

Rainwater harvesting and river harnessing – the other point of view

The rate of depletion of land and subsurface water in India is indeed alarming. To face the menace, an ambitious project to harness the mighty rivers and divert their water to other parts of the country is being conceived. River channels and valley-floor morphology have been changed by man over thousands of years, perhaps from the days of Mohenjodaro and Harappan civilization by diverting the flow, digging to make it deeper and by constructing dams¹. However, taming major rivers like the Brahmaputra, which are known to shift suddenly over a distance of tens of kilometres within a span of a few hundred years, would indeed be difficult. The river fans are also no less dangerous. The Kosi River originates from the Himalayan foothills of Nepal and makes one of the largest fans before meeting the Ganga near Mongher. Investigation on the channel pattern reveals that within a span of roughly 270 years, the river has changed its main course ten times².

If the uninterrupted flow of freshwater in the rivers were stopped, then it would play havoc on the entire mangrove system. Mangroves are a complex ecosystem, which exhibit luxurious growth where big tropical rivers like the Ganga, Mahanadi and Cauvery meet the sea. The mangroves in India cover approximately 4000 km². Eleven families and 55 species of plants grow in this region, the prominent being *Rhizophora*, *Bruguiera*, *Ceriops*, *Kandelia*, *Avicennia*, *Xylocarpus*, *Lumnitzera*, *Nypa*, *Sonneratia*, *Excoecaria* and *Heritiera*³.

The growth rate of mangroves is critically related to the availability of freshwater to the plants, which is also reflected in the soil water content and soil salinity⁴. Even a natural shift of the river to

a new channel can play an important part in the destruction of these plants. The famous mangrove of the Gangetic delta, known as the Sunderban, owes its name to the 'Sundari' tree (*Sterculia fomes*), which does not grow anymore in the Indian part of the mangrove. It is believed that when the Ganga changed its main course into Padma, about 500 years ago, that particular plant died due to less influx of freshwater and migrated to Bangladesh⁵.

Mangrove ecosystems play a major part in filtering the run-off water in stabilization of the coast, shielding against the storms, providing large amount of leaf production as nutrients, forest resources and breeding ground for many animals. Anthropogenic activities on the deltas of India have already diminished the forest cover. Saline tidal waters of the river Hooghly (Ganga) have traversed more than 300 km inland. If this trend were to continue, then reduced amount of run-off freshwater would increase the salinity of the soil and higher exposure to seawater sulphate. This would probably be followed by decreased production and increased sediment organic matter decomposition resulting in the subsidence of the delta.

The organic matter-rich estuarine and coastal waters of the Bay of Bengal and the Arabian Sea harbour billions of planktonic, nektonic, pelagic and benthic forms. The primary food production is done by the phytoplanktons through photosynthesis. The organic matter produced thereby ultimately deposits in the deep sea to be decomposed by bacteria at the bottom. If the estuarine water laden with organic matter were stopped, then the photosynthetic activity of the phytoplankton would be minimized resulting in the increase of

atmospheric CO₂ many folds. This would make the earth much warmer⁶.

The diminished flow of freshwater into the sea would destroy the mangroves; erode the deltas and the coasts; submerge the estuaries, thereby causing penetration of saline water deep into the interior part of the land and turning it uncultivable; disturbing the ecosystem and food chain, thereby causing immense damage to various organisms (including man). A rational approach is needed for this problem.

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Workshops for the student community

Various research institutes and academic institutions in our country are providing laboratory training in the name of workshops, training programmes, short courses, etc. These programmes provide hands-on training to participants in various laboratory methodologies, instrumentation techniques, etc. Undergraduate and postgraduate students are not able to attend such work-

shops since they often coincide with the college working hours. These workshops/training programmes should be held during weekends or on government holidays, for the benefit of the student community. Short-term courses can be conducted during summer vacation. Thus students will gain hands-on experience on various methodologies which may help

them to become good scientists in the future.

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