. Diwata



Photo 3. Tilted houses erected at the edge of steep slopes prevalent in Brgy. Mt. Diwata



Photo 4. Active landslides near houses in road going to Po. Depot, Brgy. Upper Ulip



Photo 5. P6, Brgy. Naboc which experience regular flooding due to canal overflows.



Photo 6. Active riverbank erosion of Mamonga River



Photo 7. River bank protection against active river scouring located at Brgy. Inambatan



Photo 8. Po. 12, Brgy. Pasian which regularly experience floods from runoff waters of surround intermittent creeks



Photo 9. Houses very close to main river channel in po.1A, Brgy. Pasian



Photo 10. Destroyed culverts in Po. 3, Brgy. Haguimitan due to high stream discharge



Photo 11. Canal within Brgy. Poblacion that regularly overflows causing flooding in the area



Photo 12. Houses near Libuton Creek, Brgy. Poblacion