6.5.4 Water is extracted (for example from aquifers, lakes or rivers), utilize sustainable water extraction technologies on associated university grounds on and off campus

Alexandria University applies an integrated water management approach that combines sustainable water extraction from local sources with advanced treatment, recycling, and irrigation systems to protect regional water resources. Through continuous analysis, innovative models, and modern technology, the University enhances wastewater reuse, reduces pollution, and improves the environment on and off campus. These efforts support high-efficiency processes such as greywater recovery, effluent reuse, desalination, and controlled rain harvesting, while strengthening performance and long-term sustainability. This integrated system demonstrates Alexandria University's leadership in developing solutions that enhance water supply, support agriculture, and improve ecosystem conditions across the region.

The *Water Recycling Program* demonstrates significant progress in non-potable water reuse and resource recovery. Treated sewage effluent (TSE) from the *Campus*, totaling approximately 1.12 million m^3 annually, is utilized for landscape irrigation. At the *Faculty of Pharmacy*, a greywater pilot system treats hand-wash wastewater for toilet flushing, while air-conditioning condensate recovery systems in select buildings supply irrigation and flushing operations. Rainwater is harvested into a central retention lake, providing an additional source for green-area irrigation. The *Faculty of Agriculture's* aquaculture facility recycles nutrient-rich effluent from its eight-pond fish farm to irrigate adjacent crops, enhancing soil fertility and yield. The University also operates a 100 m^3/day solar-powered desalination unit at *Wadi El-Natroun*. It has developed an innovative renewable energy–driven multi-stage flash desalination system (RE-NF-MSF) with nanofiltration pre-treatment, demonstrating leadership in sustainable water technologies.
Recent initiatives of the Center of Excellence for Water include student training in wastewater treatment operations, entrepreneurship bootcamps on water innovation, and workshops on EU-funded research opportunities. These activities have positioned Alexandria University as a national and regional leader in sustainable water governance, demonstrating how academic excellence, technological advancement, and environmental responsibility can be effectively integrated to address Egypt's water and climate challenges.

1. Air conditioning water collection and reuse unit in Faculty of Engineering.
2. Wastewater treatment unit at the Faculty of Engineering
3. Providing a sewage treatment plant at the university to make it suitable for irrigating green areas and gardensinside the university campus.
4. Innovative Renewable Energy RE-Multi-stage flash system (MSF) with salt precipitator and nanofiltration (NF-MSF) to pre-treat feedwater (RE-NF-MSF) by Faculty of Agriculture, Alexandria University
5. A 100 m^3 desalination unit in Wadi Natroun (Faculty of Agriculture, Alexandria University)
6. The irrigated water supplied to the fish farm at the Agriculture Experimental Research Station of the Faculty of Agriculture is recycled to irrigate the crops, vegetables, and fruits of the land farm. The recycled water is rich withnatural fertilizers and enhances the crops production.
7. In addition, the water recycling in Fish Aquaculture of the Faculty of Agriculture, Alexandria University: The watersewage of the Aquaculture of the Faculty of Agriculture, Alexandria University which consist of eight ponds (one acre and quarter/each) in Abis region. Alexandria University used the recycled water for crops culturing in the adjacent agriculture research center in Abis.
8. IOT Pilot Project in Egypt by Shanghai Water Saving Irrigation Corp. Etd performed an automatic

controlled irrigation systems IOT project for modern irrigation technology. The company implanted the IOT platform projectto irrigate economic crops and facilitate irrigation systems to overcome the water shortage problems in Egypt. This project will be performed in Alexandria University Farm for agroecological farming in Egypt.

9. Raising awareness among Alexandria University students from various faculties—including Science, Engineering (Civil, Mechanical, and Mechatronics), Commerce, Arts (Surveying, mapping, and GIS), and Fine Arts (Architecture)—about wastewater treatment was achieved through summer training and periodic visits to the laboratories of the Alexandria Sewerage Company. This effort supports the achievement of the Sustainable Development Goals by enhancing partnerships for sustainable development and fostering collaborations that mobilize and share knowledge, expertise, and technology. The training aimed to provide students with essential scientific skills and practical experience to prepare them for the job market (September 2024).
10. **Green Cycle project in the Faculty of Pharmacy - Alexandria University**
    The faculty is seeking to implement a grey water (wastewater) recycling system that depends on reusing wastewater from sewage basins only (without using wastewater from laboratory basins) by re-pumping it into the flushing bins in the toilets after work. Filtration and primary treatment. The grey water recycling initiative has a significant impact on rationalizing water use. Also, taking advantage of rainwater for use in irrigation and regulatory operations. Alexandria University have generalized this initiative in some of the faculties of Alexandria University in gradual stages.
11. **Integrated strategy Project for rainwater management in Alexandria Governorate in cooperation with Alexandria University**
    Remote sensing technology was used to know the current values of Rain and assess the current situation with thehelp of satellites. This is done with the help of the following artificial satellites:
    -TRMM and GPM are two of the NASA satellites. (Administration National Aeronautics and Space Administration,United States of America)

    - NOAA (National Oceanic, Atmospheric, and Space Administration, United States of America)
    - NCEI (National Center for Environmental Information in the United States of America)

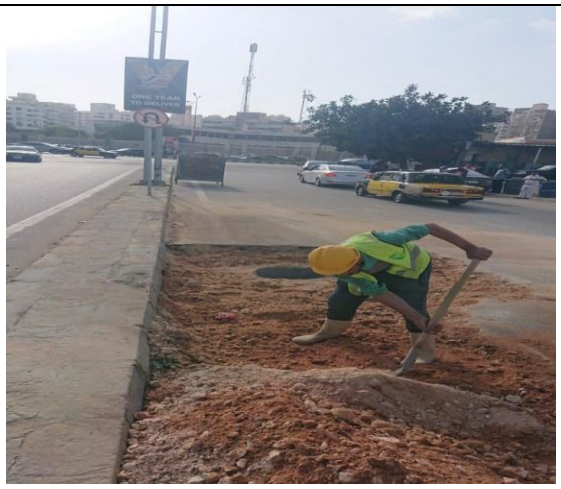
    Proposed rain management strategy

    A separate network will be created to drain rainwater for the nearest body of water for areas close to the body ofwater. The first area is the Corniche, where rainwater is collected and discharging it into marine estuaries. The second area is on both sides of the Mahmoudiyah and Beheira axis near the airport. The rainwater is collected and part of it is drained on the canal and the other part on the airport lake. In the third stage of the project, the two projects on the airport lake to exploit rainwater will be linked to the New Delta project. The rainwater will beused to irrigate the crops, vegetables, and fruits in the New Delta.

م	البيان	الوحدة	الكمية	ما تم تنفيذة	المتبقى
١	خطوط انحدار (٧٠٠ ـ ٨٠٠ مم)	متر	٣٥٠٠	٢٣٣٦	١١٦٤
٢	خط طرد (٧١٠ مم)	متر	٢٥٠	٠	٢٥٠
٤	محطات رفع	عدد	١	٠	١
٥	مطبق	عدد	٢٤	٢٤	٠
٦	شنايش مطر	عدد	٩٨	٥٠	٤٨
٧	أسلفت	م٢	٥٢٠٠٠	٠	٥٢٠٠٠

Integrated strategy project for rainwater management in Alexandria Governorate in cooperation with Alexandria University




Integrated strategy project for rainwater management in Alexandria Governorate in cooperation with Alexandria University

Before performing the integrated strategy project

After performing the integrated strategy project

Mahmoudiyah Axis Project before and after performing the project

12. Elements of Green Building Implementation as Reflected in all new construction and renovation policies in thenew buildings in Abis campus:

- The area of the project is 160 acres, a general site for educational buildings, and 120 acres are complementaryactivities. The percentage of green areas and lake is about 52% in addition to 25% streets and lanes.
- Water-saving plots are used, which will reduce water consumption by about 30%. The sewage water will betreated and reused in the irrigation of green areas in the project.
- Wastewater will be treated and reused to irrigate green areas in the project.
- Rainwater is collected in the main lake and used for irrigation.
  The use of plants with few water rationed plants to reduce irrigation needs in addition to absorbing quantitiesof rainwater to reduce the severity of rain spells.

Air conditioning water collection and reuse unit - Faculty of Engineering

Wastewater treatment unit at the Faculty of Engineering

Grey water recycling system organized by Faculty of Pharmacy and reused in rooftop cultivation