



## Flooding: That time again

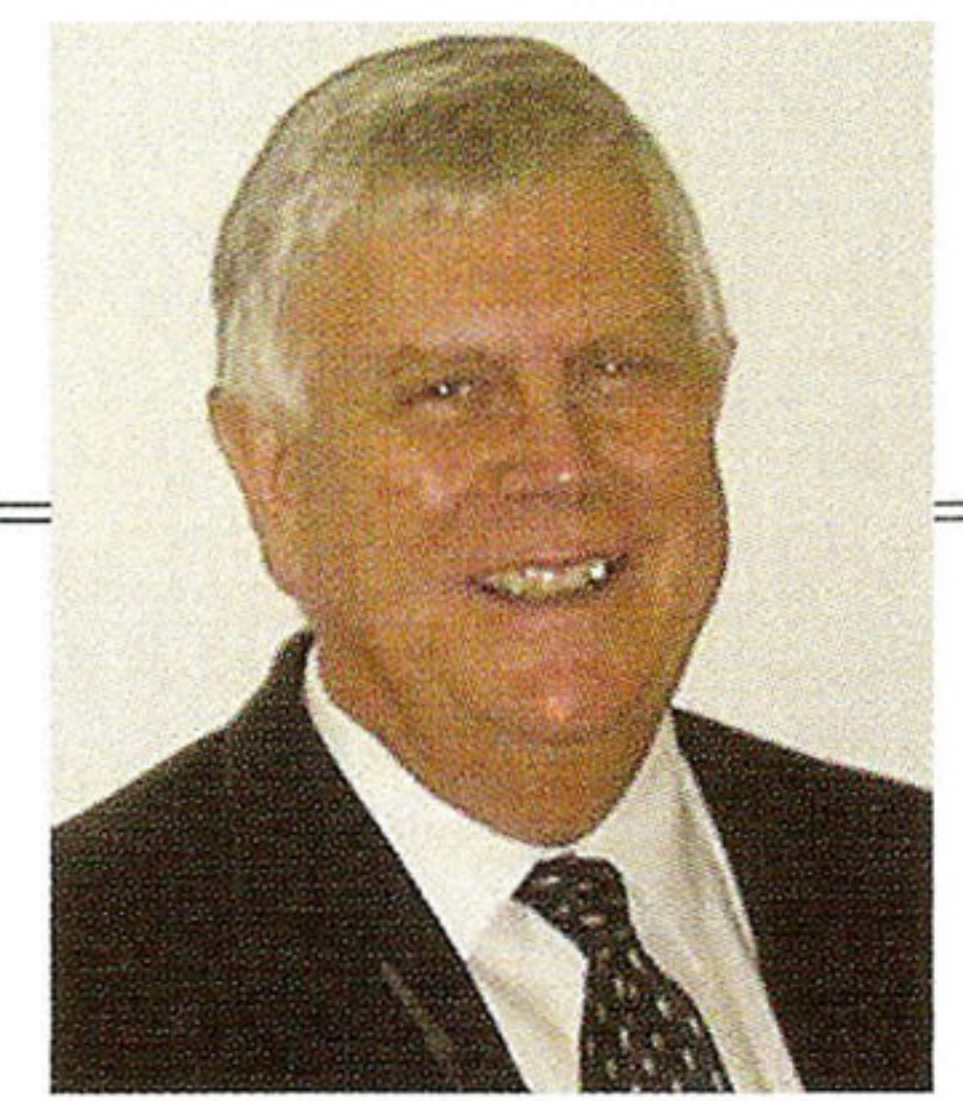
**H**UMAN BEINGS HAVE LIVED ON LOW GROUND, WHETHER on coastal or river plains, for thousands of years. Such ground, which is usually valuable for supplying populations with food and wealth, is often prone to flooding, and this is more or less a weekly occurrence somewhere in Indonesia, whether in Jakarta or in an up-country river basin.

It is unrealistic, however, to think that development should be excluded from these areas: the cost of moving would be unthinkable and losses would well outweigh resulting benefits from

moving to hilly ground to avoid overflows from storm floods.

The same argument holds whether the location is in a fully developed economy or one that is still developing. The United Kingdom has already analyzed this issue following recent great floods in the major river basins of central England.

Now that we are once more in the rainy season, every week there is a flooding story somewhere across the country. Low-lying areas of Jakarta and the airport and railway station in Semarang and parts of Bandung have all featured recently. In rural



areas landslides have been triggered with loss of life.

A 2007 report on Bali showed that there was significant annual loss of land from wet season landslides in the Island of the Gods, with impact on life and agriculture. This, of course, also applies elsewhere across the country.

Some landslides just relate to the changing structure of the earth's surface due to weathering and climate, a process that has gone on since time immemorial. The rest is due to man's handiwork, or increasingly and more correctly carelessness!

At this juncture, in Jakarta this wet season we have not yet witnessed any impact from upstream storm flows, to cope with which various dredging and river bank clean-up works are in hand or supposed to be, e.g. East Jakarta Flood Relief Canal. Riverside community involvement is essential for long-term sustainability.

The worst conditions arise when we have heavy rainfall in the city supplemented by upstream storm flows and high spring tides, while today's conditions are exacerbated by the significant subsidence of the city over the past 30 years, as it expanded in size, rapidly urbanizing new areas and greatly increasing uncontrolled abstraction of groundwater to satisfy population and commercial demand. Subsidence is, of course, irreversible.

### Depressing prospects

AS THE FULSOME WORLD BANK REPORT ON JAKARTA FLOODS, presented earlier this year, demonstrates, flooding problems within the city are only going to get worse unless groundwater abstraction is controlled (it is unlikely to be phased out) in order to slow down the rate of subsidence, and all the planned measures for fast drainage are in place.

It cannot be phased out until water supply from surface sources replace the substantial amounts withdrawn daily from underground; and that itself remains a difficult challenge.

In addition, drainage to the sea is always going to be hampered when very high tides take place, as in February 2007, and flood waters are backed up, causing huge damage to infrastructure and property.

The flooding levels caused by November's intense rainfall showed that the immediately connected drainage was inadequate to cope with the rate of discharge required, always a problem when the land use change by building human settlements means that the ground surface is no longer penetrable.

As mentioned above, the recent flooding was not caused by upstream storm flows. Further, had the debris and sediment that accumulates in the drains been cleaned out prior to the onset of the rainy season? Are they regularly cleaned?

The World Bank report is predicting that subsidence over the

next 16 years will likely increase by a further 0.8-1.2m, which will make some 40% of the land area of the city susceptible to flooding, much of it serious.

The computer-generated model of Jakarta under maximum flood is quite frightening. For those living to the north of the city, even with all the planned measures in place, there will be times when flooding will make life in the city distinctly unpleasant and sometimes downright dangerous, never mind the damage to facilities and property.

In the last very bad flood, the key water treatment works for Jakarta at Buaran were temporarily put out of action by flood waters. This area is also sinking, thus increasing the likelihood for further damage in the future, unless the works can be effectively excluded from any future major floods.

## flooding problems within the city are only going to get worse unless groundwater abstraction is controlled

One other problem with subsidence concerns the potential damage to covered services, old water pipes and their key connections being particularly vulnerable.

In the not very distant future, government will have to bite the bullet and construct some serious sea defenses to protect the city, or certainly its key areas, from very high tides. These are expected to increase by a further 100 mm by 2025. Semarang needs similar consideration.

Construction of sea defenses will have to be done with care: the foreshore ground is soft in many places, will settle, and is susceptible to sliding, although techniques to control this are well understood.

The question of living safely below sea level is not new. The Dutch have been surviving very successfully this way for years. Amsterdam, one of the most attractive cities of Europe, is several meters below sea level.

It is time to start looking ahead, planning and budgeting over a 15-year plan. The design could consider collection, storage and use of land-based flood waters for treatment and use, before discharge to the sea. Will government start the ball rolling? GA

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