

## **CHAPTER 2. HAZARD PROFILES**

### **1. Hazards Overview**

The province of Cotabato is confronted with several environmental concerns that needs to addressed accordingly. These environmental problem /issues are flooding, soil erosion, water and air pollution, forest denudation. Man made and other natural calamities also affect the province. In the past recurrence of flashfloods in most of the low lying areas were commonly observed.

Flooding causes heavy damages on crops, such as rice and corn, vital transport infrastructure facilities and housing and shelter made of light materials were commonly reported to have been affected specially along mountainous communities. Among others, in the upland areas were the erosion of mountain soils and other soils nutrients so important to sustain agricultural production.

The erosion problem in the province has reached frightening levels, over the past 10 to 15 years, 23 percent of the land area, or 149,072.40 hectares, affecting some 340 barangays has been severely eroded and only 11.4% or 75,260.34 hectares remains stable from erosion. Eighteen percent or 73,796.77 hectares (319 brgys.) are moderately eroded while an area of 273,705 hectares or 42%. has been estimated to have been affected with slight erosion more or less covering 261 barangays province wide.

This environmental problem is very alarming for it destroys soil fertility and affects so much the yield of important crops planted in the province such as plantations of high value crops of rubber, coconut, banana and other fruit trees, including the most important food crops such as rice and corn which are the major crops of our farmers. This trends calls for the appropriate and immediate attention on the part of concerned authorities / agencies.

Similarly, denudation of remaining forest cover in the province mostly found in the municipalities of Arakan ,Libungan, president Roxas, Makilala, Magpet and the municipality of Alamada has become a major environmental concern in the P-PALMA and Arakan Valley Complex.

The unabated “kaingin”(Charcoal production) practices and the illegal and unregulated logging threaten the environment of the place affecting approximately 60 % of the total land area of the province which has a great impact and poses a greater threat to the efficient production activities in the low lying areas of Cotabato.

## **2. Hydrometeorologic Hazards**

Hydrometeorologic hazards are natural processes or phenomena of atmospheric, hydrologic or oceanographic nature, which may cause loss of life, injury, property damage, social and economic disruption or environmental degradation.

Hydrometeorologic hazards include: floods, debris and mud floods; tropical cyclones, storm surges, thunder/hailstorms, rain and wind storms, blizzards and other severe storms; drought, desertification, wildland fires, temperature extremes, sand or dust storms; permafrost and snow or ice avalanches.

The types of hydrometeorologic hazard which the Province of Cotabato is exposed to are floods, flashfloods and rain-induced landslides (RIL).

Floods are characterized by a rise in the water level when a body of water, such as river or lake exceeds its total capacity. Flashfloods are distinguished from regular floods by a timescale less than six hours. It is a rapid flooding of geomorphic low-lying areas that washes rivers and streams caused by heavy rain associated with thunderstorm, hurricane, or tropical storm. Flash flooding occurs when the ground becomes saturated with water that has fallen too quickly to be absorbed. The runoff collects in lowlying areas and rapidly flows downhill.

Rain-induced landslides (RIL) are downward and outward movement of materials including rock and soil due to various causes such as excessive rain, rapid undercutting by rivers, waves or man's activities.

Of the hazards under this origin, three were covered by the Guidelines, i.e., storm surge, floods and flashfloods, and rain-induced landslides. Typhoons, cyclones, tornados are considered as hazard triggers, much like earthquakes that trigger ground shaking. The impact of typhoons, for example, is manifested by damage or loss caused by the flooding after extreme rainfall, or by rain-induced landslides.

**Table No. 2. Historical Hazard Occurrences and Description**

HAZARD AND DESCRIPTION	AFFECTED AREA/POPULATION		IMPACT		
	Barangay	Population	No. of Casualties	No. Of Houses Damaged	Damage to other Properties
<b>FLOOD/FLASHFLOODS</b>					
1. June 9, 2010 -Continuous rainfall & backflow of water from Rio Grande which resulted to flooding of low lying communities and Increasing number of IDP	Bulacaon, kadingilan, Bulucaon, Libungan Torreta, Datu mantil, Lower Bager, Buricain, Malagakit, Tubon, Simsiman, Banucagon, Matilac, Upper pangangkalan, lower pangangkalan, Cabpangi, Balacayon	2,390 families (11789 persons) displaced	1 drowned		
2. A strong rain started on June 9, 2011 @ 3:45 pm and lasted for about 2 hours and 20 mins. The water from upland areas flows to the low land and causes flood in 10 barangays of the municipality of Tulunan. Some of the residence has evacuated but some decided to stay on the higher ground near their houses.	Bacong river banks, Galidan, La Esperanza, Sibsib, Poblacion, New Panay, Dungos, Popoyon, Bual, Damawato, Tambac, Minapan, Nabundasan, Bagumbayan, Banayal, Bituan, Bual, Daig, F. Cajelo, Kanibong, New Culasi	4531 families (13593 persons) displaced			Rice & corn crops
3. June 14, 2011- It started with a heavy rain due to typhoon Cheding and typhoon Dodong affecting 14 brgys of Midsayap. Flood rose from knee to waist deep damaging houses and submerging crops	Mudseng, Rangaban, Kadigasan, Baliki, Nabalawag, Palongoguen, Kadigasan, Kudarangan, Macasendeg, Olandang, Lomopog, Damatulan, Sambulawan, Tumbras	5,998 families (29,990 persons) displaced		88	Rice & corn crops
4. June 9, 2011 - a flash flood occurred at 13 brgys in the Municipality of Mlang after days of heavy rainfall affecting houses, farms, household of residents	New barbasa, Bagontapay, Buayan, Langkong, Dugong, Sangat, Dungoan, Inas, Bialong, Lika, New Antique, Tibao, Lepaga, Tawantawan, Malayan, Katipunan, New Antique, New Consolacion	1,092 families (4,250 persons) displaced			

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<p>5. June 6, 2011 - Heavy rains from 3:00 pm until 9:00pm caused the rise of water level in Binay, Magpet. Idaoman river is the receiving point of the water both from Binay rivers &amp; Logdek creek. There were 47 households along the riverside that were affected. Although there was no casualty, most of their belongings, and farm animals including the pipes of their water system were carried away by the strong current of flood waters. Eight houses that were severely damaged.</p>	<p>Idaoman, Cabangbangan, Greenhills, Poblacion, Mabuhay, Poblacion 5,8,9,9a,11,18, Tuel</p>	<p>726 families (1,305 persons) displaced</p>		<p>140</p>	<p>Rice, corn</p>
<p>6. June 2011. CARMEN. Accumulation of water from Bukidnon and Kabacan River connecting the main Rio Grande Rivers that causes flashflood</p>	<p>Gen. Luna, Nasapian, Kibayao, Palangalan, Tacupan, Tupig, Ugalingan</p>	<p>1914 families (10,379 persons) displaced</p>			
<p>7. August 4, 2008. M'LANG. A Flashflood occurred in the municipality of Mlang around 8 pm after heavy rains. 18 barangays were affected including Poblacion A &amp; B cause by Mlang River overflow. Several homes were damaged, families displaced &amp; livestock projects affected and infrastructure.</p>	<p>Poblacion A &amp; B, Inas, Pulang Lupa, Pag-asa</p>	<p>390 families &amp; 1950 persons</p>	<p>1 dead &amp; 3 injured</p>		
<p>8. Aug. 1, 2009. ALAMADA. Accumulation of water due to prolonged heavy rain and overflowing from the rivers connecting to Cotabato City and land erosion of Bgy.Mirasol in Alamada North Cotabato</p>	<p>Bgys of Buluan, Cabpangi, Bulucaon, Capayuran, Kimarayag, Midpapan 1, New Panay, North Manuangan, Pob. 1, Pob. 2, Pob 3, Presbitero, Upper Baguer, Tubon &amp; Prado-Pigcawayan, Bgy. Sinimulang – S, Baguer &amp; Gumaga –Libungan, Central and Upper Labas -Midsayap, North Cotabato</p>	<p>1450 families &amp; 7837 persons</p>	<p>5 dead, 3 injured and 1 missing</p>		

9. Heavy and continuous rain for successive days resulted in the overflowing in the Pagalungan and Paidu Pulangi rivers. The flood have severely caused damages to people properties, crops, livelihood and hampered the delivery of basic services to almost all 42 barangays of Pikit	Bagoinged, Balabak, Balong, Barungis, Balungis, Batulawan(Sitio Punol), Bualan, Buliok, Bulod, Bulol, Dalingaoen, Damasalak, Fort Pikit, Gli-gli, Gokotan, Inug-ug, Kabasalan, katilakan, kilambog, Lagunde, Langayen, Macabual, Macasendeg, Manaulanan, Nabundas, Nunguan, Paidu Pulangi, Pamalian, Panicupan, Punol, Rajamuda, Silik, Takepan, Talitay, Tinutulan	10,793 famlies (49,886 persons) displaced	1 dead		corn & palay crops
10. Flash flood usually occurs during the month of May, June, July-August and September. The low-lying barangays of Pikit are the most seriously affected owing to its proximity to Ligawasan Marsh	34 barangays affected by flash flood. The remaining 8 barangays were considered sloping/upland barangays				1. corn-1,064 has. 2. Palay-997 has 3. Vegetable s- 20 has
<b>RAIN INDUCED LANDSLIDE</b>					
Makilala. 3 km Crack Landlines cause about by heavy rain	Leboce, Biangan, New Bulatukan, Villaflores, Cabilao, Bulakanon, San Vicente, Malunoon, Guangan, Rodero				collapsed road
<b>GROUND RAPTURE</b>					
Alamada in 2000	Brgy. Guiling, sitio Maracabac	5 families	2 houses		
Makilala in 2008	Brgy. Kisante		2 houses		200 m roads
<b>EARTHQUAKE INDUCED LANDSLIDE</b>					
Makilala. Land cracks	Malasila	3 families	3 houses		

**Flooding/Flashflood in Municipality of Pigcawayan, July 2009**



**Source: Provincial Social Welfare & Development Office**