

Review

The State of the Art and Emerging Trends in the Wastewater Treatment in Developing Nations

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Citation: Bijekar, S.; Padariya, H.D.; Yadav, V.K.; Gacem, A.; Hasan, M.A.; Awwad, N.S.; Yadav, K.K.; Islam, S.; Park, S.; Jeon, B.-H. The State of the Art and Emerging Trends in the Wastewater Treatment in Developing Nations. *Water* **2022**, *14*, 2537. <https://doi.org/10.3390/w14162537>

Academic Editor: Alexandre T. Paulino

Received: 4 July 2022

Accepted: 15 August 2022

Published: 18 August 2022

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Abstract: Water is the founding fundamental of life and hence is a basic need of life. However, due to the ever-rising population, industrialization has emerged as a global issue. This problem has notably escalated in developing countries. Their citizens face problems such as floods, drought, and poor water quality. Due to poor water quality and sanitation problems, most health issues are caused by water-borne infections. In developing countries, untreated wastewater is released into water bodies or the ground, thereby polluting natural resources. This is due to the lack of sufficient infrastructure, planning, funding, and technologies to overcome these problems. Additionally, the urbanization of megacities in developing countries is highly accelerated, but it is disproportionate to the required resources for treating wastewater. Due to this biological oxygen demand (BOD): chemical oxygen demand (COD) ratio is increasing exponentially in developing countries compared to developed ones. Spreading awareness, education and supporting relevant research, and making stringent rules for industries can alone solve the water problem in developing countries.

Keywords: point sources; unsustainable; urbanization; biodegradable; wastewater treatment

1. Introduction

No life form on earth can exist without water. Human civilization is dependent on water for domestic and industrial purposes. It is one of the most precious assets on this planet. The earth's surface consists of 71% water, but only 0.3% is usable (National Ground Water Association) as shown in Figure 1. Our water demand is fulfilled from underground, rivers, wells, and streams [1]. The earth is a closed system i.e., it does not allow the transfer or exchange of any matter including water. Hence, water is a limited resource. The water that was present billions of years ago is the same that we are using now. Mother earth maintains the water quantity and quality through the hydrological cycle. This substantiates the need of reusing water for our domestic and industrial purposes. Chemically, water is a universal solvent; it is tasteless, odorless, and colorless. Owing to this nature, water leaches minerals from nature that make it more beneficial for drinking purposes [2]. But due to the same characteristic, water also dissolves natural and artificial harmful chemicals