

SDG 6: CLEAN WATER AND SANITATION

Introduction

As the desert covers huge lands in the Kingdom of Saudi Arabia, according to the UN report in 2020, the official page revealed the Goals 6 targets of concerning clean water and sanitation in the Kingdom of Saudi Arabia which is the related Saudi Vision 2030.

The United Nations, in September 2015, outlined the 2030 Agenda for Sustainable Development, which includes 17 comprehensive and detailed Sustainable Development Goals (SDGs). These goals are designed to help alleviate poverty and climate change affecting the world. Member countries have taken the initiative to address the rapid changes in society. Princess Nora University has been at the forefront of establishing itself as a leader in sustainable development in the GCC region. PNU has aligned its strategy and policies to help meet the requirements of the SDGs especially in Water and Sanitation Sustainability (SDG 6). SDG-6 defines goals for clean water and sanitation that support the availability and sustainable management of water and sanitation for all. This goal aligns directly with the vision of PNU, that all people have access to safe water and proper sanitation, with the knowledge to sustain it for future generations. PNU has implemented smart faucets and toilets in all the campus buildings to help reduce water consumption. We have also established programs and practices such as community outreaches to directly support the UN's SDG-6 and work diligently every day to implement them. The Kingdom of Saudi Arabia is located in an arid temperature region, with average temperatures of 40°C and no reliable source of water, is facing a challenging time in securing viable water sources for its population. "The Middle East is now in a water crisis, with Saudi Arabia and the other countries of the Gulf Cooperation Council (GCC) already classified by the United Nations as water-scarce nations".

[Goal 7: Affordable Clean Energy in KSA](#)

The government of Saudi Arabia has developed a vision of the country's economy that depends on a non-oil resource, which is clearly confirmed in the 2030 Vision by diversification of energy sources, including renewable and alternative energy through producing 3.5GW of renewable energy by 2020 and 9.5GW of renewable energy by 2030. The Kingdom's Notable efforts in Energy include:

1. The Crown Prince Mohammed bin Salman signed a Memorandum of Understanding with "SoftBank Vision Fund" to implement the 2030 solar energy plan, the biggest solar energy production plan worldwide.
2. Initiative to increase the efficiency of energy consumption in iron, cement and petrochemical industries.
3. Introduction of fuel economy labeling of vehicles and adopting fuel economy standards.
4. Motivating new factories to be energy-efficient according to global normative standards.
5. Introducing new Saudi specifications for energy consumption efficiency.
6. Project of energy intensity certificate for existing and new buildings.
7. Initiative to rehabilitate government buildings and motivate the private sector to invest in energy efficiency services.
8. Developing and updating the energy efficiency standards for small and large-capacity air conditioners.
9. Initiative high-efficiency air conditioners

[Water Supply and Sanitation in Saudi Arabia](#)

It is characterized by challenges and achievements. One of the main challenges is water scarcity. In order to overcome water scarcity, substantial investments have been undertaken in seawater desalination, water distribution, sewerage and wastewater treatment. Today about 50% of drinking water comes from desalination, 40% from the mining of non-renewable groundwater and only 10% from surface water in the mountainous southwest of the country. The capital Riyadh, located in the heart of the country, is supplied with desalinated water pumped from the Persian Gulf over a distance of 467 km. Water is provided almost for free to residential users. Despite improvements, service quality remains poor, for example in terms of continuity of supply. Another challenge is weak institutional capacity and governance, reflecting general characteristics of the public sector in Saudi Arabia. Among the achievements is a significant increase in desalination, and in access to water, the expansion of

wastewater treatment, as well as the use of treated effluent for the irrigation of urban green spaces, and for agriculture.

Since 2000, the government has increasingly relied on the private sector to operate water and sanitation infrastructure, beginning with desalination and wastewater treatment plants. Since the creation of the National Water Company (NWC) in 2008, the operation of urban water distribution systems in the four largest cities has gradually been delegated to private companies as well. The apparent paradox of very low water tariffs and water privatization is explained by government subsidies. The government buys desalinated water from private operators at high prices and resells the bulk water for free. Likewise, the government directly pays private operators that run the water distribution and sewer systems of large cities under management contracts. Furthermore, it fully subsidizes investments in water distribution and sewers. Water utilities are expected to recover an increasing share of their costs from the sale of treated effluent to industries. In January 2016 water and sewer tariffs were increased for the first time in more than a decade, which resulted in discontent and in the sacking of the Minister of Water and Energy Abdullah Al-Hussayen in April 2016.

[Water Station at Princess Noura Bint Abdulrahman University](#)

6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all

6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate

6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

6.A By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies

6.B Support and strengthen the participation of local communities in improving water and sanitation management

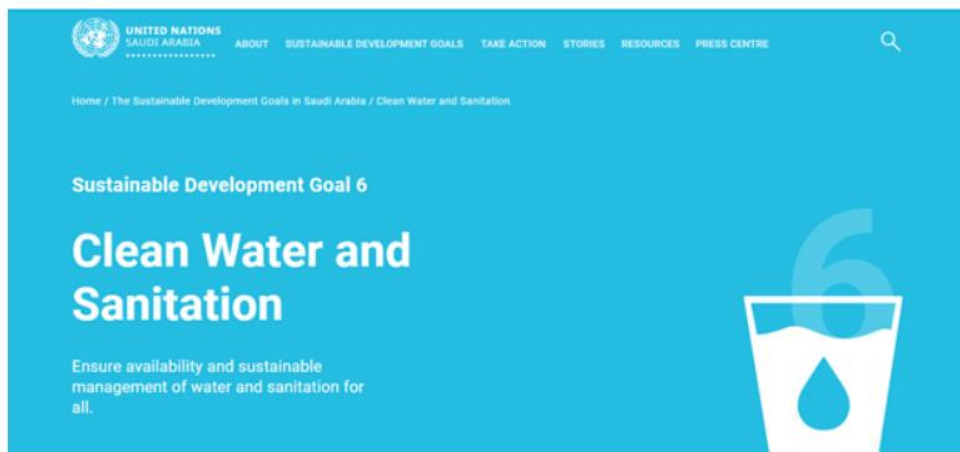


Figure (1)

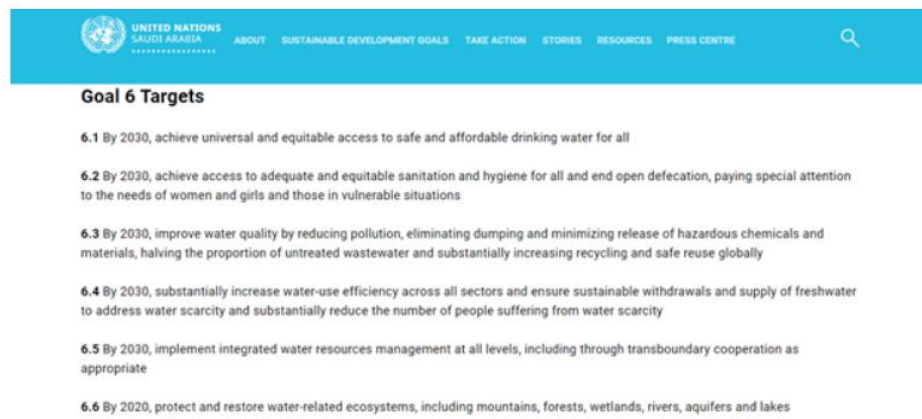


Figure (2)

Treated water consumed

The purpose at PNU Sewage Treatment Plant is to Treat the total raw sewage that will be collected from various university applications, both of suspended solids and biodegradable organic matters will be reduced through the treatment stages to an acceptable limit. The plant is capable

to produce treated water that meets water reuse standards in volume and quality. All the treated effluent/water consumed are used for irrigation with an average of 3500 m².



Groundwater project

A water well was drilled in order to carry out groundwater monitoring at PNU. This project is under development and its purpose is to establish the amount of groundwater in the well and treat this water for human consumption or for some activities on campus.

Depth: 3-6 meters

Diameter: 1.5 inch



[Water Conservation Program Implementation](#)

Princess Nourah University has opted for policy formulation leading to the implementation plan and water conservation guidelines at the university.



جامعة الأميرة نورة بنت عبد الرحمن
Princess Nourah Bin Abdulaziz University

السادة الزملاء والزميلات،
حيث أن تعاون مستخدمي المباني وتصميمهم هو عنصر مهم لنجاح برنامج توفير الطاقة والمياه في الجامعة،
فبما يلي بعض الأساليب المقترحة لتوفير استهلاك الطاقة والمياه لتتم تنفيذها من قبل مستخدمي المباني:

- الالتزام باعدادات منظم الحرارة (الثرموستات) لتبقى ضمن المدى من 19-21 درجة مئوية
- استهلاك الطاقة الكهربائية للأضاءة بطريقة موفرة والتشجيع على الاستفادة من الإضاءة الطبيعية و وحدات اضاءة المكتب الشخصية.
- إغلاق الابواب في المكاتب عند الخروج منها لوقت طويل، وإغلاق الابواب في المساحات المشتركة وقاعات الاجتماعات وغيرها عند خروج الغير شخص من هذه المناطق.
- جعل ترشيد استهلاك المياه أولوية يومية، والحفاظ على مصادر المياه كسطح حياك.
- التكد من إغلاق جميع الأجهزة الإلكترونية والكهربائية تماماً عند الانتهاء من استخدامها.
- الحرص على حذوق التوافق في المناطق السكنية لما تسببه من فقد لطاقة التبريد ومخلطة لتوازن الهواء و توزيعه داخل المباني وبالتالي استخدام أكثر للطاقة الغير ضروري.

وتشكراً لحسن تعاونكم!

Dear Colleagues,

As we consider Occupants' cooperation and support is a crucial element of success to the Energy Conservation Program, kindly find below, several "No-cost" energy conservation opportunities to be circulated between building occupants:

- Keep healthy HVAC thermostat setting ranges in your space (20 °C- 24 °C)
- Whenever possible, try to ensure responsible energy use for lighting, and utilize day-lighting and task-lighting.
- Turn-off the lights if you intend to leave your office for a long period, and turn-off the lights in shared spaces (conference room, common areas, etc...) if you are the last one to leave.
- **Keep responsible use of water as a priority & water-saving as a lifestyle**
- Make sure to turn-off equipment when not used and avoid stand-by mode whenever possible. ("Shut down" takes a second, but makes a difference)
- Avoid opening windows in Air-conditioned spaces, as it disrupts air-balance, alters inside air conditions, and causes unnecessary loss of cooling energy.

Thank you for your cooperation!



Save the Source of Life, Save Water



Tips to Rationalizing Water Consumption

This small button can help in reducing water consumption, by flushing lesser amounts.



Dear Villa Occupants,
As we consider Occupants' cooperation and support is a crucial element of success to the Energy Conservation Program, below are several energy saving habits, and it is appreciated if they are circulated and encouraged between building occupants:

- Keep healthy Air-conditioning thermostat setting ranges in your space (20 °C- 24 °C).
- Make sure to turn-off the lights when leaving your villa.
- Make sure to set Air-conditioning temperature to 28 °C when leaving for long periods.
- Keep responsible use of water as a priority & water-saving as a lifestyle.
- Kindly do not waste water on activities such as: Irrigation and Floor cleaning using hoses; protecting water is our shared responsibility.
- Please note that water-use for manual car-washing is prohibited.
- Make sure to turn-off equipment when not used and avoid stand-by mode whenever possible. ("Shut down" takes a second, but makes a difference)
- Kindly cooperate with maintenance personnel; their job is for your service and benefit.
- Avoid opening windows in Air-conditioned spaces, as it disrupts air-balance, alters inside air conditions, and causes unnecessary loss of cooling energy.



Brochures posted as an energy conservation program which support the water conservation program

Unit on water protection and conservation:

PNU has a unit on water protection and conservation. The unit must supervise and conduct a series of maintenance and inspection of water savings. Some of their task are as follows:

- Inspection each single piping layout within the campus for the routine works.
- Reports any failure/problem incurr during the utility bill record.
- Conduct a series of self-monitoring within the zoning and perimeter of water coverage.
- Training staff for the competencies of water works.
- Analyze the water saving level each month.
- Yearly workshop/meeting for the improvement of data collection.
- Promote the sustainable water conservation and protection.

The purpose at PNU Sewage Treatment Plant is to Treat the total raw sewage that will be collected from various university applications, both of

suspended solids and biodegradable organic matters will be reduced through the treatment stages to an acceptable limit. The plant is capable to produce treated water that meets water reuse standards in volume and quality. All the treated effluent is used for irrigation with an average of 3500 m².

[Princess Noura Bint AbdulRahman University launches Geo-Environment Forum with Vision 2030 in collaboration with the Ministry of Environment, Water and Agriculture](#)

Under the auspices of His Excellency the Director of the University, Dr. Inas Bint Suleiman al-Issa, Princess Noura Bint Abdul Rahman University, represented by the Faculty of Arts, launched the "Geographical Environment Forum with Vision 2030" in cooperation with the Ministry of Environment, Water and Agriculture, in the University's Conference Center, in the presence of a number of leaders, representatives of ministries and a group of experts and interested people from various universities in the Kingdom.

The program opened with fragrant verses from the Holy Quran, followed by a speech delivered by H.E. The University's Undersecretary for Graduate Studies and Scientific Research Dr. Ahmed Al Ghadeer on behalf of His Excellency the University's Director Dr. Inas Bint Suleiman al-Issa, Inas Bint Suleiman al-Issa, in his speech welcomed the generous presence and expressed his pride and gratitude for the blessed efforts our leadership has given to support the processes of education and learning to promote the country in its present and future.

The Dean of the Faculty of Arts, Dr. Mona Al-Loiba, then delivered the opening speech of the forum, explaining that the Faculty of Arts represented by the Department of Geography initiated this forum based on the vision of Princess Noura Bint AbdulRahman University to invest knowledge to be a beacon in the development of a sustainable national environmental community, where the forum (Geographical Environment vision 2030) aims to deepen and enrich the environmental culture in society, promote scientific research to serve environmental issues using GIS, and highlight the original and innovative experiences leading in environmental work. Sustainable, promoting national values in maintaining quality of life by reducing pollution in all its forms, increasing the efficiency of waste management and reuse, reducing the phenomenon of desertification, preserving natural wealth and

consolidating the value of the sustainable environment in our dear country.

Dr. Al-Loiba's speech was followed by a panel discussion introducing the process of space and geospatial information in the Kingdom presented by the former Chairman of the General Authority for Space, His Excellency Lt. Gen. Mareh Al-Shahrani, and the Undersecretary of the Ministry of Land and Space at the Ministry of Municipal and Rural Affairs, Dr. Mohammed Al Rajhi.

The forum was then launched on its first day with two sessions in which nine working papers were presented, the first session was entitled "Modern technical applications in the field of environment using GIS" under the management of Dr. Abdullah Al-Briki Al-Shammari, in which the associate professor of geography from Qassim University, Dr. Ahmed Al-Daghiri, participated in the talk about: "The contribution of spatial analysis techniques in the study and preparation of naturality in the Tesia reserve in Saudi Arabia", as addressed by Engineer Talaat Al-Rahali to "plan the expansion of the investment of the metric industry for more accurate measurements and economy of the world." "Monitoring sand creep and predicting its movement using remote sensing and geographic information systems techniques in Badr province in Medina," said Dr. Nasser Al-Zabneh, Assistant Professor of Geography at Taiba University, "Monitoring sand creep and predicting its movement using remote sensing and geographic information systems techniques in Badr province of Medina," while Princess Noura University Assistant Professor of Geography Dr. Iman al-Banna presented her scientific paper entitled "The impact of sea level rise on land uses in damietta and Rashid regions using GIS and remote sensing." Professor of Geographic Information Systems at Princess Noura Afnan University of Turkey and Sita Al-Oufi, with a scientific paper entitled "Using GIS in Environmental Planning".

The second session was entitled "How to make our environment sustainable Ramadan?" From King Saud University and its scientific paper entitled "Major transport projects for sustainable development in Riyadh and its expected impact to reduce pollution and raise the level of air quality in 2030". At the end of the second session, Professor of Islamic History Dr. Alia Al-Jubaili of Princess Noura University discussed "Islamic solutions to the problems of the environment and its impact on Islamic civilization".

The forum has been attended by 16 entities, including ministries, institutions and government and private sectors, and will continue its activities until Thursday with two dialogue sessions entitled

"Environmental Challenges" and "Waste Recycling to maintain a sustainable environment".

[Princess Nourah University implements three environmental awareness campaigns relative to the sustainable development objectives](#)

In view of the role of Princess Nourah bint Abdulrahman University in achieving environmental sustainability, and its belief in the importance of active students' participation in various international forums and events related to the environment. The Department of Biology and the Community Service Unit at the College of Science have recently organized three environmental community awareness campaigns with slogans linked to the thirteenth objectives of private sustainable development in the climate, and the fifteenth of life on the land. In the presence of the head of the Biology Department, Dr. Laila Al-Shuraim, the college's vice-rector, as well as several faculty members, administrative staff and the students.

As coordination and cooperation has been made with the General Department of Parks and Community Service in the Secretariat of the City of Riyadh to obtain various types of different annual flowering seedlings, cacti, perennial outdoor plants, and small trees to be cultivated by approximately (90) students among the fourth level students in the Biology Department within two weeks at a rate of one hour per day, under the supervision of Dr. Arwa Abdul Karim Al-Hukail.

This comes in line with the Kingdom's strategies towards the environment and the restoration of vegetation in Riyadh to reduce the damages related to drought and its negative effects, as an influential environmental mission and social responsibility to activate the role of students in society inside and outside the college and university. In addition to contributing to raising awareness and environmental sense with a number of Applied Ecology issues.

On the other hand, and to achieve the quality of educational outputs, in line with the achievement of the Kingdom's Vision 2030, the initiative has

been taken to host (14) third-graders (American Diploma) students from Riyadh Najd Private Schools to attend the various campaigns and events and participate in applied activities such as afforestation. In order to increase the green areas inside the college and educate them about home gardening methods in addition to a scientific tour to learn about the laboratories of the Department of Biology and the herbal plants in the college.

The awareness campaigns varied to include the introduction of the World Day to Combat Desertification and Drought under the slogan (Vision is affiliation to achieve development), the introduction of the International Day for Biological Diversity, whose campaign was called (Our Vision 2030 Saves Our Environment). As well as the introduction of the International Day for Preserving the Ozone Layer and shedding light on the resulting global climate change and global warming under the slogan (Vision 2030 protects the environment).

The event was accompanied by three corners of environmental issues for the three campaigns to cover them from various aspects and link their issues to each other and to clarify the risk of continuing to pollute the environment with different pollutants. Several visual presentations, which have been designed and prepared by students, were presented. In addition to reviewing some international efforts and the Kingdom's efforts specifically the directives included in the Vision 2030 for environmental protection.

This came within the framework of promoting the principle of rationalization, reducing consumption and waste in natural resources, preserving biological diversity. As well as protecting it through nature reserves, sustainable development for it, preserving it, and directing renewable (clean and safe) energy such as solar energy, wind energy, etc. as a safe and clean alternative that protects and preserves the environment and contributes to reducing the breadth of the Ozone (O₃) layer hole.

The campaigns also presented recommendations and proposed solutions to contribute to limiting the exacerbation of these problems and controlling them and explaining some positive applied mechanisms to

protect the environment. These recommendations emphasized the importance of solidarity and effective participation in eliminating pollution by limiting the use of all kinds of plastics, and the need to move to the use of safe alternatives as biodegradable plastics alternatives. As well as the possibility of using some insect repellent plants, especially in house rooms, as an alternative to the use of chemical pesticides. In addition to urging the rationalization of electricity and water consumption and preventing logging, and encouraging the participation of students in planning and implementing organized campaigns, including some positive activities and events, and developing a high sense of responsibility towards public property and cleanliness of the environment within university and college facilities.