University : Al-Mustaqbal University (formerly name: Al-Mustaqbal University College)

Country : Iraq

Web Address : https://uomus.edu.iq/Home/Index

**6.4.2: Water reuse measurement Year: in place by 2025 :Measure the reuse of water across the university?**

**Link to the public evidence:**

https://sustainability.uomus.edu.iq/SDG_Hub/Goals/6

It can be confirmed that **more than 90% of the water used within the university is recycled inside the campus** for various purposes, primarily for irrigating ornamental plants and cleaning the grounds, and this recycling is carried out under strict environmental and health conditions. This was accomplished via following projects and procedures:

***A) Greywater Treatment-Reuse project at Al-Mustaqbal University***

**1- Introduction**

Al-Mustaqbal University has launched a greywater treatment project as part of its plan to develop green infrastructure on campus and reuse of water. This initiative reflects the university's commitment to innovative environmental solutions that reduce water waste by recycling greywater generated from agriculture, sinks, and washbasins. The treated water is then reused for irrigating green spaces across the campus, thereby contributing to environmental protection and the achievement of sustainability.

The project aims to reduce the consumption of fresh water in irrigation processes by providing a sustainable alternative that relies on treated greywater for irrigation and agriculture. It also seeks to promote a culture of rational water use while offering practical learning opportunities for students in scientific and engineering colleges.

The project covers an area of **1,000 square meters** and includes an integrated system for greywater treatment with a production capacity of **10,000 liters per day**. This aligns with the university's sustainable water management plan by reusing a significant portion of water after treating it from harmful environmental pollutants. The system consists of sand and textile filters in addition to a chemical and biological treatment unit designed to reduce the **Biological Oxygen**

**Demand (BOD)** and **Chemical Oxygen Demand (COD)**, making the water suitable for irrigating green spaces on campus.

The project operates through several key phases:

- **Greywater collection unit**: collects water from various sources such as sinks and washbasins.
- **Primary filtration system**: removes impurities and solid materials.
- **Biological treatment unit**: uses biofilters and aquatic plants to further purify the water.
- **Treated water tank**: stores water ready for irrigation.
- **Distribution network**: delivers the treated water to green areas across the campus.

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**2- Importance and Benefits of the Project**

- **Protecting water resources**: to reduce dependence on fresh water for irrigation.
- **Reducing operational costs**: to lower water bills by using treated water.
- **Improving the campus environment**: to preserve green spaces and supports afforestation.
- **Enhancing practical education**: to provide students with a real-world model of water recycling technologies.
- **Minimizing pollution**: to treat greywater before disposal, reducing environmental contaminants.

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**3- Contribution to the Sustainable Development Goals (SDGs)**

- **SDG 6: Clean Water and Sanitation** – improves water use efficiency, conserving resources for future generations.
- **SDG 11: Sustainable Cities and Communities** – strengthens the university's environmental infrastructure and serves as a replicable model for cities and communities, offering sustainable solutions for water management in educational institutions.
- **SDG 12: Responsible Consumption and Production** – promotes efficient use of resources by recycling water and reducing waste, fostering responsible consumption within the university community.
- **SDG 13: Climate Action** – reduces pressure on freshwater sources and minimizes pollution from greywater discharge, contributing to environmental protection and climate change mitigation.

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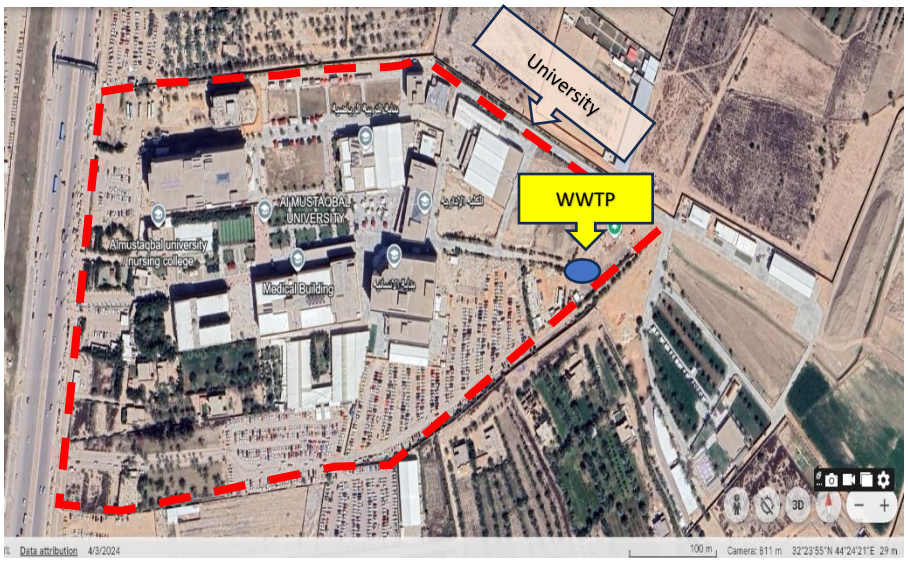





The following table presents the results of the chemical and biochemical tests conducted at the Al-Mustaqbal wastewater treatment plant. Where Eff term refered to treared wastewater.

**Table 1: Summary of Average Effluent and Influent Data – Al-Mustaqbal Greywater Treatment Plant**

| ITEM | UNIT | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. | °C | 12 | 10 | 14 | 22 | 25 | 27 | 29 | 28 | 19 | 20 | 14 | 14 |
| Inflow | $m^3$/day | 110 | 101 | 80 | 90 | 98 | 49 | 70 | 39 | 55 | 70 | 94 | 85 |
| pH INF. | mg/L | 8.5 | 8.6 | 8.2 | 7.7 | 7.8 | 9 | 8.4 | 8.5 | 8.9 | 7.9 | 8.1 | 8.5 |
| pH EFF. | mg/L | 7.5 | 8 | 7.7 | 7.7 | 7.9 | 7.5 | 8.1 | 8.1 | 7.9 | 7.9 | 7.8 | 8 |
| TDS INF. | mg/L | 1190 | 1870 | 2400 | 2300 | 3300 | 3200 | 3050 | 2900 | 1010 | 1910 | 2200 | 1990 |
| TDS EFF. | mg/L | 1120 | 992 | 1328 | 1136 | 1360 | 1192 | 1016 | 890 | 830 | 980 | 1020 | 994 |
| TSS INF. | mg/L | 990 | 890 | 500 | 600 | 701 | 706 | 506 | 520 | 776 | 744 | 989 | 792 |
| TSS EFF. | mg/L | 56 | 60 | 55 | 26 | 28 | 32 | 58 | 59 | 20 | 30 | 33 | 37 |
| $BOD_5$ INF. | mg/L | 1450 | 1090 | 1088 | 1801 | 1040 | 1581 | 1642 | 1172 | 1123 | 1115 | 980 | 779 |
| $BOD_5$ EFF. | mg/L | 9 | 15 | 12 | 10 | 11 | 10 | 9.5 | 10 | 12 | 16 | 10 | 8 |
| Turbidity | NTU | 33 | 45 | 12 | 15 | 30 | 25 | 19 | 20 | 15 | 15 | 22 | 21 |




The location of the wastewater treatment plant (WWTP) in relation to the university area

### *B) Saltwater Treatment Project for Agricultural Use at Al-Mustaqbal University*

#### 1- Introduction

The **Saltwater Treatment and Agricultural Use Project** at Al-Mustaqbal University is one of the pioneering initiatives aimed at addressing water challenges in arid and semi-arid regions. The project relies on advanced desalination technologies to convert saline water into usable water for irrigation. It represents a significant step toward environmental sustainability by expanding the use of non-traditional water resources in agriculture and ensuring the continuity of agricultural production at the university.

The project involves the establishment of an integrated desalination system using modern technologies to transform saline water into water suitable for agricultural irrigation. This treated water will be used for open-field and greenhouse cultivation, as well as for growing medicinal plants and other agricultural activities within the campus.

The project covers an area of **1,250 square meters** with a production capacity of **10,000 liters per hour**. Work has already begun on the construction of the project's facility, with several operational devices already procured. The official opening is expected in the near future.

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#### 2- Importance and Benefits of the Project

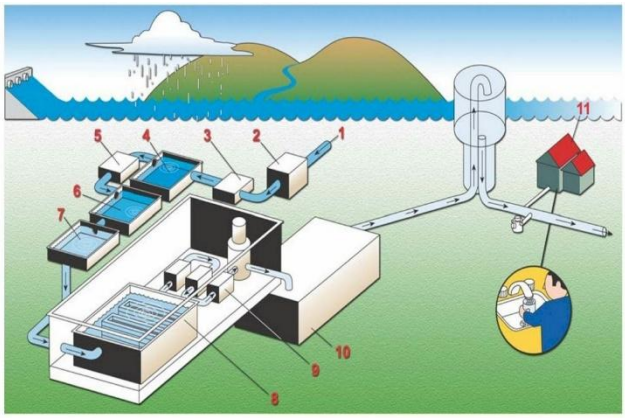
- **Enhancing agricultural sustainability**: Provides a reliable irrigation source that ensures continuous agricultural production despite limited freshwater resources.

- **Promoting agricultural diversity**: Enables the cultivation of multiple crops, including medicinal plants, thereby supporting biodiversity within the campus.
- **Reducing dependence on freshwater**: Conserves natural resources by relying on desalinated water.
- **Lowering irrigation costs**: Offers a more cost-effective alternative compared to traditional irrigation methods.
- **Serving as a replicable model**: Demonstrates sustainable water use in agriculture that can be adopted in other institutions.

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**3- Contribution to the Sustainable Development Goals (SDGs)**

- **SDG 6: Clean Water and Sanitation** – directly improves water management through the use of desalinated saline water for irrigation.
- **SDG 9: Industry, Innovation, and Infrastructure** – showcases innovation in desalination and modern irrigation technologies, while enhancing agricultural infrastructure.
- **SDG 11: Sustainable Cities and Communities** – improves the campus environment, making the university a model of a sustainable community in arid regions.
- **SDG 12: Responsible Consumption and Production** – ensures sustainable agricultural production by utilizing non-traditional water sources.
- **SDG 13: Climate Action** – reduces environmental pressures from freshwater consumption and enhances adaptation to climate change.






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