UN WATER

WATER QUALITY
AND WASTEWATER

Water pours into a rice field in Sapa, Viet Nam. UN Photo/Kibae Park

UNITED NATIONS

Good water quality is essential to human health, social and economic development, and the ecosystem. However, as populations grow and natural environments become degraded, ensuring there are sufficient and safe water supplies for everyone is becoming increasingly challenging. A major part of the solution is to produce less pollution and improve the way we manage wastewater.

A more circular and therefore more sustainable economy requires us to value wastewater for its potential, rather than discard or ignore it. More than just an alternative source of water, safe wastewater management could help protect our ecosystems and give us energy, nutrients and other recoverable materials.

The province of KwaZulu Natal, unique for its rich biodiversity, is one of South Africa's most important farming areas and suppliers of water. But its pristine natural beauty will be threatened if coal mining develops as it has in neighbouring Mpumalanga, where the mining industry has had detrimental environmental and social effects, including widespread water pollution.
UN Photo/Gill Fickling

Challenges and opportunities

Water must 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. Due to population growth, accelerated urbanization and economic development, the quantity of wastewater generated and its overall pollution load are increasing globally.

The availability of safe and sufficient water supplies is inextricably linked to how wastewater is managed. Increased amounts of untreated sewage, combined with agricultural runoff and industrial discharge, have degraded water quality and contaminated water resources around the world. Globally, 80% of wastewater flows back into the ecosystem without being treated or reused, contributing to a situation where around 1.8 billion people use a source of drinking water contaminated with faeces, putting them at risk of contracting cholera, dysentery, typhoid and polio. Far from being something to discard or ignore, wastewater will play a major role in meeting the growing water demand in rapidly expanding cities, enhancing energy production and industrial development, and supporting sustainable agriculture.

Wastewater and cities

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. However, water used by a municipal authority for irrigating green spaces or cleaning streets does not need to be treated to a potable standard. Treating wastewater to a water quality standard appropriate to its intended use increases the potential for cost recovery.

The growth of urban demand for water will require new approaches to wastewater collection and management. Indeed, reused wastewater may help address other challenges including food production and industrial development.

Wastewater and industry

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sures 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. In 2009 in Europe and North America, water consumption by industries was 50% as compared to 4-12% in developing countries. 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.

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. Improved wastewater management can improve the health of workers, especially in agriculture, by reducing the risk of pathogen exposure.

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.

Facts and figures

- Globally, 80% of wastewater flows back into the ecosystem without being treated or reused (UNESCO, 2017).

- 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. (UNESCO, 2017).

- 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. (UN-Water, 2011)

- Water availability is also affected by pollution. Most problems related to water quality are caused by intensive agriculture, industrial production, mining and untreated urban runoff and wastewater. (UN-Water, 2011)

- By 2050, close to 70% of the world's population will live in cities, compared to 50% today. Currently, most cities do not have inadequate infrastructure and resources to address wastewater management in an efficient and sustainable way. (UNDESA, 2014)

- 1.8 billion people use a source of drinking water contaminated with faeces, putting them at risk of contracting cholera, dysentery, typhoid and polio. (WHO/UNICEF 2015)

- Since the 1990s, water pollution has worsened in almost all rivers in Africa, Asia and Latin America (UNEP, 2016a).

- The greatest increases in exposure to pollutants are expected to occur in low- and lower-middle income countries, primarily because of higher population and economic growth in these countries, especially those in Africa (UNEP, 2016a), and the lack of wastewater management systems (WWDR, 2017).

Find out more:

UN Environment: Global Environment Monitoring System (GEMS Water)
UN Environment: Global Wastewater Initiative
UN-Water (2015): Compendium of Water Quality Regulatory Frameworks: Which Water for Which Use?
UN-Water (2016): Towards a Worldwide Assessment of Freshwater Quality
UN-Water Activity Information System: Safe Use of Wastewater in Agriculture
WHO/UNICEF (2015): Progress on sanitation and drinking water – 2015 update and MDG assessment
UN Environment: A Snapshot of the World's Water Quality: Towards a Global Assessment.
UN World Water Development Report 2017.

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