

milk and blood compartment of HIV-positive mothers by some, but there is no agreement on such HIV1 diversity in either compartment.

Limitations in epidemiological studies and lacunae in the laboratory evidence of the presence of infectious HIV1 or anti-HIV1 responses in human milk, call for studies to pinpoint marker/s of HIV infectivity in human milk, if any. Besides resolving the dilemma of human milk as a reservoir of HIV1 transmissions, such studies may identify transmitting HIV1-positive mothers.

1. Ziegler, J. B., Cooper, D. A., Johnson, R. O. and Gold, J., *Lancet*, 1985, **1**, 896–898.

2. Shaffer, N., *JAMA*, 2001, **285**, 2129–2131.
 3. UNAIDS, Report on the global aids epidemics, 2006.
 4. Setty, V., Population Reports, Issues in World Health, Series L, No. 14, 2006.
 5. Nduati, R. *et al.*, *JAMA*, 2000, **283**, 1167–1174.
 6. Koulinska, I., Villamor, E., Chaplin, B., Msamanga, G., Fawzi, W., Renjifo, B. and Essex M., *JAIDS*, 2006, **41**, 93–99.
 7. Rousseau, C. M., Nduati, R. W., Richardson, B. A., John-Stewart, G. C., Mbori-Ngacha, D. A., Kreiss, J. K. and Overbaugh, J., *Infect. Dis.*, 2004, **190**, 1880–1888.

8. Hocini, H., Becquart, P., Bouhlal, H., Adle-Biassette, H., Kazatchkine, M. D. and Belec, L., *Clin. Diagn. Lab. Immunol.*, 2000, **7**, 515–518.
 9. Kaul, R., *J. Pediatr.*, 2006, **149**, 591–593.
 10. Lewis, P. *et al.*, *JID*, 1998, **177**, 34–39.
 11. HIV transmission through breastfeeding: a review of available evidence, World Health Organization, Geneva, 2004.

*Shrikant Betrabet is in the National Institute for Research in Reproductive Health (ICMR), Jahangir Meherwanji Street, Parel, Mumbai 400 012, India.
 e-mail: sbetrabet2001@yahoo.com*

Conflicts and dilemma of human right to water*

J. Harsha

According to the World Health Organization (WHO), fifth of the world population, i.e. 1.1 billion lack access to safe drinking water.

In July 2010, the United Nations General Assembly adopted a resolution calling on States and International Organizations to grant financial resources, transfer of technology to developing countries and enhance efforts to provide ‘safe, clean, accessible and affordable drinking water, and sanitation for all’. The Bolivian-introduced text was adopted by 122 in favour and 41 abstentions with none against the resolution, thus recognizing the human right to safe, clean, accessible and affordable water and sanitation for all. The recognition of right to safe, clean, accessible and affordable water as a human right by the United Nations, if adopted by governments world over, would empower every human being with legal entitlement for safe, clean, accessible and affordable water despite several limitations and shortcoming to do so. But, it would bind governments with legal obligation to ‘respect, protect and fulfill this human right to water’¹.

The United Nations has adopted and recognized human right to water. Now, it

is left to the States and International Organizations to adopt the same. But, a closer scrutiny of the resolution, particularly ‘safe, clean, accessible and affordable water for all’, would provide a different picture than the impetuosity with which the resolution has been adopted by the United Nations General Assembly. The success of human right to water depends on the availability of freshwater – a finite resource shared by multiple users like agriculture, industry and environment. According to a study by Molden², ‘many river basins do not have sufficient water to meet demands; further appropriation of water for human use is not possible as the limits have been reached and in many cases it has already breached’. Thus, it is apparent that conflicts are inevitable when human right to water is adopted by States and International Organizations without a plan-of-action, investigation and feasibility, as the right confers legal entitlement of water for all.

‘Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment’³, and it has wide variations across regions both in space and time – probably the greatest limitation for ensuring human right to water. In many regions water use has exceeded water availability⁴. The International Water Management Institute (IWMI) in its Comprehensive Assess-

ment of Water Management, 2007, for the near future indicates physical water scarcity in Peninsular India, northern China and large parts of the Middle East, and economic scarcity of water in northern India, large parts of Sub-Saharan Africa, Peru and Bolivia (Figure 1). Several countries in the Middle East comprising the Asian part of Turkey, Syria, Jordan, Israel and Iraq, and those of North Africa face acute scarcity of freshwater (Figure 2) in addition to countries like Mexico, Pakistan, South Africa, and large parts of both India and China⁵. Water scarcity according to Falkenmark *et al.*⁶ is water availability below 1000 m³/capita/yr of water availability while below 1700 m³/capita/yr is regarded as water-stressed. Thus, Middle East, North African countries, Mexico, Pakistan, South Africa, India and China adopting human right to water would have to face serious repercussions due to legal entitlement granted to citizens by the right. In the case of India, water availability per capita per year which was 5176 m³ in 1951 (ref. 7) has dropped to 2309 m³ in 1991 to about 1902 m³ in 2001 (ref. 8). Further as of 2010, considering a projected population of 1.1 billion based on Census of India⁹, water availability per capita per year has dropped below 1700 m³, pushing India under water-stress category considering total water flow of

*The views of the author are purely personal and shall in no way be construed as views of his employer.

1869 km³/yr according to the Central Water Commission estimates. Hence, the adoption by governments of the UN resolution of human right to water would make it an obligation to provide water for all, while in reality; there is already scarcity of water and wide variation

across regions – key dilemma in adoption and implementation.

The causal factors for scarcity of water are both natural as well as man-made. The natural causes for scarcity of water are climatic limitations as seen in the Middle East and North African countries,

and spatial and temporal variability of water. In South Asia, a large proportion of rainfall occurs in just 4 months, i.e. June–September during the monsoon – temporal variability. In addition, water is not uniformly distributed across any country or region. In India, water availability is more in the north compared to Peninsular India⁷. Water availability in China is more in the south than in the north and north-west. Man-made causes include uncontrolled increase in population as in the case of Asian countries like China, India, Pakistan, Bangladesh and Indonesia, which has already led to artificial water scarcity in these countries. World population grew from 2.5 billion in 1950 to 6.5 billion as on 2008 (ref. 2). Uncontrolled urbanization and lack of planning in this regard will render any human right meaningless (Table 1). ‘During 20th century, world urban population increased ten fold while rural population increased only two fold thus increasing the demand for water.’¹⁰ Change in consumption pattern due to increase in economic activity will increase the demand for water, particularly agriculture. Freshwater has competing uses in addition to drinking water, like for agriculture where food security for all is essential, water for industries is vital as they are an indispensable part of modern societies world over and then water for the environment. Withdrawal of water by agriculture is 70%, industry 20% and municipalities 10% (ref. 2). Thus scarcity of freshwater is a serious impediment for the implementation of this human right.

Despite scarcity of water and wide variation across regions, governments with or without human right to water, have the onerous responsibility of providing safe, clean, accessible and affordable water to its population with the freshwater available at its disposal. Scarcity of water is compounded if it is not harnessed from the source like rivers and groundwater. With freshwater already scarce in many regions, water untapped from many rivers and lack of water infrastructure compound the problem of scarcity, thus denying safe drinking water for all. Contrary to assumptions and arguments by environmentalists, rivers left unmodified do not ensure human right to water. Rivers neither provide safe water (even under ideal conditions of no pollution from anthropogenic activities) nor deliver water to households by themselves as they are not free from microbes

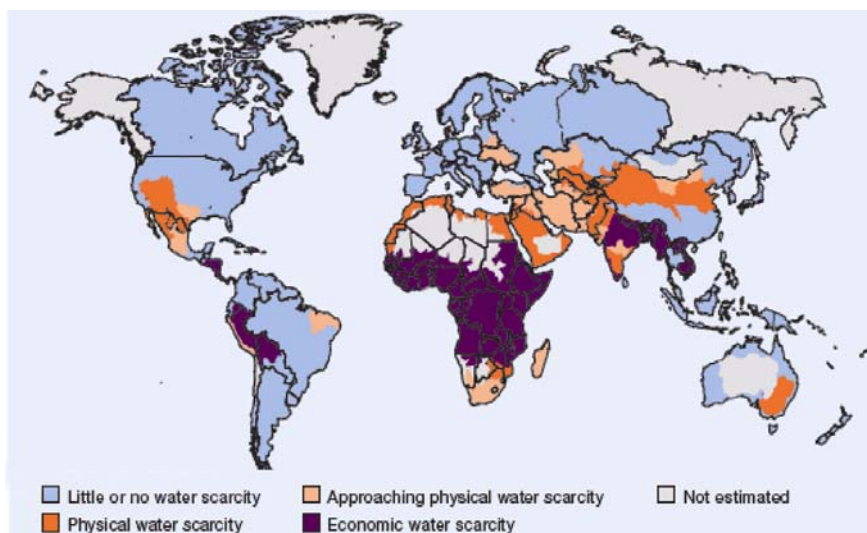


Figure 1. Scarcity of freshwater across different parts of the world².



Figure 2. Water scarce countries in the Middle East and North Africa. Note: Water-scarce countries (shaded above) are those with less than 1000 m³ of renewable freshwater per person per year¹².

Table 1. Distribution of world urban population by region, 1950–2010

Region	Year				Projection for 2010
	1950	1970	1990	2000	
Urban population (millions of inhabitants)					
World	733	1,330	2,273	2,857	3,505
Africa	33	83	199	295	417
Asia	232	486	1,012	1,367	1,770
Europe	280	413	516	529	534
Latin America and the Caribbean	70	163	314	393	472
Northern America	110	171	214	250	286
Oceania	8	14	19	23	26

Source: Ref. 10.

and parasites, do not possess acceptable level of colour and odour all the time, and may also contain hazardous chemical substances. However, in the event of adoption of human right to water, governments would be compelled to create water infrastructure to ensure safe, and clean access to water, thus setting conflicts with environmentalists and activists.

The threat to human right to water comes from activists and environmentalists as they oppose any modification of the environment, be it rivers or forests. But it is clear that water cannot reach households without modifying rivers – denial of access is denial of right. Then water that is safe and clean does not ensure human right to water as long as accessibility is denied, or vice versa. A river might be pristine under ideal conditions or a pipe may transport treated water, but it does not ensure human right to water as long as it is not accessible to people. According to WHO standards¹, source of water more than 1 km or more than 30 min of round trip time is regarded as no access. Not every river in the world is well within 1 km or 30 min of round trip time of every household. This is in exception for those few who are directly dependent on rivers for their livelihood. In the mountainous terrain, a source of water may be well within 1 km conforming to the basic access standard of WHO¹, but the round trip time may be more than 30 min, thus denying access to water. The conflict here is with civil society, particularly activists, environmentalists and other NGOs, as they oppose any interference with the environment. However, building treatment units, reservoirs and distribution systems does involve interference with the environment, without which human right to water will remain ever elusive.

The dilemma of human right to water does not end with scarcity or opposition to water infrastructure. Further, there is conflict with alternatives suggested for water infrastructure. Often, water conservation measures like rooftop rainwater harvesting in urban areas, construction of ponds or talabs or groundwater in rural areas are put forth as an alternative for water infrastructure. But water from the ponds or talabs or groundwater neither reaches households by itself nor is it safe for drinking. Groundwater ensures accessibility to every household, provided the households invest in drilling wells, tube

wells and install pumps. It should then be affordable for users to pay for the electricity charges. Groundwater does not always and necessarily supply safe and clean water – key issues for human right to water. Despite availability in plenty, groundwater in Bangladesh and the Indian states of West Bengal, Bihar, the Terai regions of Uttar Pradesh and Assam is contaminated with arsenic – a carcinogenic element – thus rendering it unsafe. ‘An estimated 30 million people in the Ganges delta are drinking water from wells contaminated with naturally occurring arsenic¹¹.’ Thus implementation of human right to water has to overcome misleading information regarding alternatives to reservoirs, treatment units and distribution systems before considering their adoption and implementation.

Human right to water does not mean free water. This is a common misconception that may exacerbate the problem, as freshwater is a finite and vulnerable resource. Poor people in urban slums pay more than the price charged for piped water by private vendors¹. But unlike piped water, there is no guarantee of safety and cleanliness of water obtained from private vendors. Thus, piped water supply is always affordable to people. In contrast, free water is not affordable to governments considering the requirement of massive investment in building reservoirs, distribution systems and treatment units in every town and village.

Providing financial resources, building capacity and technology transfer to developing countries will definitely improve the provision of safe and accessible water in the regions where it is available. But where there is physical scarcity of water, i.e. water itself is in jeopardy, it would raise questions of feasibility of human right to water. In regions where there is physical water scarcity, augmentation of water is essential as and when precipitation occurs. It is here that financial resources provided to developing countries will benefit for building water infrastructure like reservoirs and other storage structures, canals, etc. that even out spatial and temporal variations. With freshwater made available through water infrastructure, the accessibility is increased through distribution systems. Once water is made accessible, treatment facilities ensure safe and clean water for people, thus ensuring human right to water. But all this is possible only when

water infrastructure is in place, overcoming opposition from environmentalists and activists. Along with creating infrastructure, other water-management options like water markets, water pricing and virtual water trade have to be part of the strategy on human right to water to increase efficiency of water use, so that water allocation for domestic use is increased. This minimizes conflict with other competing uses like agriculture, industry and environment. But if States and International Organizations passionately adopt human right to water without giving a forethought to feasibility and ground reality, then they will have to face serious repercussions, given the fact that human right to water confers legal entitlement for every citizen.

1. World Health Organization, Right to water, health and human rights, Series No. 3, 2003.
2. Molden, D., Water for food and water for life, A comprehensive assessment of water management in agriculture, International Water Management Institute, 2007.
3. <http://www.irc.nl/page/10433> (Dublin Principles).
4. Palaniappan, M. and Gleick, P., The world's water 2008–2009, Ch. 1, Peak Water; <http://www.worldwater.org/data/20082009/ch01.pdf>
5. Coping with water scarcity – UN water-thematic issues. August 2006.
6. Gleick, P., The world's water 2002–2003, The biennial report on freshwater resources (Falkenmark Water Index).
7. *Water Data Complete Book*, Central Water Commission, New Delhi, 2005.
8. Kumar, R., Singh, R. D. and Sharma, K. D., *Curr. Sci.*, 2005, **89**(5), 794–811.
9. *Provisional Population Totals*, Census of India, 2001.
10. Water, a shared responsibility, The UNWDR-2, Ch 3, *Water and human settlements in urbanizing world*, UN Habitat, 2006.
11. De, M., *Curr. Sci.*, 2005, **88**(5), 683–684.
12. Gleick, P., The world's water 2000–2001, The biennial report on freshwater resources, table 1, 2001 World population data sheet.

J. Harsha is in the Central Water Commission, Government of India, No. 26/2, Shahid Surya Sen Road, Gora Bazar, Post Berhampur 742 101, India. e-mail: infoharsha@yahoo.com