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# **Introductory Chapter: Water Sustainability in a Dynamic World**

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Additional information is available at the end of the chapter

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## **1. Introduction**

Water is the largest limited natural resource which is vital for survival of all living beings. Floods, droughts, and famines brought about by climate changes have been noted to occur with more frequency in the recent years. Therefore, the need for the adoption of sustainable methods toward water use and management is critical in the present-day scenario. In addition, there is also an urgent need to develop policies and make smart investment decisions to promote water sustainability in the light of climate change.

## **2. Water footprint**

Increase in standard of living around the world has also brought with it an increase in the demand for water-intensive goods further impacting the already limited fresh water resources [1]. Water footprint is the term used to calculate the amount of water pertaining to the production of a commodity. The water footprint can either be classified as green, blue, or grey depending on the source of water used for producing a product. While green refers to the amount of rainwater, blue refers to the amount of groundwater used to produce a product. On the other hand, grey water footprint refers to the amount of fresh water that will be used to dilute an aqueous solution consisting of pollutants to bring it down to the desirable level. It is critical that countries take steps to keep the water footprint at the lowest and promote sustainable management of water resources as the implications of irresponsible water usage can be global in nature [2].

### 3. Water-stressed cities

Studies from The Nature Conservancy report indicate that one in four major cities is water stressed, and the demands for water will double in the next three decades. The Water Scarce Cities (WSC) Initiative was initiated by the World Bank to promote water security. This was promoted by increasing awareness among people and nations, facilitating collaborations and dialogs between stakeholders, and by facilitating and providing technical assistance and logistical support in countries [3]. In the present situation of water scarcity, it is critical to rethink related aspects of urban water management in the light of rainwater harvesting, water use, and wastewater treatment since all these sectors need to be handled together [4].

### 4. Revival and rehabilitation of waterbodies

Water management for a sustainable future also includes rejuvenation and revival of polluted waterbodies. Revival of the waterbody promotes the conservation of the ecology of the surrounding area. Rehabilitation of waterbodies is first brought about by cleaning/removal of the sludge settled, followed by methodical ways to stem the flow of effluents from industries or raw sewage into the waterbody. Recently, there has been an increased interest in exploring eco-friendly approaches in treatment of waterbodies. In the same vein, the potential of floating wetlands in promoting water purification has been widely studied. Floating wetlands often consist of hormonally treated plants with synergistic bacterial colonies in the rhizosphere region which have the ability to adsorb harmful trace contaminants in the waterbody.

### 5. Promoting clean water and cities

Proper disposal practices with regard to hazardous chemicals (e.g. fertilizers) can go a long way in reducing the load of nutrients reaching the waterbody. Excessive levels of nitrogen and phosphorus in waterbodies (from surface run-off from agricultural fields) can promote eutrophication of waterbodies leading to the destruction of the fresh water ecosystem. Maintaining a low level of water footprint and judicious water reuse strategies can significantly reduce the water consumption and reduce the water stress. Water reuse strategies such as a grey water pool system can be undertaken at a larger scale in communities to promote sustainable water management. Adoption of techniques like rainwater harvesting to recharge the aquifer as well as use it as a source of water can be promoted extensively thereby minimizing run-off of precious rainwater into open drains [5].

### 6. Conclusion

The 2030 Agenda for Sustainable Development put forth by the United Nations identified 17 Sustainable Development Goals (SDG) which requires urgent attention, implementation, and

monitoring by both developing and developed countries. SDG 6 and SDG 14 are focused on ensuring availability of safe drinking water to all and sustainable use of marine and ocean resources, respectively. This explains the urgent need to move toward sustainable water management. Many countries have taken initiatives to adopt sustainable water use and reuse techniques, while others have realized the need for such measures. Protecting the ecosystem for the future generations begins with judicious water management strategies today.

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