



# GOAL 6

Ensure availability and sustainable management of water and sanitation for all

By JUSTIN D. BROOKES and CAYELAN C. CAREY

**A**ccess to clean, safe and secure water resources is an essential prerequisite for communities to prosper. While access to water and sanitation is often taken for granted in developed countries, this basic right is denied to many across the globe every day.

Sustainable development goal (SDG) 6, as formulated by the United Nations Open Working Group, presents an ambitious, yet achievable mission for the next two decades: “Ensure availability and sustainable management of water and sanitation for all.” We propose that this goal can be achieved by applying four principles: 1) Separating drinking water from wastewater; 2) Accessing and treating drinking water to remove chemical and biological contaminants; 3) Protecting and restoring freshwater ecosystems; and 4) Guaranteeing water access and water rights.

## 1. Separating drinking water from wastewater

Historically, the single biggest factor contributing to the increased longevity of humans was the separation of drinking water from wastewater. Building sanitary infrastructure has enabled communities—and in turn, economies—to flourish, free from the burden of waterborne disease. Yet, today a staggering 1 billion people still do

not have access to improved sanitation, in spite of the fact that it would reduce disease and infant mortality. There are many examples of successful sanitation projects in the developing world when financial resources and engineering are available. They demonstrate that it is possible to separate water for drinking from wastewater in regions that traditionally have lacked this infrastructure. Although many challenges remain to ensuring adequate sanitation for all, building sanitary infrastructure is a critical step needed to achieve SDG 6.

## 2. Accessing and treating drinking water

Having water available at home or within short distances obviates the need to cart it from other sources, often over long distances. A direct result of greater water accessibility is a substantial increase in time available for productive work, attending school, developing a business, or raising a family. This is particularly relevant for women and children who spend significant time gaining access to water when it is not piped to their home. Ultimately, water will require treatment before drinking, but this challenge can be overcome with adequate resources for filtration and disinfection. In particular, point-of-use devices that are robust, reliable, require low maintenance and are widely available are needed to enable treatment for small drinking water systems. In tandem with principle 1 above, this will ensure there are multiple barriers to pathogens, offering greater protection to consumers.

JUSTIN D. BROOKES is Director of the Water Research Centre at the Environment Institute, School of Biological Sciences, at the University of Adelaide, Australia. CAYELAN C. CAREY is Assistant Professor in the Department of Biological Sciences, at Virginia Polytechnic Institute and State University, United States of America.

### 3. Protecting and restoring freshwater ecosystems

We must also be cognizant of the relationship between ecosystem well-being and human health. Most of the world's fresh waters have already been degraded due to unsustainable withdrawal, contaminants, climate change, nutrient pollution (eutrophication), and other human activities. The net result of human misuse and mismanagement of fresh waters is decreased water quality and inadequate quantity for consumption. Preserving and enhancing the ecological integrity of our freshwater lakes, rivers, wetlands and groundwater is critical for ensuring that pollutants and pathogens do not contaminate drinking water supplies. Functioning freshwater ecosystems have many built-in mechanisms that help naturally clean water that we need for drinking (e.g. riparian buffers that absorb stormwater run-off). As with principles 1 and 2 above, developing sanitary infrastructure is pivotal for protecting fresh waters from eutrophication, which is one of the greatest challenges to functioning freshwater ecosystems. Balancing the maintenance of natural capital and the provision of ecosystem services with development and increased productivity is the key to ensuring the future sustainability of our water resources.

### 4. Guaranteeing water access and water rights

Economic development inevitably requires water resources. However, it is imperative that planners and Governments are considerate of the needs of diverse water users, including communities, agriculture, industry, mining and the environment. All development and land use changes have consequences. For example, land clearing will alter river flows, increasing the risk of flooding. Similarly, deforestation will decrease evapotranspiration, reducing precipitation needed for agriculture downwind. As the need for water for agriculture and industry increases, it is critical that we develop water-sharing agreements to ensure equitable access for all water users, including the environment. These agreements will require negotiations across local, regional and national boundaries and must include participants representing all stakeholders, such as community and industry leaders, and scientists. While these discussions may be difficult, they are not impossible and will help ensure adequate water access for all.

## IMPLEMENTING THE UNITED NATIONS POST-2015 DEVELOPMENT AGENDA

Tremendous progress has already been made towards meeting SDG 6. As nations have become more prosperous, they have undertaken sanitation and drinking water improvement programmes. Nevertheless, the astonishing statistics regarding the number of people who still lack sanitation and access to safe drinking water emphasizes that this problem remains one of the greatest humanitarian challenges.

Leadership is required at every level to implement water reform: within the household, within municipalities and within Governments. The solutions for supplying potable water and

sanitation vary depending upon the available resources, the size of the communities and the scale of the desired improvement. We advocate both “top-down” and “bottom-up” approaches. Top-down water quality improvement and water allocation may appear as an imposition, but are often accompanied with more resources and provide the legislative framework necessary for sustainable development. “Bottom-up” improvement is also desirable as communities take responsibility and stewardship for the water resources and land for which they are custodians.

Education is the common prerequisite for water quality improvement. In developing nations, educating women and children in every household on the benefits of hygiene and sanitation is a fundamental first step for building awareness and implementing change. Advancing water quality in villages, towns and cities requires engineering, but also understanding of the close links between water quality and quantity, and land management. In developed nations with more advanced water treatment infrastructure, the educational focus should be on improving water sustainability and developing policies required for water reform.

Human water use across the globe is coupled with social and natural systems, both by the globalized economy, trade and capital, as well as by the global water cycle and climate systems. Therefore, local and regional water use cannot be managed in isolation. The responsibility of developed nations is not just to provide financial aid, but also to assist developing countries in building human capital with the skills necessary to improve water quality and sanitation. Developed nations can help research and advance new water treatment technologies, providing sustainable solutions for water management. Investment of time and resources to the development of low-cost, robust and reliable point-of-use devices is urgently needed.

Water reform needs to address the protection of water quality through prudent land management and the allocation of water between different users. Equitably sharing water resources between human consumers, the environment, industry, and agriculture is complex and requires strong water governance and policy so that the needs of both upstream and downstream users are met. This is further complicated by the fact that rivers flow across local, regional and national boundaries. Integrated water-trading markets are one tool that enables water to be bought and sold as a tradable commodity. This practice, however, does not consider water for the environment, which needs protection through policy and legislation.

## CONCLUSION

Water sustains life, but clean, safe drinking water defines civilization. Achieving SDG 6 promises dramatic improvement to the quality of life and longevity in some of the world's poorest nations. If we declare that access to clean, safe drinking water is a basic human right, then providing the necessary education, infrastructure and support to ensure the success in achieving SDG 6 is the responsibility of us all. **unc**