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## Urban Development

# Geological Information A Vital Tool

—Suchin Vacharapongpreecha

**B**ANGKOK—What do Karachi, Bombay, Manila, Rangoon, Bangkok, Dhaka, Jakarta, Melbourne, Hong Kong, Hanoi, Singapore, Shanghai, Tianjin, Tokyo and Seoul have in common?

All of them constitute some of the world's largest human settlements and all are found in the coastal areas of Asia and the Pacific. Because of their location, these cities are under constant threat from the so-called "geologic hazards"; earthquakes, landslides, mudflows, volcanic eruptions, subsidence and tsunami (large destructive wave).

And when these natural disasters strike, the loss of human lives and damages to property are usually high. Lessons from the past attest to this grim fact of life in these cities.

For example, since the year 1038 more than 2.5 million lives have been lost due to earthquakes. China appears to have borne the brunt of disastrous earthquakes like that one in 1556 when an estimated 830,000 died in Shen-shu.

In the recent past, about 150,000 were reported killed during an earthquake that devastated Tangshan, China in 1976. Other cities in the region also suffer from geologic

In the coastal areas, geology, more than any other single factor, affects urban development.

hazards as in Bangkok and Manila which experience every year heavy flooding and subsidence. (Subsidence is defined as a gentle movement, usually in response to groundwater pumping, in which the land surface is lowered by a few centimetres each year).

As cities grow, the tendency is to outpace any plans that were originally made for them to supply water, provide drainage and treat sewage. This indicates lack of appreciation among planners of the physical and hydrologic limitations, climatic circumstances and oceanic disturbances, according to the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP).

ESCAP puts it this way: Cities generally grow in piecemeal fashion, with one parcel or site being developed after another. Planning takes place but rarely does it go forward, fully cognizant of the geologic and hydrologic limitations to growth.

It is only later when the city has sprawled over several hundred square kilometres and suffered flooding, subsidence, groundwater

depletion or sea water intrusion that the geologist is asked to help solve the problems. "In many cases, it is then too late for any solution", says ESCAP. "Only costly and partially effective measures can be taken."

In this light, ESCAP is urging governments to seriously consider the "wise use of geologic information" in city planning. And by doing so, they can help improve the quality of life of urban dwellers. Experience has shown that planners can predict which areas in the city are likely to develop rapidly. A common planning principle is that "corridors" (highways and railways) undergo rapid development first.

This is an area where the services of geologists are deemed essential. For example, they can advise engineers on the depth to bedrock and potential foundation problems. They can also direct development into areas with adequate water supply and good drainage.

According to ESCAP, examples abound in the region of mainly geological problems encountered due to the haphazard planning of cities. In most of these cases, it says, available geological data have not

been considered by planners.

That of Bangkok is a case in point. Bangkok is sinking up to 14 centimetres per year in its eastern and southern fringes. This is due mainly to heavy pumping of groundwater for industrial use.

"A city like Bangkok, situated over 1,800 metres of soft sediments, mostly sand and clay, has a geologic framework which favours subsidence" explains ESCAP. "The topography and altitude of the city and its location near the edge of the Gulf of Thailand all make this subsidence problem more acute."

This and many other examples (like flooding in Manila) point to the need for city planners to take geological data seriously. As ESCAP explains, the geology of coastal human settlements is an essential element of planning and managing urban development.

Although geology is only one part of the complex coastal ecosystem, it affects urban development more than any other single factor. To ignore it is to invite disaster or make the life of city dwellers more miserable than it already is.—**DEPTHNEWS BANGLADESH**