

## Linking the Indian rivers

The Indian government has recently unveiled an ambitious plan to link the major rivers. The purpose is to (i) provide water for irrigation in drought-prone areas, (ii) reduce the extent of annual flooding of the Ganga and the Brahmaputra, and (iii) generate additional hydroelectric power<sup>1</sup>. The project involves a massive expenditure of about Rs 560,000 crores (at 2002 prices) for the construction of a large number reservoirs, dams and canals. Many families will be displaced from their homes when the project is implemented, and will have to be rehabilitated. The project was rejected by the then government about a decade ago, but it has now been revived by the present government. The government's estimate of the time required for implementation is about 30 years. However, the Supreme Court has directed that it should be completed in 10 years<sup>1</sup>.

A few articles have recently appeared in newspapers and journals stating that the project is impractical. For example, an article by Alam<sup>2</sup> cites the following figures, based on a lecture by M. S. Reddy, former Secretary, Union Ministry of Water Resources. According to the plan, water will be transferred at a rate of 1500 m<sup>3</sup>/s during the flood season from the Ganga to the Cauvery through a network of canals. However, Reddy states that the normal flow rate of water in the Ganga during the floods is in the range of 30,000–60,000 m<sup>3</sup>/s, which is much larger than the proposed transfer rate. Radhakrishna<sup>3</sup>, a geologist, states that as flow-rate data are not available for the major rivers and their tributaries, the project will be based on estimated flow rates which may differ significantly from the actual values. He expresses serious reservations about this project. He suggests an alternative approach

based on rainwater harvesting and conservation of water resources for irrigation purposes.

While floods are usually regarded as a nuisance, there are many subtle factors worth considering. Commenting on the Manantali dam in the Senegal valley of Africa, Naudascher<sup>4</sup> notes that (i) the natural irrigation provided by the floods is replaced by artificial irrigation, (ii) fertilization of soil with river mud is replaced by expensive artificial fertilizers, (iii) salination of the soil, which is prevented by the floods, must now be addressed by constructing drains, and (iv) the interchange of flooded and dry periods, which prevents pathogens from flourishing, is replaced by areas which are kept moist for long periods.

It is estimated<sup>5</sup> that about 150,000 people will lose a part of their land due to the canal network associated with the Sardar Sarovar project, but will not be eligible for rehabilitation. It is likely that a much larger number of people will be affected by the present project.

On the other hand, an article<sup>6</sup> by the Director-General, National Water Development Agency states that 'inter-basin transfer is an outstanding example of effective and efficient management of water resources on the basis of need and equity'. Admitting that the displacement and rehabilitation of the project-affected people pose a challenge, he notes that it would be countered with 'liberal and enlightened packages'.

Given this background, it is not certain that the project is desirable. Diverging views appear in the media, and the figures cited may be erroneous in some cases. As detailed project reports for the links are likely to be ready only by 2006 (ref. 7), neither the cost of the project nor its

feasibility can be gauged properly at present. However, the Chairman of the task force on interlinking of rivers has stated that work on some of the links may commence by the end of 2003 (ref. 8). Thus the implementation of the project may begin even before all the reports are ready, and before they are subject to scrutiny and discussion by the scientific community at large.

In such a situation, what should we (i.e. the Indian scientists and engineers) do? The project will not affect most of us directly, and few, if any, of us will be displaced. However, everyone living in the regions where the project is implemented will be affected by the long-term consequences. Should we, as Swami Vivekananda put it, 'arise and awake', or let the government do whatever it feels is reasonable?

Perhaps, academies of science and engineering in the country can form a committee to examine the feasibility of this project.

1. Alam, A., *The Hindu*, 2 February 2003.
2. Alam, A., *The Hindu*, 2 December 2002.
3. Radhakrishna, B. P., *Curr. Sci.*, 2003, **84**, 1390–1394.
4. Naudascher, E., *Archetype*, September 2001, pp. 16–30.
5. Patkar, M. and Aravinda, L. S., *The Hindu*, 3 December 2002.
6. Singh, R., *The Hindu*, 9 January 2003.
7. Parsai, G., *The Hindu*, 27 April 2003.
8. *The Hindu*, 2 February 2003.

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