



The contribution and challenges of water treatment in achieving the SDGs

Wafaa Hufdhay Ajam¹, Zahraa Hamid Mohan Al-Gawwam², Basma Abdel Khaleq Eidan³, Lina Mahmoud Tawfiq Jebril⁴, Sarah Hussein Hamzah⁵, Nadia Mahmoud Tawfiq Jebril^{5*}

¹Department of Pathology and Forensic Medicine , Hammurabi College of Medicine, University of Babylon, Babylon, Iraq.

²Department of Physiology, Hammurabi College of Medicine, University of Babylon, Iraq.

³Medical Laboratories Techniques Department, AL-Mustaqbal University, 51001 Hillah, Babil, Iraq

⁴Civil Engineering , Altinbas University, Istanbul, Turkey.

⁵Department of Biology, College of Science for women, University of Babylon.

*Corresponding author's e-mail address:

nadia.tawfiq@uobabylon.edu.iq

Abstract. In water treatment plants is critical to achieving the adopted sustainable development goals (SDGs) to increase water availability to have goals: SDG 1: no poverty, SDG 2: zero hunger, SDG 3: good health and wellbeing, SDG 4: quality education, SDG 5: gender equality, SDG 6: clean water and sanitation, SDG 7: affordable and clean energy, SDG 8: decent work and economic growth, SDG 9: industry, innovation, and infrastructure, SDG 11: sustainable cities and communities, SDG 12: responsible consumption and production, SDG 13: climate action, SDG 14: life below water, SDG 15: life land, SDG 16: peace,, justice and strong



institution and SDG 17: partnerships for the goals. In this review, the possible achieving goals and the challenges that faced the plan anticipated to advance the involvement of the water management competence to the SDGs were outlined. This review highlights the substantial encouragement of water management in the United Nations' SDGs.

Keywords: water treatment, sustainable development goals, SDG 1, SDG 2, SDG 3, SDG 6, SDG 7, SDG 9, SDG 11, SDG 12, SDG 13.

الخلاصة

في محطات معالجة المياه أمر بالغ الأهمية لتحقيق أهداف التنمية المستدامة المعتمدة لزيادة توافر المياه لتحقيق أهداف التنمية المستدامة: الهدف 1: القضاء على الفقر ، الهدف 2: القضاء على الجوع ، الهدف 3: الصحة الجيدة والرفاهية ، الهدف 4: التعليم الجيد، الهدف 5: المساواة بين الجنسين ، الهدف 6: المياه النظيفة والصرف الصحي ، الهدف 7: طاقة نظيفة وبأسعار معقولة ، الهدف 8: العمل اللائق والنمو الاقتصادي ، الهدف 9: الصناعة والابتكار والبنية التحتية ، الهدف 11: المدن والمجتمعات المستدامة ، الهدف 12 : الاستهلاك والإنتاج المسؤولان ، الهدف 13: العمل المناخي ، الهدف 14: الحياة تحت الماء ، الهدف 15: أرض الحياة ، الهدف 16: السلام والعدالة والمؤسسة القوية والهدف 17: الشراكات من أجل الأهداف. في هذا الاستعراض، تم تحديد الأهداف والتحديات التي يمكن تحقيقها والتي واجهت الخطة المقترحة لتحسين مساهمة مرافق معالجة المياه في أهداف التنمية المستدامة. تسلط هذه المراجعة الضوء على التأثير الكبير لمعالجة المياه على أهداف التنمية المستدامة للأمم المتحدة.

الكلمات المفتاحية: معالجة المياه، أهداف التنمية المستدامة، الهدف 1، الهدف 2 ، الهدف 3 ، الهدف 6 ، الهدف 7 ، الهدف 9 ، الهدف 11 ، الهدف 12 ، الهدف 13.

1. Introduction into SDGs

The supportable progress agenda was formed at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012 (<https://www.un.org/sustainabledevelopment/development-agenda>) [1] and was adopted by the United Nations in September 2015, to propose universal goals that address of the urgent challenges the opposite world. This agenda 2030, contains a set of 17 SDGs. 6 SDGs from out 17 SDGs, efforts specifically on water-related concerns,



comprising water, sanitation, and hygiene (WASH) services. WASH is associated with many other SDGs that concern health, and education, and communities have goals on raising WASH services (https://www.pseau.org/outils/ouvrages/ps_eau_the_sustainable_development_goals_for_wash_services.pdf). Due to abstraction to problems of water resources, 77% of Iraqi population does not have admittance to drinking water [2].

2. The contribution of water treatment to SDGs

Water treatment contributes to SDGs except for SDG 10, as mentioned recently SDG 10 is not related to SDGs that deal with environmental preservation. Water treatment contributions are:

SDG 1: No poverty

Water affects on poverty ratio or the "development of a society" as it is effluence on agriculture, industrial, and other human-related activities that depend on water availability. When the development of water treatment occurred, the goal of no poverty was achieved by growing the revenue of the society [3].

SDG 2: Zero hunger

As mentioned above is the food availability (agricultural activity, farm, and yields) affected by the water availability. To make sure healthy diets, it is vigorous to have fresh water be disbursed separately diurnal [4].

SDG 3: Good health and wellbeing

Untreated water (raw water either from freshwater or wastewater) contains microorganisms such as bacteria, protozoa, fungi, viruses, and parasites. These microorganisms are harmful to human health causing infections in the case of drinking. However, modern and effective treatment plants can eliminate this risk. These improvements in the treatment plants let people be healthier [5]

SDG 4: Quality education

As mentioned earlier the growing revenue of the society makes no poverty, and this occurs when water is available. When people are poor, they will not be able to attend a school or other education sectors as education is not almost free and secondly, people may work during the day to income their family. Therefore, treated and available water is giving more opportunities for people to have an education [6].



SDG 5: Gender equality

This goal shows how females are additionally precious because of their proficiency in water management. Women could be unhealthy compared to men. Women are exposed to contaminated water through their work at home or on farms, as their nature to work for domestic and agricultural purposes. When the perfections in the water treatment plants are, women will be healthier [7].

SDG 6: Clean water and sanitation

The growth of the income of society depends on clean water and hygiene development. Because the improvements lead to an increase in the accessibility of fresh water and ultimately advantage people existing in humanity [6].

SDG 7: Affordable and clean energy

The water treatment plant could offer affordable and clean energy. As the production from drinking water/ wastewater treatment plants contains a huge amount of sludge and organic matter, these products can be used for generating energy by many methods [8], [9], [10], [11].

SDG 8: Decent work and economic growth

Water treatment contributes to attired effort and financial development could be directly or indirectly. The existing/ expanding water treatment facilities in an area are likely to offer a significant number of careers. Through this, the addition of external income for the area occurred and eradicated the problem of unemployment. And this especially addresses these in developing countries more than in developed countries [12], [13].

SDG 9: Industry, innovation, and infrastructure

To get a better and more developed process in water treatment plants, innovation is needed. The innovation is usually funded by governments, organizations, or the United Nations. Through these projects, more opportunities were introduced in the technology sector, and by this, SDG 9 was achieved. The technology helps limit the hazards of untreated water or wastewater. On the other hand, this technology supports industries and generates employment chances to be linked to achieving SDG 8 [14], [15], [16], [17].

SDG 11: Sustainable cities and communities

A sustainable city is mainly planned with concern for social, economic, and environmental impressions. One of the important



addresses of environmental impact is water management [18]. To have a sustainable city, water management must be planned to have an efficient management system. Having water availability is important to reach sustainability in the city [19].

SDG 12: Responsible consumption and production

This goal encourages people to reuse natural sources instead of using them. Regarding this review, the concern about water reuse is important. The contaminated natural water must be treated and used for different purposes. On the other hand, wastewater could be recycled as a wall rather than be discharged into water bodies which protects them from contamination and in [20].

SDG 13: Climate action

Well or developed treated water and wastewater help in eliminating climate action. When treated water is used for energy incomes the practice of other new and subversive water resources is become low. On the other hand, recycled wastewater is used for renewable energy to decrease the possessions of weather alteration [21].

SDG 14: Life below water

The lifecycle underneath the aquatic system is very important for humans. If humans consume seafood that is contaminated with hazardous pollutants, their lives will be threatened. The discharge of untreated wastewater kills living organisms that live in the entire water body and more pollutants accumulate on those that are still alive. Therefore, the quality of raw water and discharged wastewater affects the life below the water, and any development in the water treatment process ensures goal SDG 14 is reached [22], [23].

SDG 15: Life land

Life land is the goal to protect the terrestrial environment resources and prevent them from being degraded for maintaining for future generations. The importance of seeking this goal that is terrestrial environment resources contribute to avoiding climate change by eliminating CO₂ and balancing oxygen, carbon dioxide, and humidity in the atmosphere [24]. In addition, SDG 15 also seeks for protecting the ecosystems/ biodiversity and their economic ethics. Therefore, when this goal is achieved the good quality of water is ensured. Terrestrial environmental possessions deprivation and water resources are related to each other. Healthy terrestrial environment resources



stock clean water. Or on the other hand, clean water produces healthy soil and is attractive for tourism.

SDG 16: Peace, justice and strong institution

Peacetime, fairness, and a sturdy organization must be practical in the aquatic management procedure. The water action developments must demonstrate occupied assurance of the agreements and guidelines associated with sustainable development and growth or human rights. As SDG 16 aims to the improving the lives of people, the importance of treated water must be developed for achieving the above goals [25].

SDG 17: Partnerships for the goals

As mentioned above, water treatment is linked to SDGs directly or indirectly. When treated water/ wastewater is available or developed or goal SDG 6: clean water and sanitation achieved, no poverty and hunger occurred, people being good health and well-being, an opportunity for both genders to have their education, reasonable and spotless vigour applied, dressed effort and financial development, manufacturing, invention, and substructure and maintainable metropolises and societies created. When the water treatment project takes into consideration the goal of accountable ingesting and manufacture, weather achievement is achieved, and lifetime underneath marine and on terrestrial is ensured, according to peace, justice, and strong institution goal [26].

3. Challenges of water treatment in achieving of the SDGs

The challenges for the contribution or development of water treatment in achieving the SDGs must be considered and could be more concerned in developing than in developed countries. The possible challenges are the lack of funding for research, nonexistence of supervise curiosity, lack of governmental enterprises/supplies, lack of constituents/properties, unbending program, deficiency of plans on water treatment, absence of official provision, and absence of supervise proficiency.

4. Conclusions

This review found that the critical interlinkages and inspirations between all of the SDGs and the contribution of water treatment to SDGs were direct or indirect. It is vibrant that the development of the 17 SDGs within a country necessitates partnership by accountable organisations to address the challenges.



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