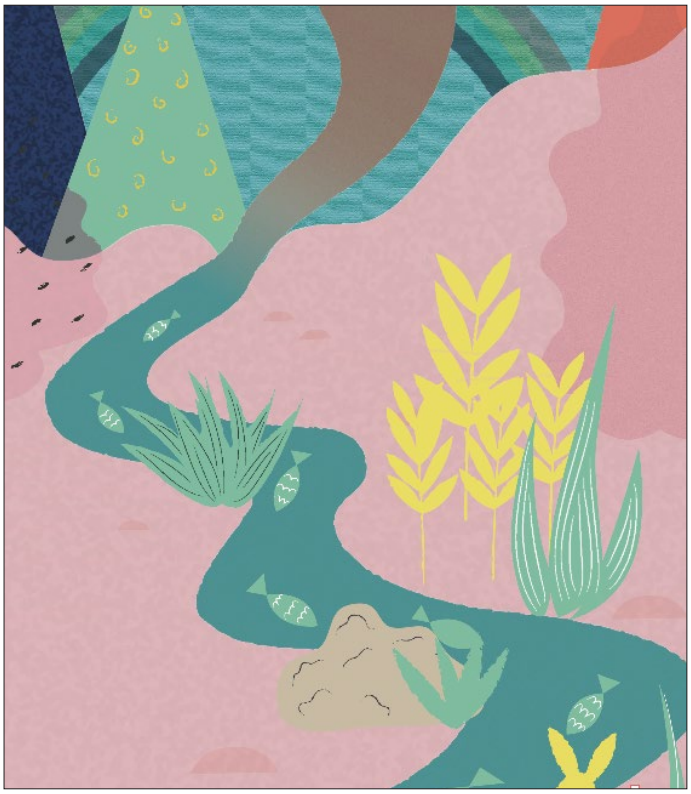
WORLD WATER DAY 2017: WHY WASTE WATER?

INTRODUCTION

World Water Day, on 22 March every year, is about taking action on water issues. In 2017, the theme is wastewater and the campaign, 'Why waste water?', is about reducing and reusing wastewater.

Sustainable Development Goal (SDG) target 6.3 requires us by 2030 to "improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally."

Progress towards target 6.3 will also help achieve the SDGs on health and well-being (SDG 3), safe water and sanitation (SDG 6), affordable and clean energy (SDG 7), sustainable cities and communities (SDG 11), life below water (SDG 14), and life on land (SDG 15), among others.



TOP LINE MESSAGES

- **Globally, over 80% of the wastewater generated by society flows back into the ecosystem without being treated or reused.[1]**

- **1.8 billion people use a source of drinking water contaminated with faeces[2], putting them at risk of contracting cholera, dysentery, typhoid and polio. Unsafe water, poor sanitation and hygiene cause around 842,000 deaths each year.[3]**

- **663 million people still lack improved drinking water sources.[4]**

- **By 2050, close to 70% of the world's population will live in cities, compared to 50% today[5]. Currently, most cities in developing countries do not have adequate infrastructure and resources to address wastewater management in an efficient and sustainable way.**

- **The opportunities from exploiting wastewater as a resource are enormous. Safely managed wastewater is an affordable and sustainable source of water, energy, nutrients and other recoverable materials.**

- **The costs of wastewater management are greatly outweighed by the benefits to human health, economic development and environmental sustainability – providing new business opportunities and creating more 'green' jobs.**

WASTEWATER AND THE WATER CYCLE

Water has to be carefully managed during every part of the water cycle: from fresh water abstraction, pre-treatment, distribution, use, collection and post-treatment, to the use of treated wastewater and its ultimate return to the environment, ready to be abstracted to start the cycle again.

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[1] On average, high-income countries treat about 70% of the wastewater they generate, while that ratio drops to 38% in upper-middle-income countries and to 28% in lower-middle-income countries. In low-income countries, only 8% of industrial and municipal wastewater undergoes treatment of any kind (Sato et. al, 2013).

[2] WHO/UNICEF (2014), Progress on drinking water and sanitation: 2014 update: https://www.unicef.org/gambia/Progress_on_drinking_water_and_sanitation_2014_update.pdf

[3] WHO (2014), Preventing diarrhoea through better water, sanitation and hygiene: exposures and impacts in low- and middle-income countries: http://apps.who.int/iris/bitstream/10665/150112/1/9789241564823_eng.pdf

[4] WHO/UNICEF (2015) Progress on sanitation and drinking water, 2015 Update and MDG Assessment https://www.wssinfo.org/fileadmin/user_upload/resources/JMP-Update-report-2015_English.pdf

[5] UN Department of Economic and Social Affairs (2014), World Urbanization Prospects: 2014: https://esa.un.org/unpd/wup/Publications/Files/WUP2014-Highlights.pdf

Due to population growth, accelerated urbanisation and economic development, the quantity of wastewater generated and its overall pollution load are increasing globally. However, wastewater management is being seriously neglected, and wastewater is grossly undervalued as a potentially affordable and sustainable source of water, energy, nutrients and other recoverable materials. It therefore needs to be seen as a resource, rather than a burden to be disposed of.

There are many treatment processes and operational systems that will allow us to use wastewater to meet the growing water demand in growing cities, support sustainable agriculture, and enhance energy production and industrial development.

WASTEWATER AND CITIES

By 2030, global demand for water is expected to grow by 50%[6]. Most of this demand will be in cities and will require new approaches to wastewater collection and management. Indeed, reused wastewater may help address other challenges including food production and industrial development.

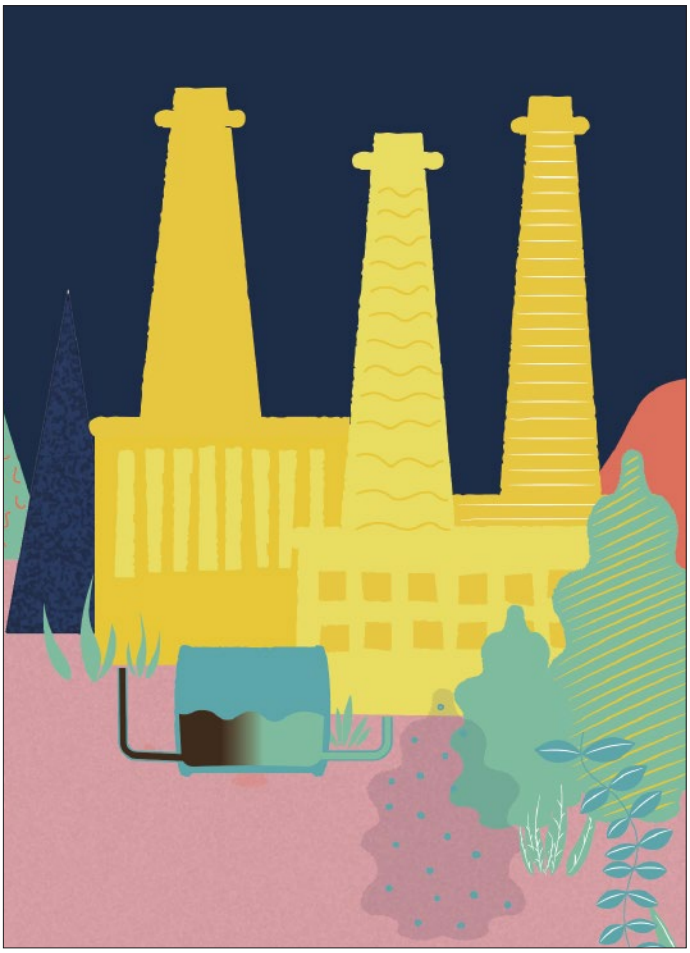
Mainly in low-income areas of cities and towns within developing countries, a large proportion of wastewater is discharged directly into the closest surface water drain or informal drainage channel, sometime without or with very little treatment. In addition to household effluent and human waste, urban-based hospitals and industries such as small-scale mining and motor garages, often dump highly toxic chemicals and medical waste into the wastewater system. Even in cities where wastewater is collected and treated, the efficiency of treatment may vary according to the system used. Traditional wastewater treatment plants may not remove certain pollutants, such as endocrine disruptors, which can negatively affect people and the ecosystem.

Examples:

- **Dual distribution systems delivering reclaimed water. Since 1977 in St Petersburg, Florida, USA, a parallel network of pipes, separate from potable water mains, has served a mix of residential properties, and commercial and industrial parks, enabling them to use recycled water for irrigation, laundry, vehicle and building washing, and ornamental water features.**

- **Biologically purifying wastewater before discharging. The effluent volume from Schiphol Airport, Am-**

[6] UNHABITAT (2016), World Cities Report 2016: Urbanization and development: http://wcr.unhabitat.org/wp-content/uploads/sites/16/2016/05/WCR-%20Full-Report-2016.pdf



sterdam, is comparable to that of a small city with a population of 45,000. About half of the wastewater originates from passengers and businesses at the airport, 25% is discharged by aircraft and catering, and the remaining volume is produced by other aviation-related businesses. The on-site wastewater treatment plant biologically purifies water to a quality fit for discharge into local waterways.

WASTEWATER AND INDUSTRY

Societal and environmental pressures over recent years have led to a growing movement for industry to reduce its wastewater and to treat it before discharge.

Wastewater is now seen as a potential resource and its use, or recycling after suitable treatment, can provide economic and financial benefits.

Wastewater can be used within the business itself or between several businesses through 'industrial symbiosis'. Industrial water consumption is responsible for 22% of global water use (UN-Water, 2012). In 2009 in Europe and North America, water consumption by industries was 50% as compared to 4-12% in developing countries (WWAP, 2009). It is expected that in rapidly industrialising countries, this proportion could increase by a factor of five in the next 10-20 years. Therefore, there is a strong incentive to use wastewater in-house and locally, based on cost savings alone.

Businesses can directly use some wastewater, providing it is fit for purpose. For instance, using process water for cooling or heating, or rainwater from roof collection or concrete aprons for toilet flushing, irrigation or vehicle washing.

Examples:

- **An industrial ecosystem. In Kalundborg, Denmark, the by-products of one enterprise are used as a resource by other enterprises, in a closed cycle. The Asnæs Power Station receives 700,000 m^3 of cooling water from Statoil each year, which it treats and then uses as boiler feed water. It also uses about 200,000 m^3 of Statoil's treated wastewater for cleaning each year. The savings to local water resources are considerable: nearly 3,000,000 m^3 of groundwater and 1,000,000 m^3 of surface water per year.[7]**

- **Reclaiming water from mining. The Witbank coalfields are located around Emalahleni, a small city in**

[7] Domenech and Davies (2011), "Structure and morphology of industrial symbiosis networks: The case of Kalundborg", Procedia - Social and Behavioral Sciences, vol 10, 2011, pages 79-89: http://www.sciencedirect.com/science/article/pii/S1877042811000127

South Africa dealing with worsening water scarcity. The Anglo American mining company built a water treatment plant that uses desalination technology to convert water from the mine into drinking water, and treat industrial water so it can be safely released into the environment. As an added benefit, in the treatment process, gypsum is separated from the water and used as a construction material. The plant provides a safe and secure water source to the city, meeting 12% of Emalahleni's daily water needs.[8]

WASTEWATER IN AGRICULTURE

Partly to help maximise yields to meet demand, usage of chemical fertilizers and pesticides has increased in recent years, both in industrial and small farming, making agriculture a potential source of environmental pollution.

Pollution of groundwater and surface water by agricultural use of untreated or inadequately treated wastewater is a major issue in many developing countries where such irrigation is practised.

Farmers are increasingly looking into non-conventional water resources, mainly wastewater, whether due to its high nutrient content or lack of conventional water resources. If applied safely, wastewater is a valuable source of both water and nutrients, contributing to water and food security and livelihood improvements.

Improved wastewater management can improve the health of workers, especially in agriculture, by reducing the risk of pathogen exposure. It can also create direct and indirect jobs in water-dependent sectors and beyond.

Example:

- **Use of wastewater in farming. It is estimated that more than 40,000-60,000 km^2 of land is irrigated with wastewater or polluted water (Jimenez and Asano, 2008), posing health risks to farmers and to eventual consumers of the agricultural products. Available technologies allow removal of almost all contaminants from wastewater, making them suitable for every use. The WHO Guidelines on Safe Use of Wastewater in Agriculture and Aquaculture and the Sanitation Safety Planning (SSP) approach provides a comprehensive framework to ensure that health risks are managed to protect public health.**

[8] For more information: "The eMalahleni Water Reclamation Plant in South Africa": http://www.iwa-network.org/filemanager-uploads/WQ_Compendium/Cases/The%20eMalahleni%20Water.pdf