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Moral drought: The ethics of water use

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Abstract

Water has been called the *berth of life* as it performs basic ecological functions in every environment. Many relevant water properties are not discernible to the human senses: microbes are invisible; colour and taste often give little indication of water composition or potability. For this reason, technological deficiencies in water management are often responsible for disease, mortality and poverty in low-income societies.

In developed countries, there is mounting evidence of the secondary effects of medicines, household products and chemicals present in sewage. Diffuse contamination caused by agriculture and livestock production can reach rivers and lead to water eutrophication favouring algae and microbe blooms.

Both the nature of the problems and the availability of technology vary regionally but improper water management places important limitations on the wellbeing of local populations, women in particular.

A moral issue stands out: the commitment to the amelioration of the population's water health, safety and resource use, while taking into account the sensibilities of local cultures.

The paper suggests a scarcity of ethics in the approach to water use. To overcome this, we should address the water problems of the whole of humankind, making our knowledge, technology and equipment easily available to others.

Keywords: Environment; Water ethics; Water supply; Water technology; Women's rights

Water

Water is the most important molecule for both biosphere and society. It has been called the 'berth of life' for helping to maintain biochemical processes and ecological functions in every environment. From primeval cultural levels to our present technological bonanza, water use has been of paramount importance to mankind and all cultures have treasured knowledge for improving water management. Traditional societies were able to develop technologies in order to construct wells, refurbish natural springs or devise irrigation schemes, creating elaborate methods with which to provide their populations with sufficient access to water.

The bases for sound water management remained obscure until scientific development illuminated the concepts behind them. The chemical properties of water make it a powerful solvent, and natural waters

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present a wide range of concentrations of both natural and artificial substances. Some other properties (variable density, viscosity, surface tension) result in a strong interaction with the surfaces of solids, favouring capillarity and the creation of bubbles and droplets, and providing suspension of large solid particles by transfer of turbulent energy. Water acts as a powerful transport mechanism by eroding, transporting and depositing particles which may include small living organisms.

Few water properties are apparent to human senses. Microbes are invisible to the naked eye and direct observation of colour or taste gives little information regarding the safety of water for drinking. Nonetheless, traditional cultures were able to grasp many potential hazards of water supply and the implications of inadequate sanitation. They had rules of thumb regarding keeping springs and wells free of organic contamination and (often) protected them from direct sun rays. Water filters made of sand or porous stone have been in operation for millennia and latrines were built separated from water supplies. All these factors made a contribution to water safety, but many diseases caused by bacteria, viruses and parasites persisted as endemics in the human population, and the link between this and the management of water was not understood.

Lack of access to technology is responsible for diseases, increased mortality and impoverishment linked to contemporary water mismanagement. According to UNEP (2008), it is estimated that more than 1,100 million people do not have easy access to a safe water source, such as a water main or protected well. Water access for 56% of the population of Africa is limited or available only from unprotected sources; 2,600 million people (half of the developing world) lack even simple improved latrines and are thus exposed to diarrheal diseases, schistomiasis and helminthiasis, and pay a heavy toll in casualties, trachoma and hepatitis A levels in their populations.

To some extent, diseases are a consequence of technical limitations in the management of the environment and its resources, particularly water. This problem is not limited to underdeveloped societies: there is growing concern in the Western world regarding the side effects of chemicals added to food and sanitary materials to enhance their appearance, taste or scent. Medicines, food residues, household products and industrial wastes find their way into sewage. Waste treatment works reduce contamination in sewage by one or two orders of magnitude, but effluent concentrations are sufficient to cause significant effects on aquatic biota, while active substances remain in the solid waste material.

The widespread use of chemicals in industry and agriculture has led to the dispersal of rare chemical elements, antibiotics, pesticides, herbicides and fertilizers on fields. Diffuse pollution from agriculture, industrial residues like mercury (Hg) or brominated flame retardants (polybrominated diphenyl ethers (PBDE)), pharmaceuticals such as hormones, aspirin, beta-blockers or even drug derivates such as benzoilecgonine (a caboxilic acid caused in cocaine metabolism), all find their way to waters (Fent *et al*., 2006; Postigo *et al*., 2010). A small fraction infiltrates the soil reaching the aquifers. Diffuse contamination and sewage represent a growing hazard in the continental waters of developed countries. 'Eutrophication of surface and groundwater is one of the major management concerns for the preservation of biological diversity and the functioning of Earth ecosystems' (Millennium, 2006). Surface and subterranean waters receive contaminants due to inadequate water management practices in both underdeveloped and highly developed countries. In either case, such contamination of water supply causes disease and resource losses to the populations.

Available knowledge can improve water conditions and clearly benefit society, but achieving this goal means overcoming obstacles represented by cultural issues, local environment and population income levels.

Moral issues

A moral issue can be highlighted: the commitment to make information available pertaining to the amelioration of local population water health, safety and resource use issues. Access to information should not disturb the delicate balance of sensibilities and priorities in the local culture.

These issues are not limited to water: the exploitation of any resource can be improved by the incorporation of technological developments. The transfer of knowledge from one group which exploits a resource to another group which can benefit from its application is a relevant ethical issue involving social and cultural traits.

In underdeveloped countries, women often assume the tasks of water abstraction and transport for the whole community. The introduction of easy access to a water source permits the women to apply their abilities to tasks other than carrying water. Plentiful domestic water supply, and the reduction of infectious diseases and child mortality, all induce favourable social changes.

In developed countries, water is a convenient commodity shared equally among the population. However, drinking water quality may still depend on income which can lead to uneven health risks. The perception of the environmental impacts of contamination is shared unequally by the population. Exposure to health risks derived from these impacts is largely governed by the availability of information.

The burdens and benefits of any resource (including water) are not equally shared in populations and the transfer of technology implies some degree of conflict between cultural status and access to technology. Technological developments can serve to drive new social construction, shifting political focus onto new demands. However, these changes are unevenly distributed among the population, and thus favour some sectors against others.

Women's cultural realm

The collection and use of water in different societies is distributed unequally according to gender, race, age, income and education. Cultural processes impose an interpretation of human attitudes or actions. Many natural elements are addressed in a symbolic way and water, a key commodity, is particularly rich in cultural significance.

Many women in underdeveloped countries must carry water to the home, in addition to collecting fuel, preparing meals and caring for children. Water demands include: laundry, child care, food preparation and cooking, and (often) the making of beer or an equivalent beverage. Distant sources and difficult abstraction make supplying the home with water a laborious job. Often, small children have to be carried along with the water.

Piped domestic water supply makes a huge difference: we are so accustomed to taps and sinks that we take them for granted, paying no attention to the elaborate technology supporting the supply.

Taps require pipes, tanks and pumps, but even a simple manual pump can make a marked improvement to water supply. Coupled with adequate water treatment to prevent contamination, it represents a dramatic step towards wellbeing.

The value of water resources also depends on knowledge. If millions of women were better informed regarding the invisible risks of water (microbes, chemical contamination), their food preparation and child care (as well as their own personal health) would greatly improve. Clear, but contaminated or toxic drinking water is a disguised killer, while acute water shortage can put whole societies in peril.

Underdeveloped countries suffer widespread pollution of drinking water, difficult access, inefficient water supply and poor sewage treatment, reflecting the inability of local communities to solve their water limitations. Some problems in the list are left to women, some are regarded as being part of the traditional way of living, and some are considered to be beyond the powers of the community.

Technology applied to water is transforming a natural resource to a social commodity. The technology and equipment available in our Western countries can help change the adverse situation of deprived communities.

Shuval *et al.* (1981) demonstrated how sanitation plays a key role in the economy of societies and how investment in sanitation must exceed a certain threshold in order to make significant advances. There is also an upper limit above which further improvements require increased investment to achieve only modest advances. The lower transition, where the potential gains are more significant, should therefore be the target of our efforts.

Water scarcity is a problem for the populations of many underdeveloped countries, but their problems are also ours. They form a part of our relationship with, and knowledge and understanding of the world. An ethical approach to society may sustain the universal impulse towards wellbeing and the universal right to knowledge, in addition to improving the access of underdeveloped communities to some basic technology (pumps, pipes, taps).

Safe drinking water must be provided, allowing its use for direct consumption, food preparation and child care. Information and equipment should be provided together in a single package in order to improve the lives of several hundred million people, particularly women and children.

For the inhabitants of wealthy countries, making water easily available in all human domestic dwellings may become an ethical imperative.

A recent revision of the ethical aspects of water has been produced by Llamas *et al.* (2009), covering topics from traditional ethics to rights, politics and new technological developments dealing with urban supply, sanitation, agriculture and natural disasters. Sullivan (2009) outlines the connections between poverty and ethics, where water and gender make significant contributions.

Pumping water to other cultures

Western society has developed technology in such a way that it can provide specific tools to address a particular situation, ranging from exploitation of resources to human health or social services. However, each technological application depends on the infrastructure sustaining it which, in turn, is based on a social model. The existence of energy supply, information networks, trade and transport infrastructure and adequate finance for these activities are taken for granted in the application of our technologies. Beyond material needs, technology implementation requires suitable personnel, social understanding and sufficient freedom to allow personal initiative. Tight social limits, strong minority barriers and powerful religious attitudes with strict codes convey a conservative atmosphere where innovation may be stifled.

According to Arisaka (2001), Kiyoshi Miki had observed by the early 1940s that technology goes beyond the sophisticated manipulation of tools, to represent a *form of action* projecting the cultural and political values of society. The possession of technology implies responsibility for its power both when

it is used and when it is restrained in its application. Technology is not a mere modality of knowledge, but the ability to harness natural forces and direct them along designed trajectories.

Technology is not independent of the society that created it. The message and the transfer involve both society and local culture. Arisaka (2001) remarks:

> *'A philosophical analysis of technology should be a pressing issue for anyone concerned with justice and the politics of liberation. For our generation and beyond, this is not simply a theoretical question but an existential one with global implications, as technology is a ubiquitous politico-cultural force that encompasses even the remotest regions of the world.'*

Water technology, in particular, must be integrated into the female sector of those societies featuring strict task divisions according to gender. The laborious task of collecting and transporting water from distant sources has allowed women to build a separate feminine community in which to socialize, communicate problems and seek advice in domestic issues. It is both forum and arena for the female population and constitutes a key social asset.

Water is rich in significance for several religions and has been incorporated into many rites. Both water and women are viewed culturally as being sources of life, and the resulting strong association between these two has led to the negative consequence of leaving women with sole responsibility for issues relating to water. However, it has a deeper significance, placing women in a meaningful position as caretakers of life through their apposite use of water. In a sense, the abandonment of some feminine practices (water abstraction, transport, storage) will be felt, in part, as a loss of personal relevance or commitment to life in the community.

When the implementation of technology in underdeveloped countries is based solely on Western standards, an interference with the attitudes and even the functioning of local communities is likely to ensue. The success of providing a water supply depends largely on the reaction of the women. Efforts geared towards improving the management of water resources, and extending access to safe drinking water and adequate sanitation often overlooks the traditional central role of women in water management (UN Water, 2002).

The need to incorporate cultural issues into projects has been recognized for some time. More recent, however, is an understanding of the close ties between female empowerment and water and sanitation facilities in their communities. From a pragmatic perspective, there is a gain in project efficiency and long-term maintenance when female views, demands and abilities are brought into the project. *The Gender Issues Sourcebook for Water and Sanitation Projects* (Wakeman, 1995: 46) has a detailed questionnaire for each project which includes:

> *'Is the design acceptable for all women in terms of:*
> *water quality and reliability?*
> *adequate access?*
> *appropriate technology and maintenance?*
> *cultural acceptability?'*

Adoption of an overly technical approach surpasses female roles and tends to shift water provision towards the males. This may have the advantage of political power but the drawbacks

include the dismissal of water supply as a non-relevant issue, a strictly feminine issue or even its consideration as unnecessary because it is the 'duty' of the women to supply water. A suitable technology, easily incorporated into existing uses, and mastered by the women themselves, produces immediate social benefits: female empowerment, reduced time devoted to water transport and therefore made available for other tasks, a higher standard of child care and a reduction in the incidence of infectious diseases.

The ethical issue of sharing water resources with communities belonging to underdeveloped countries must be tailored to the social and cultural traits of the recipient community. This would involve the use of adequate technologies and suitable formal introductions, and the involvement of optimal social sectors.

Other demands to be met in a long-term commitment to water management with a community include the need to warrant the adequacy of the technical inputs (quality, simplicity, easy local maintenance and repair). On another level, the technology must be geared to existing needs and coming demands, and the emergence of undesirable side effects must be taken into account. An example of such a side effect would be the accumulation of sewage or contaminated effluents caused by an abundance of water due to plentiful technical supply. This could, in turn, contaminate crops and effectively worsen the local sanitation.

Giving preference of water supply to industry or irrigation under the control of local politics and the aegis of a male population will possibly imply regression in terms of domestic water supply.

The current expansion of NGOs favours a large inventory of water initiatives in developing countries. However, these often lack coordination among themselves and face local political problems (inefficient or corrupt governments), resulting in the incorporation of improper technology. All this can lead to early abandonment, providing no benefits for the community and fuelling a rejection of technology and external aid. The International Water and Sanitation Centre (IRC 2009, 2011) estimates that, over the last 20 years, some 600–800,000 hand pumps have been installed in sub-Saharan Africa with 30% suffering premature failures. Breslin (2010) reports an estimated 50,000 rural water points in Africa which are broken, and that in some areas the majority of water points are not functional.

These figures are not only shameful for the Western society that provided the equipment and controlled the installation. They are also indicative of a situation which reinforces the feeling of abandonment and despair in the local populations: Breslin (2010: 65) quotes a Malawian woman who comments: 'The broken hand pump is a constant reminder of our inability to escape from poverty'.

From an ethical point of view, our failure is our inability to bring poor communities from underdeveloped countries out of poverty, and our unwillingness to provide them with an adequate water supply, sharing the basic technology to ensure water access and to operate a functional sanitary cycle.

Environmental scenarios

According to The 3rd United Nations World Water Development Report: *Water in a Changing World* (UNESCO 2009), the human population is now growing at a pace of 80 million per year, implying new water demands in the range of 64,000 million cubic meters per year. According to UN projections for 2050 and beyond (UN, 2004), the population may rise to 8.9–10.6 billion ($8.9–10.6 \times 10^9$). Roughly 90% of the 1.9–3.6 billion new people above the 2011 7.0 billion figure will belong to the populations of underdeveloped countries where water supply and sanitation pose long-standing problems.

The 55/2 United Nations Millennium Declaration (UN 2000) clearly stated the gravity of water and sanitation problems, echoing the early signals of the 1992 Rio Conference[1] and the 1994 Cairo Population Conference[2] The Millennium Declaration (Point 19, first resolution) committed the signatories 'to halve the proportion of people who are unable to reach or to afford safe drinking water by 2015'. Unfortunately, the 2007 economic crisis led to the phasing out of some of the initiatives and the target objective will not materialize in time.

The Earth has been driven into a period of climate change with rising temperatures and higher climate variability for most countries. Both of these conditions may result in more acute water shortages for agriculture, livestock and population alike. Environmental disruptions manifest themselves differently in each society: specific water demands range from basic water supply to the quality of natural waters for sustaining biodiversity. Nonetheless, water problems in whatever form are consistently present in every society and climate change is not contributing to their solution.

Access to safe water and adequate sanitation are problems well understood by international organizations, governments and the general public. It is true that hundreds of NGOs and thousands of people are making efforts to solve these problems, yet progress has been slow in reducing the casualties, and alleviating the sickness and poverty caused by water scarcity or the burden of heavy work imposed on women responsible for water provision.

Countries which possess technical ability and the means to alleviate water scarcity side effects in poor communities can overcome this situation. It is not a generic obligation of governments but an ethical issue crossing the whole social spectrum. The transfer of knowledge to underdeveloped countries encounters restrictions within the Western world, eager to receive a return for their technical contributions. This return is shaped in various ways: transferring knowledge as an exercise in marketing, presenting needs as demands for branded products, and gaining access to local markets for future commercial interest, among others.

The title of this paper suggests that in the countries of the developed West, a scarcity exists in terms of the ethical analysis of water uses and water rights – a form of moral drought. To overcome this, efforts must be made to address the water problems of the whole of mankind by making our technology freely available to enable others to meet their basic needs.

A similar reflection could bring the use of all natural resources, the use of energy or information, and perhaps the benefit of biosphere services, under our personal responsibility. Growing evidence shows how every level of human activity produces its own environmental problems, making proactive management a necessity in order to address them. Balée & Erickson (2005: 5) state: 'the human species is itself a principal mechanism of change in the natural world, a mechanism qualitatively as significant as natural selection'.

The global change now under way is harsh evidence of how developed countries are affecting the biosphere and impacting upon the resources of less effluent societies. Perhaps it is now the time for Western society to integrate the whole of mankind and the biosphere into its ethical analysis, in a concerted effort to arrest the disruption of the planet and its varied surviving cultures.

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[1] The 'Earth Summit', The United Nations Conference on Environment and Development (UNCED), 3–14 June 1992, in Rio de Janeiro.

[2] The United Nations International Conference on Population and Development (ICPD), 5–13 September 1994, in *Cairo*.

References

Arisaka, Y. (2001). Women carrying water: At the crossroads of technology and critical theory. In: *New Critical Theory*. Paris, J. & Wilkinson, W. (eds). Rowman & Littelfield, New York.

Balée, W. & Erickson, C. L. (2005). *Time and Complexity in Historical Ecology*. Columbia University Press, New York.

Breslin, E. D. (2010). Rethinking hydrophylanthropy: Smart money for transformation impact. *Journal of Contemporary Water Research and Education 145*, 65–73.

Fent, K., Weston, A. A. & Caminada, D. (2006). Ecotoxicology of human pharmaceuticals. *Aquatic Toxicology 76*(2), 122–159.

IRC 2009 (2011). 2009 report. IRC International Water and Sanitation Centre, The Hague.

Llamas, R. M., Martinez Cortina, L. & Mukherji, A. (eds). (2009). *Water Ethics*. CRC Press, Boca Raton.

Miki, K. (1968). *Miki Kiyoshi Zenshu (Collected Works of Kiyoshi Miki)*. Editorial. Iwanami Shoten, Tokyo, 7. p. 201. (Quoted by Arisaka, 2001).

Millennium Ecosystem Assessment (2006). *Biodiversity Synthesis*. Island Press, Chicago.

Postigo, C., Lopez de Alda, M. J. & Barceló, D. (2010). Drugs of abuse and their metabolites in the Ebro river basin: Occurrence in sewage and surface water, sewage treatment plants removal efficiency and collective drug usage estimation. *Environmental International 36*, 75–84.

Shuval, H. I., Tilden, R. L., Perry, B. H. & Grosse, R. N. (1981). Effect of investments in water supply and sanitation on health status: a threshold-saturation theory. *Bulletin WHO 59*(2), 243–248.

Sullivan, C. A. (2009). Poverty and the ethics of water development. In *Water Ethics*. Llamas, R. M. & Martinez Cortina, A. (eds). CRC Press, Boca Raton, pp. 129–150.

UN (2000). Millenium Declaration. Resolution adopted by the General Assembly of the United Nations on the Fifty-fifth session, at 18 September 20 A/RES/55/200.

UN (United Nations) (2004). *World Population to 2300*. Economic and Social Affairs, Population Division, UN, New York. ST/ESA/SERA/236; p. 240.

UNESCO (2009). WWDR3: "Water in a Changing World". UNESCO, Paris, London.

UN Water (2002). *Gender, Water and Sanitation: A Policy Brief. UN Gender and Water Task Force (GWTF)*, UN-Water and Interagency Network on Women and Gender Equality (IANWGE), International decade for Action 'Water for Life 2005–2015'. UN, New York.

Wakeman, W. (1995). *Gender Issues Sourcebook for Water and Sanitation Projects*. UNDP-World Bank Water and Sanitation Program/PROWWESS. Water and Sanitation Program, World Bank, Washington, DC.