8 Water Quality: The Chance to Avert a Global Crisis

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Given the scale of water pollution, the SDG targets related to water quality need to be ambitious and comprehensive if they are to prevent a global water quality crisis.

Targets for controlling pollution and mitigating impact need to be achievable and affordable for countries and should give them flexibility in choosing options.

Monitoring wastewater, fecal sludge and water quality is challenging because many countries have no data, patchy data or unreliable data. Countries/donors should invest in increasing the capacity of countries to generate reliable data.

Hopeful signs of viable approaches based on resource recovery from waste and safe reuse for beneficial purposes are already emerging around the globe. Economics and institutional capacity development are key for replicating and scaling up such approaches.

Resource recovery from wastewater and sludge must occur jointly with the development of guidelines and policies on safe reuse and must be complemented with broader programs for controlling water pollution and mitigating impact.

Rethinking Water Quality Targets

Every day, humans generate millions of tons of solid and liquid waste, much of which is discharged untreated to water bodies, severely polluting the water and damaging human health, ecosystems and industries. The impacts of waste and wastewater have been poorly considered in the global development agenda and the Millennium Development Goals.

Water quality targets now need to go beyond access to sanitation facilities to address the fate of wastewaters and their impacts on the environment and be relevant for developed and developing countries alike.

We need to:

1. make the SDG targets on water quality relevant and realistic at the national level
2. measure and track progress towards the targets
3. support countries in reaching the targets.

Water quality–related targets include targets for collecting, treating and reusing sludge and wastewater and, more broadly, for controlling water pollution and mitigating impacts on human health, ecosystems and economic activities.

SETTING AMBITIOUS BUT REALISTIC TARGETS

In developing countries, little—if any—wastewater or fecal sludge is treated. For example, 92% of the sewage generated in low-income countries and 72% in lower middle-income countries is discharged untreated to water bodies. Industry dumps an estimated 300–400 million tons of heavy metals, solvents, toxic sludge and other waste into the environment. Huge amounts of agrochemicals, sediments from eroded soils and saline drainage water from agricultural activities also end up in water bodies. To address this complexity of threats and to prevent a global water quality crisis, the SDG targets related to water quality will need to be ambitious and comprehensive.

Standard solutions to control water pollution that work in industrialized countries have not always succeeded elsewhere. Attempts to implement conventional wastewater treatment plants often fail due to poor operation and maintenance, related to:

- limited institutional capacities
- unsuitable (e.g. energy-intensive) technology
- poor cost recovery strategies
- people's inability and unwillingness to pay for water services.

These experiences show that realistic, affordable targets must be set for controlling pollution and mitigating impact. Supplying and implementing adequate and affordable technologies will be a challenge for the wastewater industry sector.

Globally, a lot of untreated wastewater and sludge is used directly, with little or no measures to protect health, or released into the environment and reused indirectly (diluted), and sometimes unintentionally, posing risks for farmers, food consumers and ecosystems. Informal irrigation with raw or diluted wastewater is common, particularly in the developing world (as shown in the photo on p39), and represents up to 90% of all current wastewater use. The challenge is to make this practice safe by implementing cost-effective health and environmental protection options, including non-treatment options. Solutions will need to be highly contextualized. Targets should give countries the flexibility to transition to safe forms of excreta and wastewater management relevant to their context. For many regions, the cost of building sewerage networks and conventional treatment facilities will remain prohibitive, and these regions will need options. On-site sanitation facilities and safe fecal sludge management will probably remain the most affordable option.

Monitoring and evaluating progress of highly contextualized approaches will be a challenge. However, measurable targets that track progress over time can galvanize the sector and catalyze national and donor investment.

MONITORING WASTEWATER, FECAL SLUDGE AND WATER QUALITY

We know little about how much wastewater and sludge are produced, collected, treated, used and disposed of globally. We know even less about the proportion of valuable resources (water, organic matter, energy, nitrogen and phosphorus) embedded in these waste streams that is recovered and safely reused for activities such as agriculture.

Many different global organizations support different global assessments and monitoring initiatives related to wastewater, sanitation and water quality. The WHO/UNICEF joint monitoring program, for example, generates national data on access to water and sanitation facilities based on national household surveys. However, it is unlikely that that program can monitor wastewater, because householders have little knowledge of its fate. FAO and IWMI, through AQUASTAT, systematically collect, select and harmonize national data on municipal wastewater production, collection, treatment and reuse. But countries do not use uniform terms to describe wastewater and its fate, making it difficult to compare data and to establish a fully homogenous global inventory. Furthermore, some countries, particularly developing countries, have no data collection systems in place, so their data are patchy.

Monitoring fecal sludge from onsite facilities such as septic tanks requires significant investment. Data are scarce and unreliable, and there is no global monitoring system. Many countries lack information on the location and condition of onsite systems, on the amount of waste they collect and on the fate of the collected waste. The data on the use of untreated waste is particularly deficient, partly because the practice occurs informally or, in some cases, there is an unwillingness to disclose data. Farmers may fear difficulties in trading their produce, and governments may not want to acknowledge a malpractice.

At regional and global levels, monitoring the state and trends of water quality is a big challenge. The UNEP Global Environment Monitoring System (GEMS), through GEMStat, collects comprehensive surface and ground water quality data submitted by governments and other organizations. Nevertheless, many countries have very limited or inexistent water quality monitoring systems, or their data are not publicly available or they lack quality control, so the data are not comparable or cannot be used for monitoring trends.

Unless countries improve their data collection, we cannot:

- adequately diagnose the health and environmental risks associated with disposing of or using untreated wastewater and sludge
- quantify the potential for recovering resources from these wastes
- plan solutions
- assess their success.

We advise countries/donors to increase the capacity of countries to generate reliable data on wastewater and sludge cycles and support them with standard definitions and methods for generating data. The sooner countries can set target baselines the better. In the interim, or in parallel, remote sensing and modeling approaches should be considered for extrapolating water quality data.

WHO, UN-Habitat and UNEP are developing a global monitoring mechanism that aligns with the anticipated SDG target and indicators for wastewater and water quality. They will be working with existing monitoring initiatives as well as investigating new data collection methods and remote sensing and modelling approaches to fill data gaps.

Many well-established, low-cost and decentralized solutions are available to the least developed countries, as long as past institutional failure is not repeated.

REACHING THE TARGETS RELATED TO WATER QUALITY

To reach their water quality targets, countries will need to choose institutional and technical solutions that are validated and context-specific and that can work at scale. Countries will also need to create the environment that allows these solutions to be sustainable.

Fortunately, many well-established, low-cost and decentralized solutions are available to support progress even in the least developed countries, as long as past institutional failure is not repeated.

Another positive sign is the emerging understanding that economics is as important as technical solutions for scaling up resource recovery and safe reuse (RRR) of wastewater and sludge. IWMI and its partners have developed suitable scalable RRR business models based on the study of 200 empirical cases that bridge the sanitation and agricultural sectors. The business models are being tested for feasibility in 10 cities across the globe.

IWMI and its partners also support public and private entities by designing innovative low-cost technologies that can work at scale in low-income countries, support livelihoods, enhance food security, support green economies and contribute to cost recovery in the sanitation service sector (Figure 10). However, resource recovery from wastewater and sludge must occur jointly with developing guidelines and policies on safe reuse and must be complemented with broader programs for controlling water pollution and mitigating impact, as supported by WHO, UNEP and FAO.

COLLABORATING FOR SAFE AND PRODUCTIVE WASTEWATER REUSE

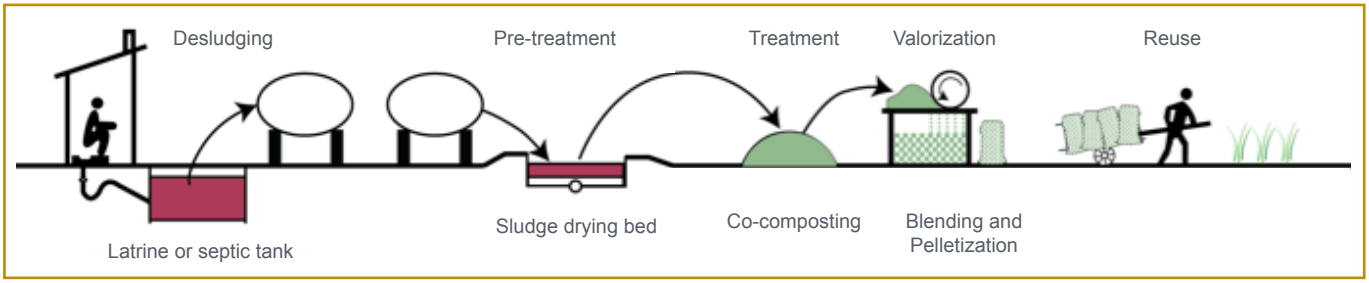
Science-based solutions, capacity development and awareness-raising are key elements that IWMI and its collaborators will be addressing to avert a water quality crisis.

IWMI tested low-cost options for safely using wastewater in informal irrigation. The results assisted WHO in developing guidance notes for its 2006 *Guidelines for safe wastewater use* and the related Sanitation Safety Planning approach and were used by FAO to develop a training handbook for Farmer Field Schools.

IWMI continues to support the wastewater database within FAO's AQUASTAT and contributes to the UNEP-led Global water quality initiatives under the umbrella of UN-Water.

Between 2011 and 2013, 160 people from 73 UN member states in Asia, Africa and Latin America took part in workshops about using wastewater safely and productively. This capacity development was supported by IWMI, the UN University, WHO, FAO and UNEP. An ambitious second phase is being planned in anticipation of the SDGs.

FIGURE 10. **Example of reuse-oriented fecal sludge management model as implemented in Ghana.**



Source: *IWMI 2013*