University : Al-Mustaqbal University (formerly name: Al-Mustaqbal University College)
Country : Iraq
Web Address : https://uomus.edu.iq/Home/IndexEn

6.3 Water usage and care

6.3.1 Wastewater treatment: A process in place to treat wastewater.

Link to the public evidence:
https://sustainability.uomus.edu.iq/SDG_Hub/Goals/6

During 2025, Al-Mustaqbal University recycled and reused **more than 85%** of its water for non-potable purposes, primarily landscape irrigation, ornamental plant maintenance, and campus cleaning. This achievement was supported by wastewater treatment and reuse systems, water-efficient irrigation practices, and regular water quality monitoring, in accordance with environmental and health standards. These initiatives contribute to sustainable water management and support SDGs such as: SDG 6, SDG 11, and SDG 12. 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 **five days-Biological Oxygen Demand (BOD_5)** 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.

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.

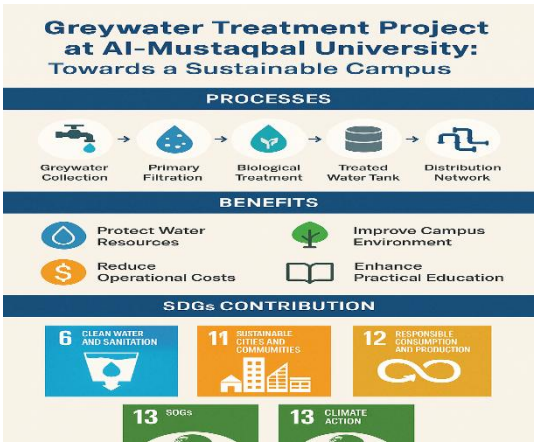
3- Contribution to the Sustainable Development Goals (SDGs)

- **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.









The following table presents the results of the chemical and biochemical tests conducted at the Al-Mustaqbal wastewater treatment plant. Where INF and Eff terms referred to untreated and treated wastewater, respectively. Note: Figure 1 shows the location of the WWTP.

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	13	14	17	21	25	29	32	31	28	23	18	14
Inflow	m^3/day	420	435	450	465	480	500	510	495	470	455	440	425
pH INF.	—	7.3	7.4	7.2	7.5	7.4	7.6	7.5	7.4	7.3	7.5	7.4	7.3
pH EFF.	—	7.2	7.3	7.3	7.4	7.3	7.5	7.4	7.3	7.2	7.4	7.3	7.2
TDS INF.	mg/L	740	760	750	780	810	840	860	850	820	790	770	750
TDS EFF.	mg/L	720	735	730	755	785	815	835	825	795	765	745	725
TSS INF.	mg/L	230	240	255	270	280	295	305	300	285	265	250	235
TSS EFF.	mg/L	16	15	14	13	12	11	12	13	14	15	16	17
BOD5 INF.	mg/L	220	235	245	260	275	285	300	290	270	255	240	225
BOD5 EFF.	mg/L	15	14	13	12	11	10	11	12	13	14	15	16
Turbidity EFF.	NTU	6.5	6.1	5.8	5.3	4.9	4.5	4.7	5.0	5.4	5.8	6.2	6.7

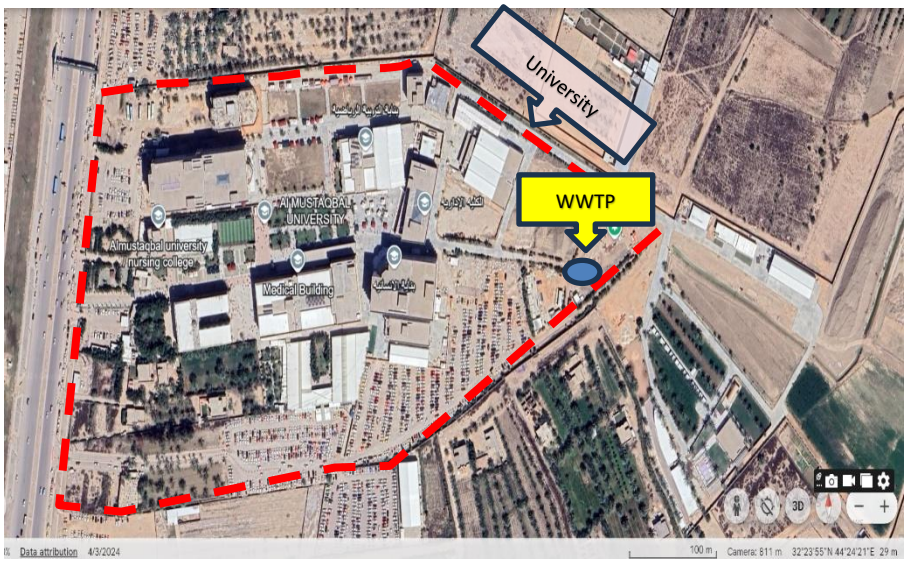


Figure 1: The location of the wastewater treatment plant (WWTP) in relation to the university area

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.

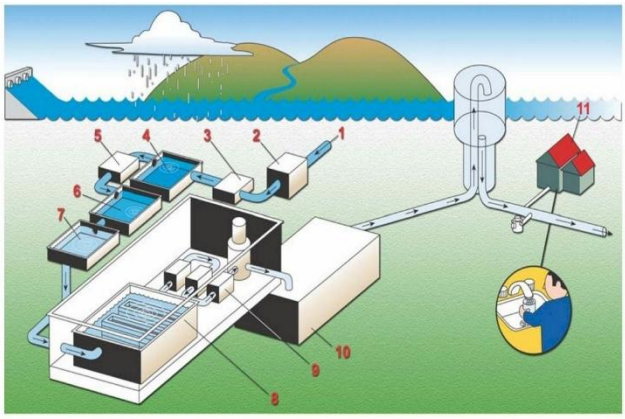
2- Importance and Benefits of the Project

- **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.

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.





In addition, the university's campus surfaces have been strategically designed with a slight slope to facilitate the natural flow and infiltration of rainwater. This design allows rainwater to be converted toward planted areas, agricultural fields, and open permeable spaces across the Al-Mustaqbal university. As a result, nearly all collected rainwater is efficiently utilized for irrigation and agricultural purposes within the campus, minimizing water loss and preventing unnecessary runoff.







Rainwater collection areas





Useful Links:





C) Policy

Al-Mustaqbal University has issued a comprehensive *Climate Action Policy* that serves as a cornerstone of the university's environmental legislation. This policy reflects the institution's strong commitment to achieving carbon neutrality and advancing sustainability across its operations. It plays a vital role in shaping environmental regulations adopted by the university, particularly in the areas of **water conservation, greywater recycling, and waste management**. Through its provisions on **rainwater harvesting, smart irrigation, zero-waste campus initiatives, and recycling programs**, the policy ensures the sustainable use of resources and promotes a circular economy within the university.

For more details, please refer to the policy available at the following link:

https://sustainability.uomus.edu.iq/Policies/details/1

Water recycling is implemented with strict compliance with international standards, including the **EPA Water Reuse Guidelines**. Acknowledging the severe water scarcity facing Iraqi communities, intensified by climate change, the university promotes conservation among staff and students while adhering to national frameworks such as the **Iraq Water Resources Conservation Law** (Law No. 2 of 2001).

The university's water management strategy is **multifaceted**, focusing on:

- Efficient conservation,
- Responsible consumption,
- Restoration and retention of water resources.

To achieve these goals, Al-Mustaqbal University recycles water from its wastewater treatment plant and other facilities generating greywater.

The above highlights that Al-Mustaqbal University has adopted concrete measures to minimize liquid waste released into the environment, primarily through innovative water recycling initiatives.

D) Projects

The hydroponic farming project covers an area of approximately **50 square meters** and consists of **7 panels (water pipes)**. Each panel has openings designed to hold plants in special cups filled with specific soil, with holes that allow the roots to reach the water inside the pipe. Each pipe accommodates **7 plants**, with a total of **70 seedlings** growing inside the system, which relies on water recycling and reuse.

Project Benefits

- Higher productivity: Efficient crop yields in limited spaces.
- Water conservation: Significant reduction in water use.
- Local impact: Supports local economy and creates jobs.








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