Drinking water problem in rural India

Addressing a two-day long National Rural Workshop on 'Water Supply and Sanitation in Rural India' at New Delhi, Raghuvansh Prasad Singh, Union Minister for Rural Development stressed upon the importance of the development of suitable technologies for drinking water supply; safe and potable drinking water to all citizens of the country, and sustainable sanitation options for achieving total sanitation by 2012, well before the timeframe of the Millenium Development Goal.

Referring to the presence of arsenic in groundwater at Bihar, West Bengal and Assam, and fluoride content in Gujarat, Andhra Pradesh, Orissa and Karnataka, as well as salinity of water in the coastal areas of the country, the Minister emphasized on the training of local villagers in testing water quality and equipping them with newly developed test-kits. In order to ensure availability of safe drinking water, the Department of Drinking Water Supply is already running a Quality Surveillance Programme under 'Bharat Nirman' programme. He also informed about the data management work done by the Department of Drinking Water Supply in carrying out survey of available water resources every year instead of the existing norm of survey once in five years. On the Total Sanitation Programme (TSC), the Minister informed about the construction of nearly one crore toilets every year and hoped that every rural school, Anganwadi centre will have proper toilets by March 2008.

Bharat Nirman has been conceived as a business plan to be implemented over a period of four years for building infrastructure, especially in rural India. The role of community participation through village panchayats is even greater, to fulfil the six objectives of Bharat Nirman, viz. rural irrigation, rural roads, rural water supply, rural housing, rural electrification and rural telephony.

Analysis of yield data of 1167 borewells in hard-rock terrains of Orissa reveals that 54% of the borewells are of low discharge (<3 lps) and 46% are of high discharge (>3 lps) type in nature. Out of 54% of the low-discharge borewells, 29% has discharge between 1 and 3 lps and the rest <1 lps. Generally, wells having yield of 1–3 lps are not properly utilized. The Rural Water Supply and Sanitation Department, Government of Orissa, which has the responsibility of supplying water to rural areas does not utilize the borewells properly. In these wells, water-supply schemes are not economically feasible. But in water-scarce areas and particularly during summer season, pumps can be lowered in these wells and *in situ* overhead tanks can be made, which rural people can utilize. These wells have to be utilized only after proper pumping test to know the sustainability of the aquifer.

The Integrated Watershed Development Programme (IWDP) is an important step in harvesting rainwater in rural India. It promotes groundwater recharge, checks soil erosion, improves soil texture and quality, vegetation, etc. Ultimately it supports the livelihood of the people. Another important step in rainwater harvesting is implementation of rooftop rainwater harvesting in all the schools. Karnataka is a pioneer in this project.

Different water-harvesting structures like ponds, lakes, tanks, etc. were common in ancient times and also during the British period. Each village in Orissa has ponds. But presently most of these structures are neglected and are on the verge of extinction due to siltation. In the temple city of Bhubaneshwar, more than 100 temple tanks are present. Experiments have shown that removal of bottom clay from these tanks shows up to ten-fold increase in recharge to groundwater.

In India, presently there is the problem of arsenic in the groundwaters of Bihar, West Bengal and Assam, fluoride content in Gujarat, Andhra Pradesh, Orissa and Karnataka, and salinity hazard in the east and west coast of India. High fluoride content, above the permissible limit of 1.5 mg/l, is widespread in Nawapada District, Orissa, which causes drinking water crisis. Though high iron content does not create any health hazard, it makes the water unsuitable for drinking in mining areas of Joda–Badbil of Orissa. Thus after delineation of the problematic areas, people have to be made aware of the situation and alternate sources of drinking water need to be found.

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Developing countries' scenario: Difficulties in health research or research despite difficulties?

In developing countries, the word 'research' is nearly synonymous with 'challenge'. There is an urgent need to strengthen the research infrastructure in developing countries to improve health status and to ignite young minds at an early age to propel research.

Research is one field where scientific temper should outdo economy. If funding is not a problem, there is no end to research. But there lies the crux of the problem in developing countries. The per capita GDP (Gross Development Product) of USA is US$ 39,901 and that of India is US$ 1830 (ref. 1). Yet USA spends 15% of its GDP on health, whereas India spends just 4.8% (ref. 1). And only a miniscule of this is devoted to research. In this economically strangulated situation, in spite of having many patients, is it possible for us to study this vast body of data well?

In this entire research 'industry', the developing countries have grossly failed to appreciate their true strength – the vast expanse of patients. We have made a 'guinea pig' of our population by submitting it to even phase I of various international multicentric clinical trials of drugs to be marketed in the West! This largely

occurs because the poor people are easily lured by monetary incentives for their participation in these trials.

My objection to this is: how can a drug, designed to target a Western population be tested for pharmacokinetics and adverse drug reactions in a genotypically different group of people? Are the developing countries only a soft target?

Inadequate representation of developing countries in various international journals and research agencies has been a major hurdle. Many good studies from developing countries face rejection. The same is true for the patenting policy; for instance over turmeric.

The doctor–patient ratio in India is 1 : 2460 as against 1 : 40 in developed countries[2]. This leads to doctors being overworked in India. In tertiary care centres in India, doctors, especially residents, are known to continuously work for 48 h. With this time crunch, how can anybody do quality research? Hence an increase in the health personnel would automatically and instantaneously show up as quality research work.

The recent revolution world over for 'open access' aims to curb the policy of 'no subscription – no information access'. Talking economics, the annual per capita income of an average Indian is US$ 530 (ref. 3) and that of a Britisher is US$ 27,650 (ref. 4). The average annual subscription rates of a few well-known journals like *BMJ* and *JAMA* are US$ 337 and US$ 160.60 respectively. This quest for subscription could be partly satiated by means of Public Library of Science (PLoS), information portals, Open Access Initiatives, Budapest Open Access Initiative, Health internetworking Access to Research, etc.

Somehow, we in the developing countries have failed to take the research results to the common man, which journals like the *BMJ* have been successful at. The media too plays an important role to convey research directly pertinent to the common man. For example, surgical procedures like minimally invasive cardiac surgery and painless labour techniques literally dance on the tongues of the layman overseas. Once the common man is interested in research results, so would be the government and hence funds would flow in.

Thus investment in research in developing countries should be regarded as one that would improve the health status in the near future. For further details one may refer to ref. 5.

1. http://www.who.int/countries
2. Venkataramani, G., *News Today*, 7 April 2006.
3. http://www.plan-international.org/where-wework/asia/india/?view=textonly
4. http://www.success-and-culture.net/articles/percapitaincome.shtml
5. http://www.globalforumhealth.org/filesupld/Young%20Voices/07/art/YoungVoices07_Dhamangaonkar_HealthResearchinDevelopingCountries.pdf

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Taxonomic reasoning: The case of giant wrinkled frog

A recent issue of *Current Science* carried a correspondence entitled 'Taxonomic vandalism: The case of the giant wrinkled frog' by Ranjit Daniels[1]. The author is critical of a communication authored by us.

Daniels, in his correspondence[1], has narrated a background history: a claim of having made the first collection of the giant wrinkled frog, from a private estate, Neria in Karnataka; his attempts to fix the true identity of the specimens, and in this context approaching R. S. Pillai (Zoological Survey of India (ZSI), Chennai), for clarification and confirmation, and identifying the specimens as *Nyctibatrachus humayuni*, since they 'so closely matched the published descriptions'. According to him, having no access to the types of *N. humayuni*, the specimens were later sent to the Bombay Natural History Society (BNHS), where they were identified as *N. major*, and deposited with appropriate registration numbers. Here, certain inferences are clear. Daniels' identification of the specimens as *N. humayuni* was erroneous, even after they 'so closely matched the published descriptions'. The true identity of the specimen(s), whether they were *N. humayuni* or *N. major*, then had remained uncertain.

We need not, in general, doubt or question the reliability of the so-called history of the specimens or the 'species', but, in this context, the record must have vast strength. Daniels claims to have provided the common English name for the frog, a photograph and illustrations of the species in a base paper[3] published by him in 1992. A scrutiny of the paper reveals that there was no explicit reference to the name 'giant wrinkled frog'; it was mentioned as a 'large species of wrinkled frog', obviously due to its large size and the wrinkled skin-feature. Besides, there were no photographs and supportive illustrations in the base paper[3]. The question arises as to why he did not reveal this to Krishnamurthy *et al.*[4] and stop them publishing their work in 2001. Again, Daniel's argument that he had no access to types of *N. humayuni*, is untenable. It is self-contradictory, because Bhaduri and Kripalani[5] had deposited seven specimens of *N. humayuni*, six in BNHS (Cat. nos 577, 775, 427, 428, 429 and 430) and one in ZSI, Kolkata (Cat. no. 20628).

In 2005, 15 years after his claim of having found the Neria frog for the first time, Daniels published a book exclusively on *Amphibians of Peninsular India*[6], which was incidentally reviewed by Gururaja[7]. In this volume on amphibians, the author vaguely states that the species (in question) was wrongly identified as *N. major* and *N. humayuni*. Here also, Daniels has not provided details about specimen deposited, voucher number, etc. The obvious question again would be as to why the author had not provided the specific details of the frog specimens then, which he is mentioning now, in 2008?

It is intriguing to us why the facts were not suggested to Krishnamurthy (who showed him a good photograph along with a manuscript of this species in 2001), to look into the collections at BNHS, or to