

# Chapter 2

## Challenges and Opportunities in Implementing AI for Smart Water

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### **ABSTRACT**

*Adopting emerging technologies based on Artificial Intelligence in water management is essential to address the challenges of drinking water scarcity. Artificial Intelligence proposes new advantages over current technologies, with the main objective of optimizing the drinking water supply and ensuring that future generations have access to safe and clean water. The current issues detected from the Sustainable Development Goals (SDGs), in particular SDG 6 - clean water and sanitation, seek to reduce water scarcity, optimize efficiency and sustainability in water use, improve the quality of water for human consumption, maintain real-time monitoring and management, among other aspects relevant to everyday life. This chapter aims to identify opportunities and challenges in water management through the ethical and appropriate use of Artificial Intelligence to achieve SDG 6 and propose viable alternative solutions.*

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# 1. INTRODUCTION

## 1.1 Importance of Water for Human Consumption

Water is fundamental to life; in fact, it is the origin of life. Playing a vital role in all physical and chemical reactions, including those that occur internally in living organisms, water is the most crucial element on our planet and has enabled the emergence and development of species, according to the National Institute of Public Health (INSP, 2022).

Suffice it to say that 80% of the chemical composition of living beings is water (70% in the case of humans, which is stored especially in cells), which allows metabolic processes to occur; for example, digestive processes require water to dissolve nutrients from food. Water is part of almost all cellular chemical reactions (UNAM, 2024).

For people, water enables the development of distinct functions, among them:

- Transports nutrients to the cells.
- Collaborates in blood circulation, respiration, and digestion.
- Enables the proper functioning of the nervous system and brain.
- Forms part of muscle contraction and allows tissues to have flexibility and elasticity.
- Helps regulate body temperature.
- Provides basic minerals such as magnesium, calcium, and fluoride.
- Aging dose.

In fulfilling such principal functions, a lack of water can prevent the body from adequately developing its activities, such that chronic dehydration can be fatal (Secretaría de Salud, 2016). Therefore, daily water consumption, between six and eight glasses a day, is essential to stay hydrated and for the body to function efficiently.

Water is an essential resource for all forms of life. It is a common good (Zamagni, 2014), which has no substitute in the market, a renewable but finite and exhaustible natural resource, which has social value and is considered a third-generation human right (Shiva, 2002).

Recent studies by the United Nations (UN) show the existence of a serious water crisis caused both by climatic factors and by human or anthropogenic actions. It is estimated that 40% of the world's population suffers from water scarcity and that 50% of humanity could live in water-scarce areas by 2025 because global demand for freshwater will exceed supply by approximately 40%.

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