

along with Balick and Cox, we also believe that every time a traditional healer administers a medicinal plant to a sick individual, the efficacy of the indigenous tradition is empirically tested and evaluated. Only the context of the trials performed by the modern scientists and by the traditional healers may be different.

So far, such re-evaluation of traditional medicinal plants was focused mainly to discover new drugs for western medicine. Isolation and characterization of single-activity bioactive principles or 'magic bullets' from plants against disorders predominantly associated with western lifestyles such as cancer, AIDS, cardiovascular and nervous diseases, etc. was the ultimate aim. The driving force undoubtedly is the multimillion dollars-worth market potential tagged to such products. An analysis of the total money spent on drug development in the United States indicates that 26% of it goes for cardiovascular drugs, 18% for cancer, and 14% each for nervous disorders and antibiotics<sup>1</sup>. But the surprising fact is that these categories of diseases hardly find a place in the indigenous pharmacopoeia where the priorities have been easily detectable ones such as complaints of the gastrointestinal and urinogenital systems, skin diseases, etc. In fact, few indigenous languages have a word for cancer, leukaemia or hypertension! In the ethnomedicine of coastal Karnataka, major diseases treated are those of the skin

(20%), digestive system (18%) and urinogenital system (15%)<sup>2</sup>. The reluctance of modern scientific approaches to recognize this basic difference in the priorities of the western demand which it owes to fulfil and that of the traditional practices from which it seeks guidance, is the major reason for the recorded low success rate in this field. In spite of about five decades of such bio-prospecting activities, there are only 89 plant-based drugs currently prescribed in the western medicine<sup>1</sup>, discovered by studying traditional medicinal knowledge which globally involves more than 20,000 species of plants<sup>3</sup>.

Another limitation of the modern methods of re-evaluation of herbal remedies is with regard to the multiherbal preparations. Traditional practices are abound with such compound formulations whose curative effect seems to be resting on the principle of co-operative action of many active ingredients, each targeted against a particular symptom of the disease under treatment. For example, we have recorded 24 multiherbal methods of treatment for herpes – a skin inflammation caused by viral infection and associated with severe burning sensation. An analysis with the help of published literature revealed that these compound preparations involve a combination of herbs claimed to be possessing mainly antimicrobial, anti-inflammatory, wound-healing and coolant properties<sup>2</sup>. These

drugs are prepared either by grinding (extracting?) with lime juice, rice-washed water or the juice of pericarp of tender fruits of a local variety of coconut called 'gendali'. Any modern attempts of re-affirming the scientific basis of these remedies need to be holistic and flexible enough to consider all these aspects, rather than just fractionating the involved herbs individually with different chemical solvents and looking for those elusive antiviral or anti-inflammatory compounds in them.

1. Balick, M. J. and Cox, P. A., *Plants, People and Culture – The Science of Ethnobotany*, Scientific American Library, New York, 1996.
2. Bhandary, M. J., Ph D thesis, Mangalore University, 2001.
3. Vedprakash, *Ethnobotany* 1998, **10**, 112–121.

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## Saraswati – the ancient river wrongly identified?

Reading the article 'Saraswati – the ancient river lost in the desert' (*Curr. Sci.*, 1999, **77**, 1054–1060) by A. V. Sankaran, I found myself in a bind. I have been concerned with this subject intensely for the last half a century. I have now come to the conclusion that Saraswati is not an extinct river at all. It is extant and very much alive, but outside India, in the Balkhash region.

My difficulty is very simple. 'How many rivers can there be, qualifying for the title Vedic Saraswati?' Obviously the answer would be *only one*. Since I claim to have found the answer, I give some tests that the so-called Indian Saraswati

and its protagonists should be able to try and satisfy. This is independent of the fact that there is a controversy about the identity of Saraswati. My solution passes all these tests successfully.

The first point is why is it called Saraswati? By definition, it should meet a lake and a sea. My solution says, 'The Balkhash is a peculiar lake. Its water is potable where it meets the river Ili (Saraswati) and salty at its eastern end, where it is at sea. It is an inland sea.' These are not normally met with, except in North Asia. River Ili first meets the sweet end of the lake, thus satisfying the condition of meeting the lake and then

along with this lake meets the sea. The hypothetical Indian Saraswati might meet the sea, but what about the lake?

Saraswati has an alternative name, Sharada. How do we explain it? Sharada is a goddess of education. A suitable explanation for it is in order. For 'my' solution, river Ili has formed a delta where it meets the lake Balkhash. This area consists of stands of reeds called shar. These shar grasses mature just before the onset of winter. Thus the area, which is the mouth of river Ili (read Saraswati) is the giver of shar, Sharada. It is thus at once the name of the pleasant autumn and also of the river mouth which

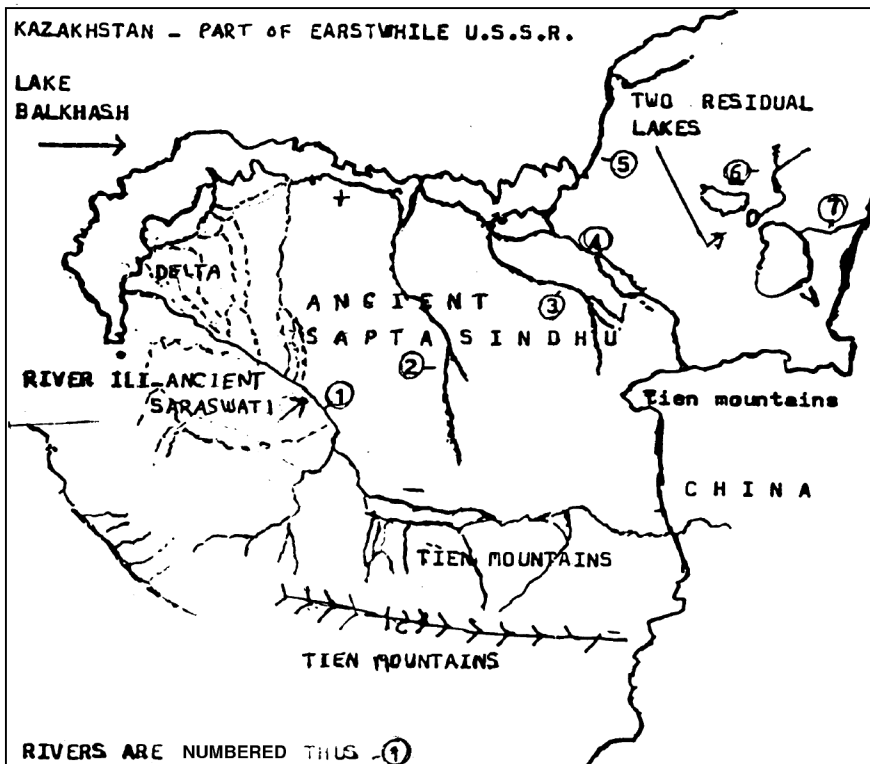


Figure 1. Balkhash environs. River Ili (Saraswati) has been numbered one and the rest of Saptha-sindhu accordingly.

Brahmins. Sharada was thus the goddess of knowledge who gave the tools for trade.

*Sapta-sindhu.* Vedas speak of seven such rivers, including the Saraswati. We have only one. How do we explain this? According to me, all of them are present outside India (see Figure 1).

The *Mahabharat* lists all the sacred places on Saraswati. There is one named Oceanus which corresponds to Greek Oceanus. Balkhash is the Greek Oceanus.

Then there is a famous dhyana shloka of Saraswati. It is supposed to bring before the mind's eye, a picture of the river. In that couplet it describes the river as *shubhra vastrankita*. According to me, *shubhra vastra* – a saree – is but a paper thin crust of ice which formed on the river surface. This can happen only outside India. This dhyana shloka is recited throughout India by the devout, without worrying about the exact meaning.

I put these points as a poser to those who believe in an 'Indian Saraswati'. Can they find satisfactory answers?

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gives shar. So the river is also Sharada. This shar grass is the raw material for

arrows used by kshatriya and reed for pen used by the mercantile community and

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## India's imminent water scarcity is a concern for people and environment

Nirupa Sen's article on the land- and water-care movement in India (*Curr. Sci.*, 2001, 81, 236) is timely, since water shortages are now becoming a major global concern. Falling water tables from over-pumping of groundwater are now ubiquitous in several parts of India and also in China, Mexico, Thailand, the United States, Northern Africa and the Middle East. Rising water tables of polluted and over-salinized water are also destroying crops in coastal areas of India by water logging and adding a deadly level of salt to the soil. Experts believe that the water scarcity will also be a security threat of the future<sup>1</sup>.

Historically, Egypt has threatened to go to war to protect its water supplies and just two years ago, the Libyan leader Muammar Qaddafi warned that the next Middle East war would be over dwind-

ling water supplies! The long-standing tensions between Israel and the Arab world are perhaps the most famous of these water tussles. Other areas where friends may be forced to become foes include the Danube in Europe, the Zambezi and Nile in Africa, and the Mekong, Ganges and Indus in Asia<sup>1</sup>.

Based on per capita of renewable water availability, India has water barely to meet its people's needs. Despite an estimated 2464 cubic metres per person per year, many of its nearly 1 billion people do suffer occasional water shortages, as a result of uneven availability. According to the International Water Management Institute, India is one among the 17 countries that will face absolute water scarcity in the future. India has showed miraculous achievement in agriculture, solving food shortages through the green

revolution in the past. But, will it handle the imminent water shortages in future?

Even those who live in areas of high rainfall in India often face the threat of droughts because of deforestation. Since the soil is compacted, rain water runs off before it can be absorbed. Even the legendary Cheerapunji that receives the highest level of mean rainfall, suffers from excessive flooding for 3–4 months and frequent droughts during the rest of the year<sup>2</sup>.

Asia and the Pacific have 23% of the world's land area, but 58% of its people<sup>3</sup>. Patterns of unsustainable resources use and conflicting policies are already causing continued loss of biodiversity in Asia, including the biological hotspots of India<sup>4</sup>. With a rapidly growing human population pressure, water shortages and desertification in India are likely to