that the academic community is polarized into two cultures, generally comes
when colleagues, cutting across disciplines, brush against each other. In my ex-
perience, the biotechnologist/sub-cellular biologist asserts that he is doing ‘hard
science’, employing state-of-the-art technology, ideas and concepts. He also
emphasizes his accomplishments in funding generation by alluding to the ‘crones’ he
has brought to the institution from national and international agencies. But if science
is all about money and the paraphernalia it brings, not to mention the hype and the
power to hire and fire manpower, much like the CEO of a private enterprise, then
the organismal biologist usually comes second.

It can be argued, of course, that actually there cannot be any ‘two cultures’ in
biological research and if sophisticated instrumentation, heavy funding, etc. indi-
cate something to the effect, then it is only a superficial categorization. After all, bi-
ologists of all hues are trying to understand patterns and processes, at different levels
of biological organization; some at the molecular and sub-cellular levels, others
at the level of organism, populations and communities. Moreover, in our times the
kind of synergy between different branches of biology is like something never
seen before. While molecular techniques are being increasingly employed in eco-
logical, taxonomic, eco-remediation and physiological work, the ecologist has
much to offer a biotechnologist, say a scientist developing genetically modified
varieties of plants. (Witness the recent debate on Bt cotton, where it was clear
that without prior ecological testing of the hybrid plants, it would be foolish to
use GM seeds.) Therefore the differences, if any, are in terms of attitudes, percep-
tions and the importance given to certain areas at the national and international
level, and also to the funding available.

As a member of the academic commu-
nity, I witness acrimonious battles whenever the two cultures clash. The battles are
related as much to resources (such as space, funds, etc.) as they are to academic
matters. But when biologists of one camp shout across the fence to those on the
other side, asserting that theirs is the only ‘true science’ and what they are doing
is also being done in the ‘West’, then I am reminded of a passage from a short story
by Amitav Ghosh. The story – ‘The Imam and the Indian’ – is the author, stay-
ing for some months in rural Egypt while doing his research at the Universi-
ty of Alexandria, goes to confront the Imam of the village who is horrified to
learn that in the Indian doktor’s native country people burn (cremate) their dead.
The Imam is particularly stung when told that even in the west, people sometimes
also burn their dead. As Ghosh writes:

(‘The Imam) turned around and laughed.
‘He’s lying,’ he said to the crowd. ‘They
don’t burn their dead in the West. They’re
not an ignorant people. They’re advanced; they’re educated, they have
science, they have guns and tanks and
bombs.’

‘We have them too!’ I shouted back at
him. I was as confused now as I was
angry. ‘In my country we have all those
things too’, I said to the crowd. ‘We have
guns and tanks and bombs. And they’re
better than anything you have – we’re
way ahead of you.’

The Imam could no longer disguise his
anger. ‘I tell you, he’s lying,’ he said.
“Our guns and bombs are much better
than theirs. Ours are second only to
the West’s.’

‘It is you who’s lying,’ I said. ‘You
know nothing about this. Ours are much
better. Why, in my country we’ve even
had a nuclear explosion. You won’t be
able to match that in a hundred years.’

So there we were, the Imam and I,
delegates from two superseded civiliza-
tions vying with each other to lay claim
to the violence of the West.

At that moment, despite the vast gap
that lay between us, we understood each
other perfectly. We were both traveling,
he and I; we were traveling in the West.

A. J. URFI

Department of Environmental Biology,
School of Environmental Studies,
University of Delhi,
Delhi 110 007, India
e-mail: ajurfi@rediffmail.com

Interlinking of Indian rivers

According to the National Water Policy, water is a prime natural resource for hu-
mans and, hence, a precious national asset. Nowadays, it is hard to find freshwate
due to growth in population, agricultural and industrial activities, and contamina-
tion of water resources. By 2020, the global population is expected to reach up to
7.9 billion and the world may be under great scarcity for freshwater. India is also
expected to face water problem in the coming years. The country receives about
4000 km³ of water as precipitation annually, but due to different precipitation
patterns and mismanagement, it often leads to wastage. In view of this inter-
linking of Indian rivers, a highly ambitious and massive project is planned,
which is under debate.

Arthur Cotton was the first person who
originally conceived the idea of networking
the rivers about two centuries ago, but
the idea of interlinking Indian rivers was
revived a few decades ago independently
by M. Visvesvaraya, K. L. Rao and D.
J. Dastur. Recently, the Supreme Court
of India ordered the Government of India
on 30 October 2002, to complete this
project within the next 12-15 years. In
response to this order, the Government of
India appointed a Task Force headed by
Suresh Prabhu. Scientists, engineers,
ecologists, biologists and policy makers
started to ponder over the technical, eco-
nomic and eco-friendly feasibility of this
gigantic project costing about Rs 560,000

719.
1362.
134.
Pieces, Ravi Dayal, Delhi, 2002.
Before discussing the economic and social status of this project, it is essential to know the planning of this project in brief.

Basically, a large amount of water from rivers flows into the sea, which should be prevented to enable transfer of water to water-deficit areas for domestic, agricultural, industrial and other activities. The proposed project has the Himalayan and peninsular components; the Himalayan component entails construction of reservoirs and canals on the main tributaries of the Ganga and the Brahmaputra to transfer excess water to the west. The peninsular river interlinking has two components, one of interlinking the peninsular rivers themselves and the other of linking the Ganga to the peninsular rivers. Water will be transferred either by gravity flows (tunnelling through mountains) or by lifting across natural barriers.

This project has been designed with the concept that it will improve the living status of people in India, with growth in our economy. The completion of this project will result in constant water supply for domestic use, agriculture and industries along with flood control, improvement in water flow, navigation, food security, etc. Construction of dams, canals, etc., and their maintenance will create opportunities for new jobs, which will check the migration of people from villages to cities. The interlinking project is to bring an extra 34 Mha of land under irrigation using 173 BCM of additional water created in this project. Production of hydro-power (34 gigawatts) in this project is expected, which may be inexpensive and eco-friendly.

However, several scientists and others are worried about river diversion, which would disturb the entire hydrological cycle by stopping the rivers from performing their normal ecological functions. This project will change the composition of the sediment load, river morphology and the shape of the delta formed at the river mouth. Construction of dams and canals will get villages dislocated, flood towns and cut through millions of hectares of agricultural land. The large network of dams and canals will also alter natural drainage so that occasional flooding and waterlogging will inundate millions of hectares of agricultural land. Moulding of natural flood-water will reduce land fertility gradually and over the years the fertile land will change into desert, affecting agricultural production. An increase in agricultural activities may result in increase in nitrogen compounds and methane, which may affect the ozone layer in the atmosphere. Due to the high cost involved, there are talks about privatization of this project; but by allowing the private sector to invest in this project, the rights of the people for water resources may be affected. Before looking for a loan from the World Bank or the Asian Development Bank, it is necessary to consider whether we will be in a financial and physical position to repay the loan as we are already running in debt.

India is having water-related conflicts among its states, e.g. Haryana and Punjab, and Karnataka and Tamil Nadu. Already, Bihar, West Bengal, Maharashtra, Kerala, Assam, Punjab and Rajasthan have opposed this proposal. Bihar has always argued that its water needs have not been met with from the Ganga. The proposed canals will carry water through many neighbouring states and each state will claim a portion of water, which may be a big problem to be tackled. Dams are proposed to be constructed on the Brahmaputra and Ganga or its tributaries; Bangladesh, which is a lower riparian state has objected. Besides, Nepal and Bhutan are also expected to be affected by this project.

Some experts have proposed other alternatives of solving the water and food problems in India. Decentralized local rainwater harvesting, reusing and improving traditional techniques can meet essential requirements more efficiently and at a lesser cost. There is much scope for increasing the efficiency of the irrigation systems in place by reducing waste and through better water management. Besides, the optimal use of existing projects, traditional water-harvesting projects and recharging groundwater may be useful as alternative sources. According to UNICEF and the WWF, if the precipitation within the watersheds or sub-basins is harvested and conserved properly, domestic water needs will not be a problem in most parts of the country.

The most important points to be considered are the cost, in comparison to other alternative methods to control water and food scarcity and the impact on our economy and the environment. The project should be undertaken with full recognition of the serious ecological damages that may be caused by interlinking rivers and that the benefits should far outweigh these costs. Interlinking of rivers should be subjected to a more comprehensive and realistic assessment. There is need for examining the pre-suppositions on which the interlinking project is based. Besides, all Indian states and neighbouring countries like Bangladesh, Nepal and Bhutan should also be brought into confidence. We should also consider the fate of interlinking river systems in Australia during mid-1940s, which affected the environment with rivers turning saline, natural eco-system withering away, and water along the natural course of the river drying up. The side effects of this mammoth project on the environment and human beings can be avoided by proper scientific planning before its execution.


Imran Ali
National Institute of Hydrology,
Roorkee 247 667, India
E-mail: dirimran_ali@yahoo.com