Do rivers go waste into the sea?

By Ashish Kothari

ONE OF the most common refrains from supporters of big dams in India is that we should not allow our rivers to "run waste into the sea." A number of recent pro-dam articles in the media have used this as a major justification, arguing that while people and their croplands go thirsty, it is criminal to allow millions of cubic metres of water to simply flow out into the oceans.

Powerful imagery, this, but how scientific is it? I ask specifically about the "scientific" validity, because many of those using this argument are technocrats, supposedly using hard science against the "emotions" of the anti-dam ilk. I could well argue this one on cultural grounds, but that can wait till later. First, let us take a look at whether indeed nature made a colossal mistake in channelling rivers into the gaping mouths of the oceans.

When rivers course their way through forested, cultivated, and settled lands, they carry with them large amounts of silt. They also gather more and more water through the many tributaries joining along the way, thus finally discharging enormous quantities of freshwater into the deltas and river mouths. In so doing, they perform at least three critical functions:

1. Depositing of silt and sediment all along the river course, and finally in very large quantities into the river mouth and coastal/marine areas beyond the mouth. This silt helps actually form the coast, stave off sea-wave induced erosion, strengthen banks, and enrich the waters with nutrients that are critical for coastal life.

2. Continuous pushing out of the sea, which would otherwise invade deep into the land.

3. Infusion of freshwater into the saline waters of the coast, helping to maintain a delicate balance of PH and other factors that is again so critical for marine life.

Now, build a dam across the river, and the consequences are obvious: blocking of silt and nutrients, and reduction or changes in the freshwater flow into the sea. All over the world experience is showing the disastrous effects of these consequences on ecosystems, wildlife, and people. Let's look at some examples cited in Patrick McCully's book *Silenced Rivers* and other sources:

• The Akosombo Dam on the Volta river in Ghana has reduced the supply of sediment to the coast along this country and the neighbouring Togo and Benin so drastically that the coast is being eroded at the rate of 10 to 15 metres a year. In one storm in 1984, the sea ate up 20 metres of land, washing away a big portion of the Ghana-Togo-Benin highway. The Togo Government has spent $3.5 million per kilometre to artificially reinforce the coast, but this may only be a short-lived solution.

• Dams in the United States have reduced the sediment outflow along the southern California coast by four-fifths, completely destroying beaches, some of which were 90 metres wide. The resulting erosion and cliff collapses along the sea have caused millions of dollars of loss to property and roads in the 1980s.

• Dams and diversions have reduced the discharge of the Volga River into the Caspian Sea by nearly 70 per cent, and that of the Don, Dneister, and Dnieper into the Black and Azov seas by about half. The resulting increase in salinity in the river deltas and estuaries has reduced commercial fisheries by 90 to 98 per cent! One estimate of the economic loss, between 1977 and 1987, is $35 billion.

• The reduction in nutrient outflow on the Nile due to the Aswan dam drastically reduced the catch of sardine fish, shrimp, and other fish in the Egyptian Sea.

• Closer home, dams and diversions on the mighty Indus and its tributaries, in Pakistan and India, have reduced water outflow into the Arabian Sea by 80 per cent, destroying deltaic mangroves which are dependent on a balance of saline and fresh water. These mangroves once stretched for about 250,000 hectares, and were the spawning grounds for much of the coastal fisheries in the area.

• Saltwater intrusion into the land, due to the reduced ability of rivers to 'push out the sea,' has affected coastal agricultural production and drinking water availability in several river basins of the world. Kerala is believed to be a prime victim.

The above examples are probably only the tip of the iceberg, as long-term studies of dams and their impacts are relatively rare. In India, monitoring of the ecological, social, and economic conditions of estuarine and coastal areas before and after dam construction simply does not exist. We know that mangroves are being destroyed, salt-water intrusion is happening, fisheries are being affected, coastal erosion is serious... but how much of this is due to dams, is not clear. But the above examples should be enough warning, and should certainly be adequate to poke gaping holes in the "rivers running waste into the sea" refrain.

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Recent evidence has shown an even more frightening possibility: that big dams may actually be aiding in the greenhouse effect (the warming of the earth's atmosphere, threatening disastrous sea-level rise and climatic changes). A long term study by the University of Hamburg and our own National Institute of Oceanography (Goa) has shown that the reduction in nutrient flow into the Arabian Sea due to dams (and other diversions from rivers) may actually be adversely affecting the sea's ability to absorb atmospheric carbon. In other words, we are probably slowly incapacitating the world's most important natural 'sink' for the greenhouse gases, and one of the several factors is mega-dams.

Dam related consequences in estuaries and coastal areas have their most telling impact on traditional or small-scale fisherfolk, and small cultivators in coastal areas. Tens of millions of such people around the world (not to mention myriad species of wildlife) are dependent on the continued ecological health of the coast and off-shore waters, and big dams only make such ecosystems chronically ill. Perhaps this partly explains why the mass-based National Fishworkers' Forum in India is supporting the Narmada Bachao Andolan... apart of course from sharing a common vision of an ecologically and socially friendly development model. Our marine biologists too need to take stock, and support struggles against big dams.

Of course, technocrats will still argue that providing drinking water to thirsty people in arid zones is more important than maintaining coastal health. Apart from the fact that this continues to trust a rather murderous model of 'development' ('some people are always expendable'), such a view also ignores the highly successful examples of providing drinking and irrigation water, even in arid areas, through decentralised water harvesting structures. We will be forced to find even more such acceptable alternatives, if we admit that the ecological and social costs of big dams are unacceptably high.

Tribal and non-tribal folklore along the Narmada river, as perhaps along other Indian rivers, is dominated by the image of a freely running river, one which escaped all attempts by evil demons and kings to shackle it. During our 1983 trek along the Narmada, villagers in several places asked whether rivers do not have a right to run free, and expressed the hope that the upcoming dams too would be broken by the free spirit of the river goddess. I wish I could share their optimism. Humans have shown that they are, in their enormous hubris about how nature should be controlled, technologically capable of defeating nature's mighty designs. But only for a while, and only to the long-term detriment of humans themselves, as the examples above show. Perhaps technocrats with mega- dreams about mega dams should learn some humility from the villagers living along the Narmada.

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