



TOWARDS A WORLD FREE OF UNTREATED WASTEWATER



It's high time to break the Catch-22 situation that low-income countries and their populations face.

When the targets of SDG 6 are met in 2030, and the amount of untreated wastewater is reduced by half, millions of people in low-income countries that use wastewater for food production will remain exposed to long-term health risks in their daily lives. A shift in thinking, in policies and investment – away from reactive public health measures to effective treatment of wastewater – is a key to improving the livelihoods of these communities.

Findings

- The use of untreated wastewater in developing countries presents a 'Catch 22' situation: it provides critical economic and social benefits to poor communities, but this often comes at the expense of unacceptable health and environmental risks.
- Recent evidence suggests that there are significantly higher prevalence rates of water borne diseases such as gastroenteritis in areas irrigated with raw wastewater (75%) than freshwater irrigated areas (13%); with associated higher annual health costs.
- The Disability Adjusted Life Years (DALYs) – a key global indicator for population health and wellbeing – stemming from diarrhea are significantly lower in countries with improved water quality; expressed as a higher percentage of wastewater treatment, and vice versa.
- If SDG 6.3 is achieved worldwide by 2030, Low income countries will still have 46% untreated wastewater, 36% in lower-middle-income countries, 31% in upper-middle-income countries, and 15% in high-income countries.
- Monitoring the progress of implementing and achieving SDG 6.3 at the country level will require access to pertinent, high quality data and robust monitoring mechanisms, which today are lacking or embryonic in most developing countries.

Introduction

Water recycling and safe reuse is critically important for water quality protection and water resource conservation. Safely managed wastewater protects environment and health and when safely used in agriculture it helps improve livelihoods and the resilience of farming communities. In addition, when wastewater is safely managed, nutrient and energy recovery results in revenue generation to enhance the economic value of wastewater and increase in cost recovery (WWAP 2017). However, despite multiple benefits that wastewater brings to communities, progress on treatment of wastewater and fit-for-purpose use of treated wastewater remains very slow in many developing countries (Andersson et al., 2016). Today, these countries are at a crossroads to move forward with decision-making and put in place supportive policies that open strategic investments, to expedite wastewater treatment, that will contribute to water-related sustainable development.

Sustainable development and wastewater treatment

Transforming wastewater management is a critical factor to shift the world onto a sustainable development path. Managing wastewater safely is key to addressing water-related sustainable development, and particularly SDG target 6.3 – which calls for improving water quality by reducing pollution, eliminating dumping and minimizing the release of hazardous chemicals and materials, and ultimately, by 2030, halving the global proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

Achieving SDG 6.3 at country level reveals interesting data points, even as data is not available on wastewater and treatment for all countries. Lower-middle-income countries (LMICs) on average treat 28% of wastewater they generate, while only 8% of wastewater is treated in low-income countries (LICs) (Sato et al., 2013).

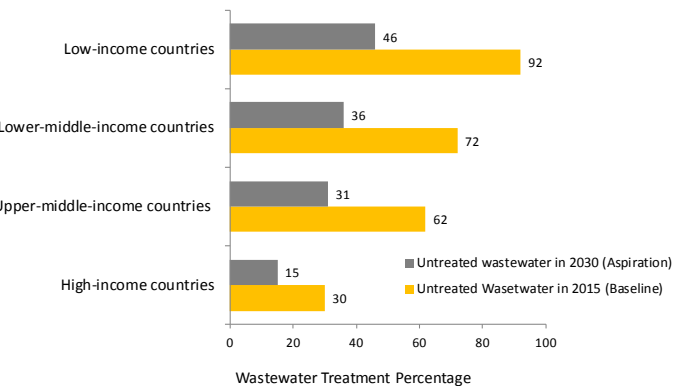


Figure 1. Percentage of untreated wastewater in 2015 in countries with different income levels and SDG 6.3 aspirations for 2030 with 50% reduction over the 2015 baseline (Calculated using data from Sato et al., 2013)

Looking at this situation from the perspective of SDG 6 (availability and sustainable management of water and sanitation for all), these two country groups are expected to achieve higher reductions in untreated wastewater than high-income countries (HICs) and upper-middle-income countries (UMICs). If SDG 6.3 is achieved worldwide by 2030, there will still be 46% untreated wastewater in LICs, 36% in LMICs, 31% in UMICs, and 15% in HICs (Figure 1).

Improving wastewater treatment is also closely linked to other SDGs such as SDG target 3.3 (By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases); SDG target 3.9 (By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination); and SDG target 12.4 (By 2030, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil to minimize their adverse impacts on human health and the environment).

Current practices and policies

While wastewater brings considerable value to farming communities in LICs and LMICs, its use in untreated and inadequately treated forms damages the environment and people’s health, and has longer-term implications for sustainable development. For example, contaminants such as heavy metals, salts and pathogens accumulate in lands irrigated by wastewater, causing long term degradation and the need for their removal from soil and plant root zones. Heaving irrigation and leaching practices help remove these contaminants, but often shift pollution from wastewater-irrigated land to groundwater. This scenario exposes urban and peri-urban populations to contaminated groundwater. This is a dangerous side effect, as this resource is the primary source of drinking water and other domestic water needs for millions of people living in low income communities (Dickin et al., 2016). Studies comparing wastewater and freshwater irrigated areas show environmental degradation and higher rates of water-borne diseases among children in areas irrigated with untreated or inadequately treated wastewater than in freshwater zones (Box 1).

The impacts of irrigation with raw wastewater go beyond children to other segments of the population and may be expressed in Disability Adjusted Life Years (DALYs). As elaborated by the World Health Organization (WHO), DALYs for a disease or health condition are calculated as the sum of the Years of Life Lost (YLL) due to premature mortality in the population and the Years Lost due to Disability (YLD) for people living with the health condition or its consequences. Using secondary data on the quality of water, reflected through percentage of wastewater treated at the country level (FAO-AQUASTAT, 2017), and the burden of water borne

diseases, expressed in DALYs attributable to water, sanitation and hygiene (Prüss-Üstün et al., 2008), statistically significant correlation was found between wastewater treatment percentage and DALYs; i.e. the DALYs values stemming from diarrhea were significantly lower in countries with improved water quality expressed through higher percentage of wastewater treatment, and vice versa.

An urgent need for supportive policies and strategic investments

To better manage and mitigate the negative effects of untreated wastewater and the associated increasing health costs, developing countries need to make sound economic assessments on the feasibility of investing in wastewater treatment. These analyses need to consider economic, social, societal, health, and environmental benefits. Apart from inadequate public budgets for wastewater treatment, other factors contribute to a wastewater management gap experienced by LICs and LMICs. These gaps include a lack of supportive policies, unclear institutional arrangements, and a critical shortage of human resources that have the skills and expertise needed to address these problems. These shortcomings combine to create the wastewater treatment problems that most developing countries face today.

The good news is that there is a wealth of practical examples showing how to improve wastewater management and reduce its negative effect on populations. Higher income countries point to 'bright spots' of good practice for wastewater collection, treatment, reuse and safe disposal of wastewater (WWAP, 2017). For example, the wastewater treatment, use and disposal in North America northern Europe and Japan

are subject to stringent effluent discharge regulations for environmental quality. Treated wastewater is used for irrigation in these locations, but the practice is not substantial in humid areas. The situation is different in the arid and semi-arid areas of developed countries, such as western North America, Australia, Parts of the Middle East, and southern Europe, where wastewater, after treatment, is used primarily for irrigation – a fact of life, driven by increased competition for ever more scarce water, between agriculture and other economic sectors.

Given increasing water scarcity in the world's semi-arid and dry areas, it is likely that the demand for wastewater as a source of irrigation will increase in these zones of LICs and LMICs, necessitating safe distribution and management of wastewater. To best address this situation, several practical interim technical and policy questions need to be considered by decision makers in developing countries. These include better:

- **methods for handling wastewater** on farms and in farm communities
- **recommendations for crop irrigation and cultural practices** that are suitable for settings where wastewater is the primary source of irrigation
- **methods for protecting farm workers and consumers** from the potentially harmful pathogens and chemicals in wastewater, including risk reduction measures such as sanitation safety planning (WHO, 2016).

It is clear that improving wastewater management globally, and particularly in developing countries, is not something that can be done quickly. But positive change can start today if changes are made to current practice and policy thinking. Bringing in these new perspectives in developing countries will spark the change needed to move toward a world free of untreated wastewater, sooner rather than later.

Box 1. Vulnerable segments of population suffer in areas irrigated with raw wastewater

A study investigating health implications of wastewater irrigation on children (8-12 years) in peri-urban Aleppo, Syria, revealed significantly higher prevalence rates of water borne diseases such as gastroenteritis in wastewater-irrigated area (75%) than freshwater irrigated area where only 13% of children were affected by gastroenteritis. The annual health cost per child (sum of expenses on physician fee and medicine cost) was 73% higher in wastewater area than the health cost for the same age group in freshwater area (Grangier et al., 2012). Regarding prevalence rates of non-water borne diseases, such as chickenpox, there were non-significant differences between freshwater and wastewater-irrigated areas. These findings suggest that children, being the most vulnerable members of these communities, are at greater risk from water borne diseases, in wastewater areas. This points to the need for strategic policies and investments to guide wastewater treatment and safe and productive use of wastewater rather than spending on their health costs.

Grangier, C., M. Qadir, and M. Singh. 2012. Health implications for children in wastewater-irrigated peri-urban Aleppo, Syria. *Water Quality, Exposure and Health* 4 (4): 187-195.

Recommendations

- **It is high time for a call for action to break the cycle of wastewater benefits at the expense of environmental and health risks** through increased coverage of wastewater treatment to make water recycling and safe reuse profitable and see a world free of untreated wastewater sooner than later.

- **Improving wastewater treatment coverage should be promoted beyond achieving SDG target 6.3** as it would support and ensure the success of other SDGs such as SDG 3.3 (ending epidemics and combating water-borne and other communicable diseases), SDG 3.9 (reducing deaths and illnesses from air, water and soil pollution), and SDG 12.4 (reducing release of wastes to air, water and soil to minimize their adverse impacts on health and environment).
- **Policy makers need to prioritize supportive policies for strategic investments** in (1) increasing wastewater collection and treatment to trigger a win-win for those communities irrigating with wastewater and those using wastewater produce, and (2) the environmental and human health.
- Given the slow pace of increasing wastewater treatment coverage in developing countries, **a range of practical interim technical and policy level interventions are needed** to take forward new thinking, until full-scale wastewater treatment is achieved in these countries. This can include, for example, better methods for handling wastewater on farms and in farm communities; better recommendations for suitable irrigation and cultural practices in settings where wastewater is the primary source of irrigation; and better methods for protecting farm workers and consumers from the potentially harmful contaminants, including risk reduction measures such as sanitation safety planning.
- **Developing countries need support to build capacity for planning, collecting, and synthesizing wastewater datasets** to report on the status of achieving SDG 6.3. Several UN-Water members and partners have a range of expertise and a history of fruitful cooperation in building capacity on safe and productive use of wastewater in agriculture, aquaculture, aquifer recharge, and agroforestry systems. In addition, countries can benefit from the UN-Water's Integrated Monitoring Initiative for SDG 6, that builds on the experience and lessons learned during the Millennium Development Goals (MDGs) period.

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Authors: Manzoor Qadir and Jacintah Mwachiro

Editors: Vladimir Smakhtin and Michael Devlin

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204 - 175 Longwood Road South, Hamilton, Ontario, Canada, L8P 0A1

Tel: +905 667-5511 Fax: +905 667 5510