GEOTECHNICAL BRANCH

Geological Survey Division of the Department of Mining (DoM) has her mandate from the Australian Government Cabinet decision in 1946 to provide Geological Services in PNG. This mandate was assumed by the Mining Department in 1994 and is now degraded with the introduction of the Mineral Resource Authority and the separation of the Geological mapping and the Geotechnical Branches. The Public Services components of the Geological Survey have been left to merge with the new Department of Mining Policy and Geohazard Management (MPGM).

MISSION

The mission for the Department of Mining was to ensure that Papua New Guinea's Geological Resources are properly documented, effectively promoted, sustainably developed and managed for the long term benefit of the people of PNG.

One of the principal roles of DoM was to systematically document PNG's geology and to assist the State in implementing and disseminating geo-scientific information on geo-hazards to the people of PNG.

The Geotechnical Branch inspects, collects, synthesizes and provides geo-scientific information to the public including information on landslides in PNG. But since the creation of the Mineral Resource Authority (MRA), we have lost half of our scientific staff as a result leaving a residual number of staff members who are very happy to assist in educating our

WET SEASON AND GEOLOGICAL HAZARDS

We are now moving into the 2007 wet season and high incident of geological hazards. Disasters will not wait for us in 2007 and we should use this opportunity and time for active awareness to inform out population of the likely geo-hazards this season. The high death tolls of many hazards in PNG are directly related to the human ignorance. Given the benefits of home-grown data available for decision making and information sharing it should be the role of both the general public and us to inform other fellow Papua New Guineans. An aggressive approach in public awareness appears very important and time must be spent educating communities on natural disasters and their participation in monitoring of hazards. The education of communities of the risks involved may in the long run save evacuation costs and thereby minimize casualties.

LANDSLIDES INSPECTED IN PNG

Landslides occur because of the imbalance in internal rock or soil properties and/or reduction of external forces that control the stability. Landslides vary in types and sizes and in PNG the government only investigates and reports the landslides that have caused problems to the infrastructures, mine sites and loss of life. Landslides can be caused by a number of or combination of factors and the most notable landslides that the Geotechnical branch has investigated are:

Bairaman Landslide 1985

A large landslide triggered by an earthquake dammed the Bairaman River in the Pomio District of East New Britain. This landslide was artificially breached when the people on the coast were evacuated with no loss of life.

Kaiapit Landslide 1988

A large landslide collapsed in 1988 onto the Markham valley and the event of failure was recorded on the Yonki Seismic Station. This landslide killed about 75 people and flooded the Highlands Highway.

Boana Landslide 1996

The 1993 Finisterre Earthquake triggered the Boana Landslide and debris blocked and dammed the river for 3 years. In 1996 the saddle was breached artificially and the debris destroyed two bridges and reshaped the offshore bathymetry of the Huon Gulf. The saddle gave way early in the night and reached the Bumbu Settlement in the early hours and no human life was lost. The Busu Bridge was rafted to about 1.0km downstream.

LANDSLIDES IN PNG

Landslides in Papua New Guinea are generally associated with the large shallow earthquakes. Landslides denude the soil and vegetation from steep slopes, destroy food gardens, bury people, dam rivers and destroy infrastructure. In PNG landsides occur during the wet season as the rainwater infiltrate the soil and weaken the restraining properties of the soil or and rock. Landslides triggered by Earthquake often block rivers and their saddles have to be artificially breached in order to save lives. Sometimes, there is infrastructure damage.

Awareness is often carried out on landslides during inspection. The government only carries out inspection and provides a report on the problematic aspects of landslides to development and if these have killed people.

TSUNAMIS

Tsunamis have occurred and destroyed property and lives in PNG, more recently a tsunami from a submarine landslide killed more than 2500 people on the north coast of PNG.

Large shallow earthquakes that occur close to the coast often trigger tsunamis. An earthquake may cause a landslide that triggers shockwaves to generate waves. The high level of earthquake shaking near the coast should be regarded as a warning of likely tsunami and this should depend on the geometry of the seabed. For instance, bathymetry carried out in Huon Gulf showed that the canyon just offshore from the Lae Harbour and wharf (Morobe Province) is curved and contributes to the deflection of any Tsunami wave.

People who live near the coast must move to higher ground following severe earthquake. There will definitely be sea-water retreat following the earthquake if there is to be a tsunami.

FLOODING

Flooding occurs yearly during the wet season, when rain-water in the headwaters cannot be discharged efficiently. Flooding only becomes a problem if people do not take steps to mitigate flood hazards. For example, people living along the Sepik River have their houses on high posts and that is a pre condition to mitigating damage from approaching flood waters. If there is very heavy rainfall then there will be flooding. It is essential to note that a warning sign for this is heavy rainfall in the headwaters during the wet season.

Flooding is also caused by increased cultivation of forest land. In the wet season rain falls on bare soil and the runoff from slopes accumulates, forming fast flowing streams. De-vegetation caused by removing top soil can cause flooding. De-vegetation may also remove toe support on slopes causing additional slope failure.

For instance, the Ramu River in Madang was inspected following a request form the Provincial Administration. The team visiting the area noted that Ramu River over flooded her banks upstream of the confluence with the Meara River with villagers attributing the aggradation to agricultural activities in the headwaters. Additionally, in 1970 a large earthquake within the Adelbert Range and later the 1993 Finisterre earthquakes shed enormous debris after deposited by landsliding. Debris is being gradually flushed down the river system but yet to reach the sea.

DISASTERS ARE HERE TO STAY

Be assured that disasters are here to stay. Therefore, it is imperative that local populations in partnership with us must work together to identify, manage and reduce the effects of such hazards. We must also eliminate actions that do not bring revenue to our people. We must also act now to reduce hazards because the economic costs are astronomical. As

the saying goes, “Prevention is better than cure”; and so, we should redirect our limited resource to educating ourselves on the hazards and what we should do to prepare or respond when the time comes. When we do so, we increase our chances of preserving lives, property, economic activities and the environment. To give you a mental picture, below is an estimated economic value of the loss sustained (including loss of life) as a result of natural disasters.

1996 Manam volcanic eruption; 13 people lost their lives	K0.39 million
2002 Wantoat Landslide	K1.1 million
1993 Landslides; killed 107 people	K3.2 million
1998 Aitape Tsunami; killed 2500 people	K75.0 million
1951 Mount Lamington volcanic eruption; killed 3000 people	K90.0 million
1994 Umi Bridge collapse	K150.0 million

If you analyze the above figures, you will note that the highest losses are attributed to human error. The collapse of the Umi Bridge in 1994 was due to human error and it cost the nation losses of more than $US 50 million over a period of 5 weeks; that amounts to losses of about K4.2 million per day. This cost is based on loss of coffee exports alone. But the compound effects of other economical variables cannot be quantified. Therefore, it pays to eliminate human error in order to preserve life, property, economic activities and the environment.