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Evaluating Integrated Water Resources Management: Current State and Prospects

تقييم إدارة الموارد المائية المتكاملة: الوضع الحالي والتوقعات المستقبلية

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Abstract (English):

The study aims to explore measures related to the utilization and control of water for the benefit of the public, assessing its intertwining with economic, social, cultural, and environmental dimensions, this includes a comprehensive evaluation of available water management capabilities, assessing needs, and the extent to which a balanced approach to water management is achieved while preserving both the quantity and quality of water, in accordance with Sustainable Development Goals (SDGs).

The research paper highlights the sixth goal of the Sustainable Development Goals, emphasizing global-scale water resource management through the UN Development programme, it examines the objectives and achievements of this goal until 2023, relying on reports and statistics issued by the United Nations, following the descriptive and retrospective methodology.

Keywords: UN Development programme 2030; SDGs6; Integrated Water Resources Management .

ملخص باللغة العربية:

تهدف الدراسة إلى استكشاف الإجراءات المتعلقة باستخدام المياه والسيطرة عليها لصالح الجمهور، ومدى ارتباكها بالأبعاد الاقتصادية والاجتماعية والثقافية والبيئية، ويتضمن ذلك تقييمًا شاملاً لإمكانيات ادارة المياه المتاحة، وتقييم الاحتياجات، ومدى تحقيق نهج متوازن لإدارة المياه مع الحفاظ على كمية وجودة المياه، وفقًا لأهداف التنمية المستدامة.

تسلط ورقة البحث الضوء على الهدف السادس من أهداف التنمية المستدامة، مع التركيز على إدارة موارد المياه على نطاق عالمي من خلال برنامج الأمم المتحدة للتنمية، وفحص الأهداف والإنجازات المتحققة لهذا الهدف حتى عام 2023، بالاعتماد على التقارير والإحصاءات الصادرة عن الأمم المتحدة، وذلك باتباع المنهج الوصفي والمنهج الاستقرائي.

كلمات مفتاحية: برنامج الأمم المتحدة للتنمية 2030؛ الهدف السادس من أهداف التنمية المستدامة ؛ الإدارة المتكاملة للموارد المائية.

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1- Introduction:

Sustainable development has risen as the fundamental principle steering global progress over the long term, as outlined by the 1987 World Commission on Environment and Development, the commission articulates that sustainable development entails addressing current needs while safeguarding the capacity of future generations to fulfill their own requirements.

In an effort to advance sustainable development, all United Nations member states unanimously embraced the Sustainable Development Goals (SDGs) in 2015, These goals represent a universal call to action, aiming to eradicate poverty, safeguard the planet, and ensure peace and prosperity for all by the year 2030. They emphasize a balanced approach that encompasses social, economic, and environmental sustainability.

To translate these aspirations into concrete action, the UN has implemented various measures, these include the sustainable management of natural resources and urgent initiatives in water resource management to shield the Earth from degradation and ensure the availability of resources for both present and future generations.

The significance of this study lies in the incorporation of water resource management as a crucial goal to be achieved by 2030, This involves adopting an integrated approach to water resource management, facilitating the sustainable development of both terrestrial and associated resources. The objective is to pursue economic and social well-being while concurrently safeguarding essential ecological systems.

The study aims to explore measures for water use and control for public benefit, linking economic, social, cultural, and environmental dimensions, this involves comprehensive assessment of water potential, evaluating water needs, and achieving a balanced water approach while maintaining quantity and quality, aligned with the SDGs.

The research paper sheds light on the sixth goal of the Sustainable Development Goals, focusing on water resource management on a global scale through the UN Development Programme, it examines the objectives and achievements of this goal up to 2023 based on UN reports and statistics.

Consequently, the research question is posed: **Have the Sustainable Development Goals related to water resource management under the UN Development Programme achieved their objectives in light of their accomplishments by 2023**? The topic is divided as follows:

Firstly: The content of the sixth goal of the UN Development Programme 2030, "Clean Water and Sanitation."

Secondly: Objectives of the sixth goal of the UN Development Programme 2030.

Thirdly: The current state of water resource management globally according to UN reports on Sustainable Development Programme 2023.

Fourthly: Challenges in achieving sustainable water resource management based on the annual Sustainable Development Goals report for 2023.

2-The content of the sixth goal of the UN Development Programme 2030, "Clean Water and Sanitation".

Amidst the formidable challenges presented by the impacts of climate change, economic and population growth, and pollution, prioritizing water security and promoting sustainable development becomes imperative.

In the face of daunting challenges posed by the consequences of climate change, economic expansion, population growth, and pollution, it becomes crucial to prioritize water security and advocate for sustainable development, these considerations are vital for effectively addressing the intricate interconnections among food, energy resources, and water (Zineb Moumen, 2019, p. 302).

SDG 6 was introduced as a distinct goal to the UN, recognizing that ensuring access to clean, safely managed water, sanitation, and hygiene constitutes fundamental interventions (Nina Lansbury Hall, 2020, p. 02).

The sixth goal of the United Nations' 2030 Development Agenda emphasizes the integrated management of water resources, as endorsed by the Advisory Committee of the Global Partnership, involves a comprehensive approach to overseeing and utilizing water sources in a coordinated manner, this goal signifies a process facilitating the sustainable development of terrestrial and associated water resources (Souilah, 2014, pp. 57,58).

The objective is to attain enhanced economic and social well-being while ensuring the equitable sustainability of ecological systems (Halim, 2017, p. 69), This encompasses a series of measures concerning water utilization and regulation, establishing connections between economic, social, cultural, and environmental aspects.

Achieving water security and sustainable development hinges on a comprehensive approach that involves a meticulous evaluation of water capacities, a thorough assessment of water requirements, the establishment of a balanced water distribution system, and the implementation of appropriate strategies to conserve both the quantity and quality of water resources (kenza belhocine, 2022, p. 54).

3- Objectives of the sixth goal of the UN Development Programme 2030.

The sixth goal of the UN Development Programme 2030 is dedicated to ensuring clean water and sanitation for all. The specific aim, as outlined by UN indicators, includes:

- Guaranteeing universal and equitable access to safe and affordable drinking water for all is a pivotal commitment, as articulated in the UN Development Programme 2030.

- Strive for equitable access to sufficient sanitation and hygiene facilities for all, placing a particular emphasis on eradicating open defecation and meeting the distinct requirements of women, girls, and vulnerable populations.

- Enhance water quality through measures such as reducing pollution, eliminating indiscriminate dumping, minimizing the release of hazardous substances, decreasing the proportion of untreated wastewater, and significantly promoting global recycling and safe reuse of water.

- Significantly enhance water-use efficiency across various sectors, ensuring sustainable withdrawal and provision of freshwater to effectively combat water scarcity, thereby reducing the number of people impacted by it.

- Enforce integrated water resources management at all levels, advocating for collaborative efforts, especially in transboundary contexts when required.

- Protect and restore water-related ecosystems, encompassing mountains, forests, wetlands, rivers, aquifers, and lakes, with the target of completion by the year 2020.

- Broaden international cooperation and offer capacity-building assistance to developing nations in endeavors and initiatives associated with water and sanitation. This encompasses the advocacy of technologies for water harvesting, desalination, water efficiency, wastewater treatment, and recycling.

- Promote and enhance the involvement of local communities in the enhancement of water and sanitation management.

4- The current state of water resource management globally according to UN reports on Sustainable Development Programme 2023.

As of 2023, the global state of water resource management, as outlined in UN report on the Sustainable Development Programme:

- Despite progress in providing essential services such as safe water, sanitation, and hygiene, a significant global population still lacks access to these basic necessities. The challenge of water scarcity is escalating due to various factors, including conflicts and the adverse impacts of climate change. Additionally, water pollution remains a pressing concern, affecting both human health and the environment across numerous countries, To attain universal coverage by 2030, a significant acceleration beyond current rates of progress is imperative, This entails a six-fold increase for drinking water, a five-fold increase for sanitation, and a three-fold increase for hygiene, To align with Goal 6, critical measures involve boosting infrastructure investments,

promoting cross-sectoral coordination, and addressing the consequences of climate change.

- As of 2022, despite significant progress, approximately 2.2 billion people still did not have access to safely managed drinking water services, Additionally, 3.5 billion lacked safely managed sanitation services, and 2.0 billion lacked basic hygiene services. Although the majority of those affected lived in rural areas, the unserved population is decreasing in rural regions while remaining stagnant or even increasing in urban areas. Achieving universal coverage by 2030 requires a substantial acceleration, estimated to be between 5 to 8 times the current rate.

- As of 2022, in the realm of wastewater management, about 58 percent of household-generated wastewater was safely treated, as indicated by data from 140 countries and territories. However, concerning domestic wastewater trends, there has been minimal progress observed toward the objective of halving the proportion of unsafe discharges by 2030.

- Between 2015 and 2020, global water use efficiency exhibited a noteworthy improvement, rising from $17.4/m3 to $18.9/m3, reflecting a notable enhancement of 9 percent. In 2020, approximately 57 percent of countries sustained water use efficiency levels at $20/m3 or lower, a slight decrease from the 58 percent reported in 2015.

- In 2020, global water stress persisted at a relatively safe level of 18.2 percent. However, substantial regional disparities were evident, with a 1.2 percent increase from 2015, Water stress levels varied from high in Central and Southern Asia to critical in Northern Africa. Particularly concerning was the 18 percent surge in water stress levels experienced by Northern Africa and Western Asia from 2015 to 2020.

- Despite some advancements, half of the countries still lack effective frameworks for sustainable water management. This deficiency leads to insufficient coordination across various sectors, including agriculture, industry, energy production, and household supply, this lack of coordination jeopardizes the achievement of various Sustainable Development Goals, particularly those concerning food, energy, and terrestrial life. Although global progress has been visible since 2015—rising from a score of 49/100 in 2017 to 54/100 in 2020—the pace of implementation must double to meet the set target.

- Comparing data between 2017 and 2020, it is evident that only 32 out of 153 countries sharing transboundary rivers, lakes, and aquifers have operational arrangements that cover 90 percent or more of these shared water resources. This indicates challenges and gaps in the effective management of transboundary water resources on a global scale.

- The global landscape of surface water bodies, encompassing lakes, rivers, and reservoirs, is undergoing rapid changes, alarming statistics reveal that one in five river basins has witnessed significant fluctuations in surface water levels, surpassing the natural variability observed within

the past five years, this underscores the dynamic and evolving nature of surface water systems on a global scale.

- Official development assistance (ODA) directed towards the water sector has experienced a noteworthy decline, marking a 15 percent decrease from $9.6 billion in 2015 to $8.1 billion in 2021, Additionally, total ODA commitments to the water sector decreased by 12 percent, dropping from $11.2 billion in 2015 to $9.8 billion in 2021, It's worth highlighting that commitments reached their highest point at $13.5 billion in 2017 and have consistently decreased each subsequent year, This trend raises concerns about the sustained financial support for crucial water-related initiatives.

- Since 2016, a significant percentage of countries have implemented procedures to involve local communities in both rural drinking water and water resources management, surpassing 70 percent. However, the proportion of countries demonstrating substantial levels of actual community participation remains consistently low, consistently staying below 40 percent, even with established procedures outlined in law or policy, this suggests a gap between policy frameworks and the practical implementation of community engagement in water-related initiatives.

5-Challenges in achieving sustainable water resource management based on the annual Sustainable Development Goals report for 2023.

In the 2023 annual report on Sustainable Development Goals, the spotlight is on the challenges associated with achieving sustainable water resource management, these challenges illuminate the obstacles hindering efforts to ensure responsible and efficient water utilization for both current and future generations,The challenges include:

5.1- While there have been improvements in water-use efficiency, particularly within the agricultural sector, the escalating water stress in various regions raises significant concerns.

Water-use efficiency has witnessed significant enhancements, especially within the agricultural sector, However, the growing water stress in various regions continues to be a cause for concern. Despite global water stress levels remaining at a relatively safe status of 18.2 percent en 2020, the need for continued attention to sustainable water management practices is evident. (Milan, 2017, p. 489).

Despite maintaining a relatively safe global water stress level of 18.2 percent in 2020, substantial regional disparities persist, Central and Southern Asia are confronted with high water stress levels, exceeding 75 percent, while Northern Africa grapples with a critical water stress situation, surpassing 100 percent, Of particular concern is the significant 18 percent surge in

water stress experienced by Northern Africa and Western Asia from 2015 to 2020, In 2020, an estimated 2.4 billion people resided in water-stressed countries, with nearly 800 million living in areas classified as high or critically high water-stressed. This underscores the urgent need for targeted measures to address water stress disparities and ensure sustainable water management practices.

Addressing water stress necessitates a concentrated effort to enhance water-use efficiency, which is recognized as a pivotal strategy in mitigating these challenges. Globally, water-use efficiency has shown a commendable 9 percent increase, escalating from $17.4/m3 en 2015 to $18.9/m3 en 2020, These figures showcase considerable diversity, ranging from below $3/m3 in economies heavily reliant on agriculture to over $50/m3 in highly industrialized or service-based economies. This underscores the importance of tailoring water-use efficiency strategies to the specific characteristics of different economies and sectors.

The agricultural sector has witnessed the most significant improvement in water-use efficiency, marking a substantial 20 percent rise since 2015. In comparison, the industrial and service sectors experienced increases of 13 percent and 0.3 percent, respectively. Advancing water-use efficiency requires the adoption of more effective irrigation systems, enhancements in agricultural management practices, addressing leakages in distribution networks, and optimizing industrial and energy cooling processes. (UN report, Goal-06, 2023).

Fig.1. Water-use efficiency, 2015 and 2020 (United States dollars/m3)

Source: UN, report/2023, https://unstats.un.org/sdgs/report/2023/Goal-06/

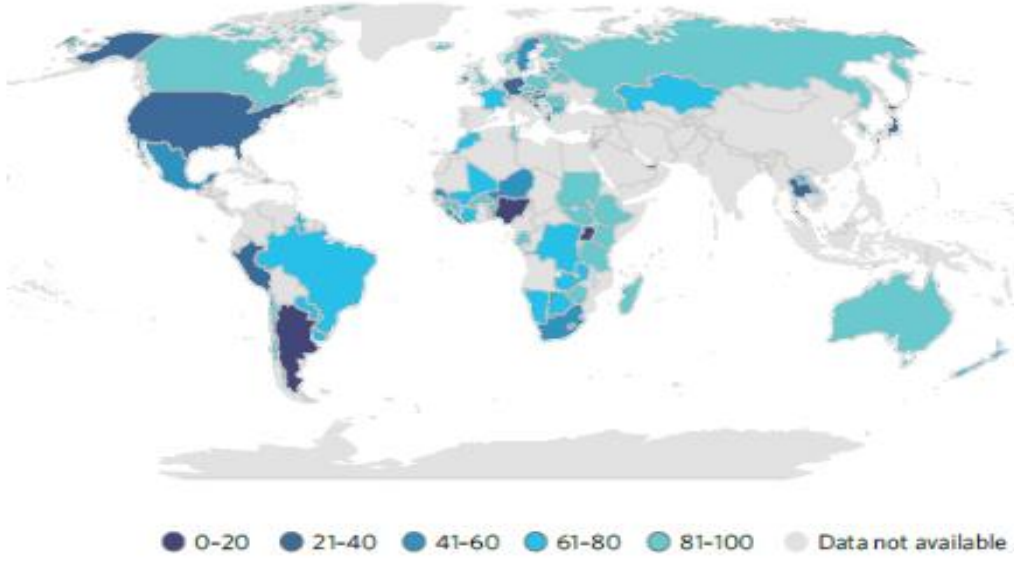
5.2- Water quality is showing signs of improvement in countries with robust monitoring systems, yet numerous uncertainties persist:

Progress toward the goal of halving the proportion of untreated wastewater by 2030 remains limited. According to data from 140 countries and territories, approximately 58 percent of household wastewater was safely treated in 2022. However, there is a significant gap in wastewater statistics in many countries, and reporting is particularly low, especially from industrial sources.

Data spanning from 2017 to 2020 reveal that 60 percent of assessed water bodies in 97 countries exhibited good ambient water quality, Positive trends were evident in countries with robust monitoring systems, with 44 percent of countries reporting in both 2017 and 2020 on track to improve water quality. Nevertheless, a lack of data poses a risk to over 3 billion people residing in areas where the quality of freshwater remains unknown. This underscores the importance of comprehensive and consistent monitoring to ensure the effective management and improvement of water quality worldwide.

Major threats to water quality emanate from agriculture and untreated wastewater, with measurements of nitrogen and phosphorus frequently failing to meet targets , Urgent efforts are required to enhance farming practices and wastewater treatment, particularly in regions experiencing high population growth. This information is derived from a UN report on Goal 6, released in 2023. (UN report ,Goal-06, 2023)

Fig.2. The percentage of water bodies with favorable ambient water quality, 2017–2020.



Source: UN, report/2023, https://unstats.un.org/sdgs/report/2023/Goal-06/

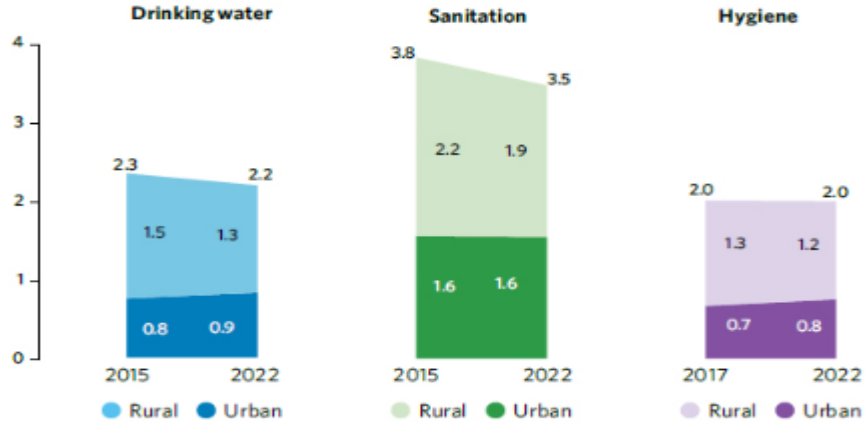
5.3- Access to potable water, sanitation, and hygiene has witnessed notable enhancements in rural areas, presenting a stark contrast with the stagnation or regression observed in urban regions.

Despite concerted efforts, advancements toward the objective of halving untreated wastewater by 2030 remain constrained. Data gathered from 140 countries and territories reveal that approximately 58 percent of household wastewater underwent safe treatment in 2022, However, a substantial dearth of wastewater statistics persists in numerous countries, particularly in terms of reporting from industrial sources.

Between 2017 and 2020, approximately 60 percent of assessed water bodies in 97 countries displayed favorable ambient water quality, Countries with robust monitoring systems showed positive trends, with 44 percent of nations reporting improvements in water quality for both 2017 and 2020. However, the lack of comprehensive data poses a risk to over 3 billion individuals living in areas where the quality of freshwater remains undisclosed.

Agriculture and untreated wastewater have emerged as significant threats to water quality, with measurements of nitrogen and phosphorus often falling short of established targets. Urgent efforts are imperative to improve agricultural practices and upgrade wastewater treatment facilities, especially in regions facing rapid population growth.(UN report, Goal-06, 2023).

Fig.3.Global urban and rural population without safely managed drinking water, safely managed sanitation, and basic hygiene services, 2015/17–2022 (billions



Source: UN, report/2023, https://unstats.un.org/sdgs/report/2023/Goal-06/

5.4- The decrease in official development assistance (ODA) allocated to the water sector raises substantial concerns:

Between 2015 and 2021, ODA disbursements to the water sector witnessed a noteworthy decrease of 15 percent, plummeting from $9.6 billion to $8.1 billion, Similarly, total ODA commitments to the water sector dropped by 12 percent, decreasing from $11.2 billion in 2015 to $9.8 billion in 2021, Notably, commitments peaked at $13.5 billion in 2017 but have consistently dwindled in every subsequent year.

Despite Sub-Saharan Africa receiving the largest share of official development assistance for the water sector, making up 28 percent or more of disbursements annually since 2015, all Sustainable Development Goal (SDG) regions saw a decrease in disbursements from 2019 to 2021. Moreover, the alignment between donors and national water-sector plans remains low, with only 29 percent of countries reporting high alignment in 2021 (UN report, Goal-06, 2023).

6- CONCLUSION

Certainly, here are more specific results based on the study:

- **Acknowledgment of Significance**: The research emphasizes the crucial role of integrated water resources management in the attainment of sustainable development, It underscores that water is not merely a fundamental resource for human survival but also a pivotal factor influencing various sectors such as agriculture, industry, and energy production.
- **Challenges and Pressing Issues:** The study identifies a range of challenges, including water scarcity in many regions, water pollution from industrial and domestic sources, and the adverse effects of climate change leading to irregular rainfall patterns and droughts.
- **UN Development Programme 2030:** The study aligns with the UNDP 2030 agenda, emphasizing the need to integrate water management into broader sustainable development goals. It emphasizes that addressing water-related challenges is essential to achieving poverty reduction, gender equality, clean energy, and other development objectives.
- **Interconnectedness of Goals:** The study highlights the interconnectedness of goals by showcasing how integrated water resources management is intricately linked with other sustainable development goals. Successful water management not only contributes to poverty eradication but also enhances food security, improves health, and positively impacts the overall well-being of communities.
- **Importance of Collaboration:** The study highlights the necessity of international cooperation and collaboration among governments, organizations, and communities to share

best practices, technologies, and knowledge. This is crucial for addressing transboundary water issues and ensuring equitable access to water resources.

- **Long-term Sustainability:** The study emphasizes the importance of long-term thinking and planning in water management. It calls for policies and strategies that take into account the needs of current and future generations to ensure the sustainability of water resources.
- **Innovation and Research:** The study encourages investment in research and innovative technologies to address water-related challenges. It points out that advancements in water treatment, desalination, and efficient irrigation methods are essential for overcoming water scarcity issues.
- **Policy Framework:** The study recommends the establishment of comprehensive policy frameworks at both national and international levels. These frameworks should prioritize sustainable water management, allocate resources effectively, and integrate water considerations into various sectors.
- **Community Engagement:** The study emphasizes the role of local communities in water management. Empowering communities to participate in decision-making processes and manage their water resources can lead to more sustainable outcomes.
- **Urgency of Action:** Finally, the study underscores the urgency of action. With increasing population growth and the impact of climate change, immediate steps are required to ensure water availability, sanitation, and equitable distribution for all.

In conclusion, the study provides a comprehensive understanding of the current state and future possibilities of integrated water resources management in alignment with the UNDP 2030 agenda, it offers insights into the challenges, opportunities, and recommendations necessary to ensure sustainable water management practices for the betterment of present and future generations.

Based on these findings, this study **recommends** the following steps:

- Enhance awareness of the importance of water resources and the need for sustainable management through awareness campaigns and educational programs.
- Foster research and innovation in water resources management by encouraging research and developing new technologies.
- Strengthen international collaboration and knowledge exchange among countries to achieve sustainable development goals related to water.
- Develop and implement integrated policies and strategies for water resources management that consider environmental, economic, and social challenges.

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