Headline: Why not underground reservoirs?
Source: *The Straits Times*, pA4
Date: 23 March 2012

Why not underground reservoirs?

By Grace Chua

A PROFESSOR of engineering has floated the idea of building reservoirs deep underground, in rock caverns.

Etched out of granite 100m below ground, these caverns can perform triple duty, said Professor Lui Pao Chuen.

Firstly, they can capture the stormwater run-off from urban areas and alleviate flooding. Secondly, as stores of fresh water, they can guard against future droughts. And thirdly, having these freshwater stores means less water will need to be produced through desalination.

Prof Lui was giving a talk at the National University of Singapore (NUS) yesterday, in conjunction with World Water Day. The talk was hosted by NUS' Global Asia Institute, which focuses its research on issues key to Asia's future.

Prof Lui, who retired in 2008 from the Ministry of Defence where he was chief defence scientist for 22 years, is not new to the idea of subterranean facilities: He spearheaded the research on Singapore's underground ammunition facility and is now adviser to the National Research Foundation.

Speaking to mostly academics, he noted that rainfall and rainfall intensity here have increased, but all it would take for Singapore to be hit with a water shortage is two consecutive years of low rainfall.

Rock cavern reservoirs underground can thus catch excess rainfall for use in a dry season; 20 such caverns could hold 10 million cubic m, or 1.67 per cent of the country's annual demand of 597 million cubic m or more.

He suggested that these caverns could be in the north or south of the island – "it depends where the rocks are" – and that disused quarries would be potential entrances into the earth.

The notion of underground reservoirs has been raised several times over the years. In 1997, national water agency PUB dismissed it as an expensive proposition, saying they would cost as much as 20 times more than surface reservoirs of similar size.

Prof Lui estimates that rock caverns would cost about $100 per cubic m to build. He has two ideas of offsetting the cost.

One is to sell the rocks that are dug out; the other is to sell the hydroelectricity generated from pumping water from ground level into the caverns.

He added that land-scarce Singapore must also consider the value of the land that a surface reservoir would take up.

The four-year-old underground ammunition storage facility in Mandai, for example, freed up land about half the size of Pasir Ris town.

Drainage specialist and chair of the Government-appointed panel on flood prevention, Professor Chan Eng Soon, who was at the lecture, called Prof Lui's idea "really refreshing, especially when we're not just looking at flood issues, but also at various other grand challenges related to energy and space utilisation".

Prof Lui, asked how seriously he felt the authorities are taking his idea, said: "I think they're serious. And the reason is that we're running out of land... When the economy is right, it'll be done."