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**Protecting and Managing Water Quality
for Health**

While the MDG target for access to improved water supply has been met, questions still exist around the potability and sustainability of those supplies. Moreover, the sanitation target is still unlikely to be met. In order to mitigate water-related health impacts, both now and post-MDGs, it is necessary to co-ordinate community interventions, focussing not only on water quantity and access, but water quality, sanitation/wastewater treatment and source water protection. While some interventions are technological, we need to invest more money and time in enhancing capacity, providing information and empowering communities to take ownership.

KEY WORDS: *water quality, health,
sanitation, education*

Water quality is a function of human activity, water quantity, and barriers put in place to protect water resources from contamination. Around the world, water quality is compromised by global inequalities in access to sanitation and exacerbated by lack of access to improved drinking water supplies. These inequalities are greatest in low and middle income countries, rural versus urban areas and for women versus men. Given the significant health and economic benefits, not to mention the environmental benefits, why are we struggling to meet the Millennium Development Goal (MDG) targets for improving access to drinking water and sanitation? Currently, while on target to meet the drinking water target, the sanitation target is likely to fall short by a billion people (JMP, 2010).

A co-ordinated approach to sanitation, hygiene, and drinking water interrupts the transmission cycle for waterborne diseases that cause diarrhoea, the second leading cause of mortality in under 5s and responsible for 1.5 million deaths every year (UNICEF/WHO, 2009). This makes good health sense, but it also makes good economic sense – the returns on investment from a dollar invested can be as much as 30 times greater, through reduced absenteeism and increased productivity, reduced burden on care givers, and increased school attendance (Hutton et al., 2007). As women and girls bear the brunt of the burden associated with lack of access (i.e. issues of dignity, personal safety, access to education, and health), improved access is an important contributor to gender equity and initiatives must involve women at the community level for ensured sustainability.

There are three barriers to uptake: an information deficit, a capacity deficit, and an investment deficit. In order to make a decision, it has to be informed through reliable, unbiased, and validated information. While such information may exist, it is not always easy to access. Capacity is not simply needed to insert a technology and operate a system; there is a need for fiscal, risk, and asset management. The financial investment, particularly in sanitation, is lacking and does not go to those in absolute need (UN Water,

2010) but financial investment is only part of the story. Yes, money is required, but so is investment in time and experience.

The barriers are not technological. This is not to say that there is not any need for improved and new technologies, but the technology and infrastructure – hardware – is not as important for sustainability as the software. There is a need to ensure sustainable implementation and uptake of existing technologies. Sustainability is all about the balance of appropriate, affordable, effective hardware, and its acceptance, operation, and maintenance (i.e. ownership). In social marketing terms, we need to identify the reasons for people to change their behaviour and implement something different, whether it is at the individual, community, or national level. Another way to frame this is to look at access versus use. If the global water crisis was simply one of technology, we would have met the MDGs already and be well on our way to 100 % coverage. It is not expensive, in terms of money and time, to build a toilet or dig a well. What does take time and money is the co-ordination and communication between stakeholders, including community members; identifying and then finding the information needed in order to make an informed decision, whether at the community, institutional or national level. It is the education of investors, policy-makers and community members.

However, software cannot be the sole focus either. There are still technical needs to be met such as: improved efficiency in energy, effluent, footprint, cost; detecting and removing emerging contaminants and enhanced effectiveness (e.g., arsenic removal); and resiliency in terms of maintenance, operator capacity, and future water quality and quantity constraints.

We need a multiple barrier approach to protecting water quality for health. The first requirement has to be sanitation and pollution reduction mechanisms. The second requirement is sustainable solutions – ones that are community based, community driven, and appropriate (i.e., effective, efficient, affordable, and matched to the water source and the local capacity). Furthermore, data are needed for informed decision-making. Ecosystem integrity is essential, as ecosystem services are important facilitators in maintaining water quality. Finally, a multi-level, multi-sector response is required. Water does not simply flow in channels. It flows through society and through lives, providing for life, livelihoods, and leisure opportunities, all essential to human health.

What mechanisms can be employed to promote improvements at the water-health nexus? From a technological view point, redundancy is key, as are alternative technologies (e.g., ecosan, rain water harvesting, combined energy systems). However, as mentioned earlier, technology is only part of the solution. Diversification, social cohesion, education, alternative livelihoods, and alternative practices are all mechanisms through which communities can reduce their impact on local water resources and improve health.

In order to move forward, we need to *engage* within and across sectors through co-ordination and communication (e.g., water and wastewater; environment; health; technology providers; researchers). We need to *empower*: at the local level this can be achieved through community-based and –driven initiatives; at the institutional level

through professional development; and, at the national level through access to evidence-based information. Finally, we need *enlightenment* – understanding that bridges between options and action and which is the key to behaviour change. It requires relevant evidence-based information and education to ensure that the “why” is understood. This can mean demonstrating options available, the benefits and disadvantages, and experiences of others, such as returns on investment and linkages between cause and effect.

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