



# Template for Evidence(s) UI GreenMetric Questionnaire

University : Samarra  
 Country : Iraq  
 Web Address : [www.uosamarra.edu.iq](http://www.uosamarra.edu.iq)

## [4] Water (WR)

### [4.1] Water Conservation Program Implementation



Project of Harvesting rain and Flood Water (University of Samarra, Iraq)



Proposes innovative Solutions for water Desalination using Photovoltaic Roof (College of Engineering, University of Samarra)

Example of Water Conservation – Lake (Universitas Indonesia, Indonesia)



University and Location	Average Rainfall (mm/hr)	Water Flow Rate (liters/hr)	Number of Reservoirs	Capacity of Reservoirs (liters)	Number of Lakes	Capacity of Lakes (liters)	Number of Recharging Pits	Capacity of Recharging Pits (liters)
College of Engineering Campus .1	50	5000	1	200000	0	0	-0	0
College of education Campus.1	40	4000	1	12000	0	0	0	0

**Description:**

Components of the rainwater and floodwater harvesting system at Samarra University, which was approved by the College of Engineering in cooperation with the relevant departments at the university.

**1. Project of Harvesting rain and Flood Water:**

- **Watershed (water reservation area) Catchment area:**

It is intended to temporarily reserve water in preparation for transfer to the storage area, which is the surface that receives precipitation and allows rainwater runoff to be collected by a filtration basin or collection system and later converted to final use. The watershed can be any surface that receives precipitation such as soil, rocks, the surface of a facility (building, house, farm, roads, tree shade, plastic sheeting, etc.).

- **Conveyance system: Conveyance system:**

Where water harvesting systems sometimes require it to be transferred from the holding area to the collection area through channels or grooves, and the system consists of sards, drainage pipes, pipes or earthen channels that collect water from the watershed and deliver it for final use or tank.

- **Collection device storage system:**

It is the place where water is held from the time of collection until use, and the sizes of these places vary according to the amount of annual rainfall. These reservoirs are like a water tank, pond, small dams, plastic tanks, underground pits, concrete tanks, etc., where the collected rainwater is stored for later use. Storage tanks can be located above or below ground.

- **Treatment System:**

Treatment can vary greatly depending on the end use of the water and its desired quality. Treatment can be through a simple filtration stage, a sedimentation stage inside the tank or filtration, water sterilization or other treatment methods.

- **Distribution System:**

This system includes connections, ducts, pipelines and pumps necessary to deliver water from the tank to the point of use.

- **Target area:**



It is the point of end use of collected water (domestic use, cultivated crops, animals, etc.) etc).

### 1. Proposes innovative Solutions for water Desalination using Photovoltaic Roof

A scientific research that proposes an innovative solution to combine desalination of salt water and generation of clean energy using photovoltaic roofs. The research is based on exploiting highway spaces to install solar panels on covered roofs, with the aim of generating solar energy and converting part of it to desalination of salt water. The research aims to address two major challenges facing Iraq, namely the scarcity of fresh water resources and the provision of energy. The research presents the idea of utilizing large areas along highways, where solar panels are installed to generate clean electricity, with part of this energy being used to operate desalination technologies. These sustainable solutions are an important step towards addressing water and energy scarcity in modern and environmentally friendly ways. The research reviews the modern technologies used in this field, and proposes scientific methods to achieve integration between energy generation and water desalination, which contributes to supporting sustainability and enhancing the optimal use of the Earth's resources. All buildings of the University of Groningen have a separated sewerage system, for waste water and for clean water (rainwater). Rain water is thus collected from the roofs of the buildings and is then discharged into the local ponds and canals around the buildings. The university has also buildings where all the rainwater is collected for toilet flushing and for watering the plants inside the building. At our campus we have a separate sewerage system. We collect rainwater from the roof, parking area etc. and discharge this in the ponds and channels at our campus.



AFFORDABLE AND CLEAN ENERGY (GOAL 7)

## Samarra University proposes innovative solutions for water desalination and clean energy generation using photovoltaic roofs

Samarra University Sustainable Development :Posted by

Two researchers from the College of Engineering at Samarra University, Assistant Professor Dr. Rana Ibrahim Khalil and Dr. Raed Hassan Abdullhah, presented a scientific research that proposes an innovative solution to combine desalination of salt water and generation of clean energy using photovoltaic roofs. The research is based on exploiting highway spaces to install solar panels on covered roofs, with the aim of generating solar energy and converting part of it to desalination of salt water.

The research aims to address two major challenges facing Iraq, namely the scarcity of fresh water resources and the provision of energy. The research presents the idea of utilizing large areas along highways, where solar panels are installed to generate clean electricity, with part of this energy being used to operate desalination technologies. These sustainable solutions are an important step towards addressing water and energy scarcity in modern and environmentally friendly ways

The research reviews the modern technologies used in this field, and proposes scientific methods to achieve integration between energy generation and water desalination, which contributes to supporting sustainability and enhancing the optimal use of the Earth's resources



NEWS AND ACTIVITIES

# Two lecturers at Samarra University publish a study on desalination of groundwater in a journal included in Scopus containers

December 2, 2022 • Samarra University :author



Professor Abbas Hadi Abbas and Assistant Professor Khaled Hamid Latif, lecturers at the College of Engineering at Samarra University, published a joint research in Scopus containers, entitled "Desalination of brackish groundwater in several areas in Baghdad - Iraq using reverse osmosis membrane technology", within the proceedings of the American Conference on Physics AIP .conference Proceedings in November 2022

The research studied the desalination and desalination of groundwater in several areas in Baghdad city, including Al-Amiriya, the Fifth Police District, and New Baghdad, using reverse osmosis .technology

The importance of this study comes in light of the scarcity of fresh water facing Iraq due to the decline in the level of the Tigris and Euphrates rivers, as a result of the construction of a large number of dams in Turkey, as well as the climate changes surrounding the country, which seriously calls for .thinking about alternatives to fresh water in the coming years

The research used the reverse osmosis (RO) unit. ULP 1812- 50, which achieved a water recovery rate of (18.18 - 33.33)% and a salt removal rate of (97.07 - 99.29)%. The study showed high removal of physical and chemical properties, represented by the removal rates of turbidity 100%, total hardness 100%, calcium 95-100%, magnesium (84-93)%, chlorides (70-96)%, sulfates (85-100)%, and nitrates .%(73-93)

The study concluded that the reverse osmosis system is highly efficient in desalinating salt water, making it safe and suitable for drinking and other domestic uses, and a good alternative to the .scarcity of fresh water in the future

**Additional evidence link (i.e., for videos, more images, or other files that are not included in this file):**

<https://uosamarra.edu.iq/sustainable-dev/%d8%ac%d8%a7%d9%85%d8%b9%d8%a9%d8%b3%d8%a7%d9%85%d8%b1%d8%a7d8%a1-%d8%aa%d9%82%d8%aa%d8%b1%d8%ad-%d8%ad%d9%84%d9%88%d9%84%d8%a7d9%8b-%d9%85%d8%a8d8%aa%d9%83%d8%b1%d8%a9-%d9%84%d8%aa%d8%ad%d9%84/>.

<https://uosamarra.edu.iq/%d8%aa%d8%af%d8%b1%d9%8a%d8%b3%d9%8a%d8%a7d9%86-%d9%81%d9%8a-%d8%ac%d8%a7d9%85%d8%b9%d8%a9-%d8%b3%d8%a7d9%85%d8%b1%d8%a7d8%a1-%d9%8a%d9%86%d8%b4%d8%b1%d8%a7d9%86-%d8%af%d8%b1%d8%a7d8%b3%d8%a9/>.