Qassim University
جامعة القصيم

Qassim University Framework strategy for Climate change

Table of Contents

ESG Environmental

Qassim Region

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Definition:

It is one of the administrative regions of the Kingdom of Saudi Arabia, and the headquarters of its emirate is the city of Buraidah, and is characterized by the abundance of groundwater, and provides the Kingdom of Saudi Arabia with the finest types of dates and vegetables, and its most important cities: Buraydah, which is the largest city, Unaizah, Al-Ras, Al-Comet, Al-Bukairiyah, Al-Bada'i, Al-Khobar, Al-Khabar, Al-Asyah, Aqla Al-Saqour, Dhariya, Ayoun Al-Jawa, and others, and it is mentioned that Antara bin Shaddad, Zuhair bin Abi Salma and his son Kaab bin Zuhair are pre-Islamic poets who lived in this geographical spot, and the latter is the one who praised his famous poem Maqam Prophecy (peace and blessings of Allaah be upon him).

Qassim is located in the center of the Kingdom within the Najd Plateau which includes the regions of Riyadh, Qassim and Hail, making it occupy a privileged position in terms of trade, agriculture and population. Qassim is a name mentioned in ancient sources, where it is stated in the tongue of the Arabs that Qassim is what facilitated the land and many of its trees, and Qassim is the source of Ghada, Arta and Salam. The ancient Qassim region passes through the trade and pilgrimage routes that flourished during the Umayyad and Abbasid eras, especially the roads of Basra, Kufa and Baghdad, and Qassim still retains the monuments and landmarks of these roads and their stations.

Its inhabitants work in trade, agriculture, grazing and industry, and are distributed in more than four hundred cities, villages and migration. The trade of the people of Qassim is generally concentrated in agricultural wealth such as: cereals, dates, vegetables and so on, due to the availability of surface and groundwater in it, as well as livestock such as: camels, cows and sheep, in addition to clothing and other luxuries. The climate of Qassim is no different from that of central Arabia, it is cold, rainy, hot, dry summers.

The Qassim region is connected to the regions of Riyadh, Medina and Hail by a network of high-quality highways, and it also has a regional airport that mediates the region, and from which some international flights depart to the Arab countries, as well as the northern train that reaches the Riyadh region and then to the Eastern Province.

Geography of the region

Climate:

Hot dry in summer, cold rainy winter, the average temperature in summer is about 36 ° C, and in winter 20 ° C, and the temperature in summer can rise to more than 40 ° C and decrease in winter to 10 ° C. Average rainfall is slightly higher than most parts of the kingdom due to the height of the region; but it rarely exceeds 200 mm per year.

Natural characteristics of the area:

Wadi al-Rama is the most important natural phenomenon in the Qassim region, crossing the whole region from west to east and is the longest valley in the Arabian Peninsula, with a current length of 600 km from its source near Medina to its mouth in the sands of Thuwayrat east of Qassim. Dozens of valleys from the north and south are connected to Wadi al-Rama. On the northern side, Wadi al-Mahlani, Wadi Margala, Shuaib Sabih, Shuaib al-Dulaimiyah, and on the southern side are connected to Wadi al-Jaffen, Wadi al-Pursala, Wadi al-Jarir, Shuaib Jarrar, Shuaib al-Dath, Shuaib al-Khushibi, Wadi Dukhna, Wadi al-Nisa' and Wadi al-Rasha was connected to Wadi al-Rama near the governorate of Unaizah, but

the influence of the sister stood as a barrier between the two valleys at present. The land of Qassim varies between 600,750 m above sea level, and its surface gradually descends, generally from west to east. The maximum height of its bottom from sea level as mentioned above is between 600,750 m, but in some plateaus it reaches 900 meters, which affects the climate. The summer nights of Qassim are like desert nights, a gentle breeze, clear skies, and bright stars that delight in seeing those who are fond of the wonderful tranquility of the desert.

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The Geography of the Region

A) The climate:

It is hot in summer, cold and rainy in winter. The average temperature is about 36 degrees Celsius

Qassim University Framework strategy for Climate change in summer, and 20 degrees Celsius in winter; the temperature can rise to reach more than 40 degrees Celsius in summer, and fall to 10 degrees Celsius in winter. The average rainfall is slightly higher than most regions of the Kingdom, but it rarely reaches more than 200 mm per year, due to altitude.

B) Natural Features of the Region:

Wadi Al Rama (Al-Rumah) is considered as the most prominent natural phenomenon in Qassim region. It crosses the whole region from the west to the east. It is the longest valley in the Arabian Peninsula; the current length is 600 km, from its source near Medina to its estuary in Al-Thuwairat sands east of Qassim.

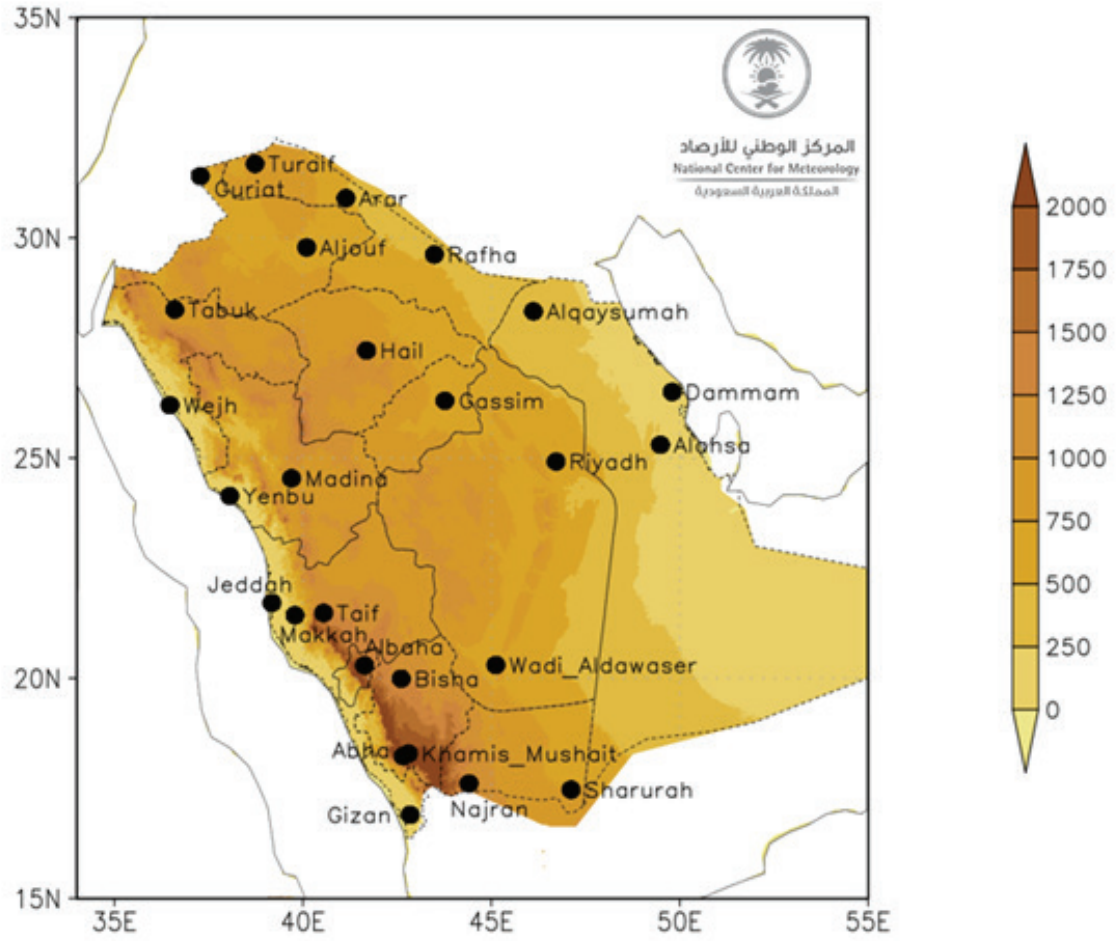
Dozens of valleys are connected to Wadi Al Rama (Al-Rumah) in the north and the south. In the north are Wadi Al-Mahalani, Wadi Marghala, Shuayb Sbeih, Shuayb Al-Dulaimiyya. In the north are Wadi Al-Jafn, Wadi Al-Rigla, Wadi Al-Jarir, Shu'ib Jarrar, Shu'ib Al-Dath, Shu'ayb al-Khushaibi, Wadi Dukhna, and Wadi al-Nisaa. Wadi al-Rasha used to be connected to Wadi al-Rumah near Unaizah governorate, but Al-Shaqiqa Al-Nafūd stood as a barrier between the valleys at present.

The altitude of Qassim region ranges between 600 to 750 m above sea level, and gradually declines from the west to the east in general. The maximum altitude, as mentioned above is between 600 - 750 m, but some hills reach up to 900 meters, which affects the climate.

Qassim enjoys the desert nights in the summer with the gentle breeze, the clear sky, and the bright stars in the sky that entertain the beholders who are fond of the magnificence of the quiet desert.

C) Area and Boundaries:

Qassim region covers an area of about 73,000 square kilometers, which represents about 3.2% of the total area of the Kingdom. Its maximum breadth is about 480 kilometers from the north to the south, and 400 kilometers from the east to the west. It is bordered by Riyadh region in the east and in the south, Hail in the north, and Medina in the west.



The Climate change:

Globally, climate change has become one of the most important problems in recent decades. Where scientists have concluded that the increased temperatures and climate changes have several short-term and long-term risks on the environment, human, animal and plant. Evidence suggests that the main causes of this environmental change are the intensive use of fuel, urban expansion, and forest removal. Consequently, severe environmental change is happening, such as drought, floods and heavy rain. United Nations reports have shown that billions of people are negatively affected by climate change. This problem is growing in cities of course, with increased urbanization rates quickly, Which resulted in an unprecedented request for energy in urban areas. According to the United Nations report of human communities, cities cover only 2% of Earth's surface area, however, consume 78% of global energy due to the centers of cultural and social activities. It also issues more than 60% of carbon dioxide emissions, as well as other greenhouse gases that intensify the global warming, which, of course, increasing the negative effects of the problem of climate change.

Universities and their roles in Sustainability and climate change

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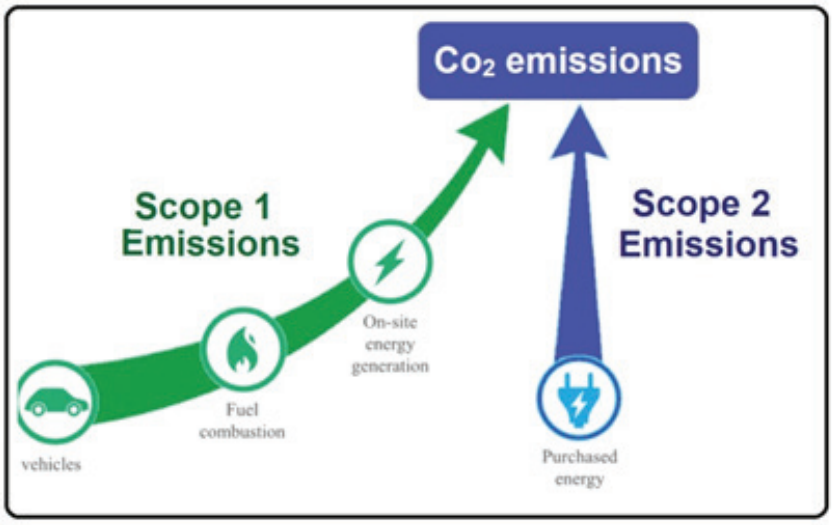
In 2015, 193 countries set together and agreed to adopt the sustainable development goals (SDGs). These SDGs are the first action plan by the global community to end up poverty, protect the environment and to ensure that all people enjoy peace and prosperity (United Nations General Assembly, 2015)3 . Universities are playing a crucial role in alleviating climate change impacts throughout their efforts in education, research and community outreach programs. Nevertheless, universities are also large organizations with significant greenhouse gas emissions (scope1, 2 & 3)4 . They produce emissions on their buildings and campuses through using electricity, fuel consumed from cars and buses traveling from and to universities, … etc. Thus, they have responsibilities in reducing their greenhouse gas emissions as well as their carbon footprints and plan actions to stop impacts of climate change. Universities should report and cover their 'scope 1' and 'scope 2' emissions in their buildings and campuses. Scope 1 emissions are the direct emissions produced by universities, like natural gas consumption on campus for heating buildings. Scope 2 emissions are those generated by electricity purchased by a university and produced using fossil fuels.



Scope 3 emissions occur because of the activities of the university, but outside of their direct control boundary. For example, emissions from products and services purchased by the university. In fact, scope 3 emissions are more difficult to measure and reduce, therefore, universities need to account for them to properly alleviate climate change impacts.

Sustainability concepts in the Strategic plan of Qassim University 2020-2025

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The current strategic plan (2020 - 2025) of Qassim University is prepared in correspondence with the sustainable development perspective. The sustainability concept is shown in both mission and vision of Qassim University. The initial drafting of the Strategic Framework included a detailed analysis of the strategic governing frameworks incorporated important policies especially the Vision KSA 2030, and the New Universities System. National trends issued by the relevant authorities and the sustainable competitive advantages of the Qassim region were also taken into account.

The 7 major strategic directions for the current strategic plan (2020 – 2025) included a direction about the necessary to direct more efforts and applied research to achieve the local Sustainable Development Goal (SDG) to ensure environmental sustainability. The most prominent reflections of the University's Strategy considered the sustainability factors in facilities development, food, and sustainability of natural and projects and in the operations and maintenance of financial resources, a focus on the sustainable competitive operations, and most importantly, the implementation of the green building.

The strategic plan (2020 – 2025) of Qassim University is including several strategic projects

related to sustainability as follow:

01.01.06 Sustainable university – Promoting Green Courses.

02.03.03 Building a sustainable development research database.

02.03.02 Sustainable University - Greening the Research

02.03.01 Defining competitive advantages and sustainable development priorities for the Qassim Region

03.01.06 Sustainable university - Institutional Greening.

04.04.02 Achieving the Sustainable University status - Greening the headquarters.

The framework of the QU strategy and commitment to alleviating climate change.

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Objective 1: Reduction of Co2 emission (Scope 1 & 2).

Main Initiatives:

A. Increasing area of green plantation inside university.

B. Lower the Co2 emission from vehicles inside the university.

C. Lower the Co2 emission inside the university.

Key Performance Indicators:

1- The ratio of open space area to total area.

2- Total Area on Campus Covered in green plants or trees Vegetation

3- The Total Carbon Footprint.

4- Number of Zero Emission Vehicles (ZEV) in Campus.

5- The total number of vehicles (cars and motorcycles) divided by total campus' populations.

6- Transportation Initiatives to Decrease Private Vehicles on Campus.

Objective 2: Reduction of Energy Consumption.

Main Initiatives:

A. Increasing the Energy Conservation.

B. Increasing the on-site renewable energy.

Key Performance Indicators:

1. The number of Renewable Energy Sources in Campus.
2. The Electricity Usage per Year (in Kilowatt hour).
3. The ratio of renewable energy production divided by total energy usage per year.

Objective 3: Increasing elements of green buildings

Main Initiatives:

A. Increasing number of elements of green buildings in the existing buildings.

B. Ensuring of green building designing in the new buildings of the university.

Key Performance Indicators:

1. Energy Efficient Appliances inside all university buildings.
2. Smart Building Implementation in all university buildings.

Objective 4: Focusing on climate change in education and research.

Main Initiatives:

A. Implantation of green courses (includes climate change).

B. Implementation of green research (includes climate change).

Key Performance Indicators:

1. The University budget for sustainability efforts.
2. Number of Offered Courses/Subjects Related to climate change and sustainability.
3. Number of scholarly publications on sustainability and climate change.
4. Number of Events Related to Sustainability and climate change.

Objective 5: Student's engagement in activities and community services about sustainability and climate change.

Main Initiatives:

A. Increasing involvement of students in activities related to sustainability and climate change.

Key Performance Indicators:

1. The Number of student organizations related to sustainability (includes climate change).

2. Number of cultural activities on campus (e.g.Cultural Festival) including virtual activities involving sustainability concepts (includes climate change).

3. Number of organized community services to tackle the sustainability and climate changeConcepts.

Impactful university program(s) on climate change

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A- Research Programs for reducing greenhouse emission Qassim University have several research programs aiming to deal with energy and climate change by reduce greenhouse gas emission. Here is a summary of these projects:

Qassim University have several research programs aiming to reduce greenhouse gas emission. Here is summary of these projects:

1- "Sustainable and value chain research in agricultural and veterinary sciences".

This Program addresses the sustainability of agricultural and animal health. Research activities under this program deal with recycling of date palm waste to valuable products, production of biofertilizers and biocontrol agents, and mass production of natural enemies to eliminate the effect of destructive pests and reduce the use of harmful chemical pesticides, as well as finding effective ways to rationalize irrigation water and conserve water resources. Outcomes of this research program will reduce greenhouse gas emission as well as environment contamination.

2- Sustainable Developments in the Energy, Water, and Environmental Engineering Sectors Energy and water systems have often been treated as a separate system over the entire pathway from production to consumption. However, their close interdependence requires some perspective of the water-energy nexus, especially in regions with very high-water stresses combined with a myriad of rapid changes in resource production and consumption. The proposed research areas within this priority address 7 out of 17 Goals of Sustainable Development established by UN to transform our world including clean water and sanitation, affordable and clean energy, industry, innovation, and infrastructure, sustainable cities and communities, responsible consumption and production, climate action, and life below water.

3- Innovative Biotechnology and nanotechnology for a healthy life Biotechnology and nanotechnology are disciplines that developed from the interaction of physical sciences, molecular engineering, biology, chemistry, and biotechnology, and holds major advances in pharmaceuticals and health care in the diagnosis, prevention, and treatment of various disease.

Biotechnology and nanotechnology research is a promising field that can generate income and can initially focus on the improvement of dangerous diseases treatment. Globally, nanoparticles have become part of daily life as they found in fertilizers, and cosmetics, for instance. Given the breadth

of the potential applications, nanotechnology has become a research priority for many countries, as shown by the UNESCO Science Report: towards 2030 in. Thus, the outcome of this research priority will focus directly on bettering the health of chronic disease patients such as cancer patients, etc. around the globe.

4- “Development of Smart Cities”.

More than half of the world’s population lives in cities today, with that figure set to rise over the coming decades. There is a pressure on cities to provide better and more efficient infrastructures and services as well as an environment-friendly buildings. These smart cities will integrate the quality of life for its citizens, the energy-efficient, the local economy, transport, traffic management, environment, public safety and interaction with government for future cities developments.

6- The “Green land of Qassim” Initiative

This initiative is including planting trees inside the university campus as well as in different locations all over the Qassim region. The university’s students are also contributing in this initiative by planting trees by themselves. The overall outcomes of this initiative will help in reducing the greenhouse gas emission.

B- Qassim University Program to decrease the parking area on campus

Qassim University started an initiative to plant trees inside all parking spaces in the university. This initiative reduced the parking area, increased area of green plants and will reduce CO2emission as well.

C- Number of Transportation Initiatives to Decrease Private Vehicles on Campus There are several initiatives that have been conducted in Qassim University to reduce number of private cars, such as:

1. Shuttle bus services is available and free of charge.

2. The university have opened 13 branched (with two main satellite campus) to reduce the number of private vehicles in the campus, journey to the university main campus ((So, students staff drive for short distances to reach their colleges in a nearable sites/cities)), which aid reducing CO2 emission not only at the campus but also in the surrounded area, and cities/villages.

3. There is a students’ hostel inside the main campus, which is a walking distance from the teaching building.

4. Most of services, and teaching materials are affordable online through the University website, which reduce the need of making a long journey to the main campus, or branches to afford it.

D- Elements of Green Building Implementation as Reflected in All Construction and Renovation Policies

Qassim University is adopting sustainability criteria in different aspects. One of them is the application of green building elements in all of its new constructed buildings. Therefore, the university is always assuring the presence of green building elements in the construction contracts of its new buildings.

At the same time, the university is fulfilling many green building elements in the university existing buildings such as:

Elements of Green Building Implementation at Qassim University

New Buildings

Construction Contracts containing items to fulfill elements of green building

Existing Buildings

The university is fulfilled many elements such as:

- Energy efficiency
- Indoor environmental quality
- Structure design efficiency
- Water efficiency
- Waste Management

1. Energy efficiency:

o Qassim university buildings were designed to use the natural daylight to reduced wasting of energy as electricity.

o There are energy efficient appliances all over the university buildings.

o All light sources at the university buildings are being substituted by energy sufficient ones.

o There are air fans inside buildings to distribute air efficiently and to reduce waste in energy of air conditioning.

2. Indoor environmental quality:

o There is many green plants inside the building to enhance the indoor environmental air quality.

o There are air fans inside buildings to distribute air efficiently and to reduce waste in energy of air conditioning.

o There are energy efficient appliances all over the university buildings. A station for Monitoring CO2 emission inside the campus has been implemented along with CO2 measuring devices.

3. Structure design efficiency:

o All free spaces around buildings have trees and plants.

o Buildings walls are insulated.

o Inside buildings, there are plants that help in reducing CO2 emission

References

[1] [Online]. Available: https://www.qu.edu.sa/content/p/1.

[2] [Online]. Available: https://pdq.qu.edu.sa/laravel-filemanager/files/shares/Final_Qassim%20University%20Framework%20strategy%20for%20Climate%20change.pdf.