

Environment in Qatar: Indicators, Challenges and Strategies



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Abstract:

This research aims to study environmental protection in the State of Qatar by presenting the most important indicators and environmental challenges it faces. These challenges have necessitated the adoption of several strategies for environmental protection, biodiversity, and climate change, contributing to Qatar's distinguished achievements.

Keywords: *State of Qatar; Environmental Challenges; Environmental Protection; Biodiversity; Climate Change.*

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Introduction

The issue of the environment gains significant importance and top priority on the international agenda due to its profound impact on planet Earth, human life, flora and fauna, among other variables and risks with near, medium, and long-term effects.

The State of Qatar has focused on environmental issues and sustainability for the present and future generations. The interest of humans lies in being within a balanced environment to continue living a healthy and sound life.

In this context, the permanent Qatari constitution has imposed an obligation on the state to provide a healthy environment that secures the future, addresses the negative effects of climate change, reduces pollution, and conserves and protects the environment, maintaining its natural balance and caring for cultural heritage and biodiversity. Article 29 of the constitution emphasizes that natural resources and wealth belong to the state, which is responsible for preserving them.

The urgent need to adopt ambitious actions to establish a clear framework for conserving ecosystems and biodiversity in Qatar contributes to achieving a sustainable environment for future generations. This underscores the vital role of the environment in providing a healthy life for every individual living on its land, in line with the Qatari leadership's interest in developing natural resources and wealth guided by its National Vision 2030 and the developmental plans and strategies that emerged from it. The state has dedicated all its energies towards constructive work to achieve a sustainable environment.

Research Importance:

Recognizing the importance of development and the environment, and keen on finding long-term solutions to a number of environmental problems that have arisen due to the developments witnessed by Qatar, the Qatari authorities have been keen on enacting legislation and laws, and implementing environmental projects and initiatives to preserve the local environment, maintain its cleanliness and protection, and involve the community through environmental awareness and education. This is crucial as biodiversity in the Qatari environment is part of the natural heritage and legacy for future generations, which must be preserved and sustained.

Research Objectives:

This scientific paper aims to achieve the following objectives:

- Analyze the current environmental situation in Qatar and highlight its main challenges.
- Present strategies for environmental protection, biodiversity, and climate change in Qatar.

- Highlight the most significant Qatari achievements in the field of the environment.

Research Problem

Through numerous projects and initiatives, the State of Qatar works to achieve these strategic environmental objectives, enhancing environmental protection and sustainability, and integrating them with public health.

The constitution of Qatar, environmental laws, and Qatar Vision 2030, which adopted environmental sustainability as one of its four pillars for sustainable development in the state, have underscored its significant interest in the environment. These have been translated into goals and projects in the national strategy and the sustainable ministry strategy.

Based on the foregoing, the research problem can be formulated in the following main question:

- What strategic initiatives has the state undertaken to face various environmental challenges?

This main question encompasses the following sub-questions:

- What are the indicators and environmental challenges for the State of Qatar?
- What are the contents of the environmental strategies set by the State of Qatar?
- How have various initiatives and activities contributed to achieving Qatari achievements in the field of the environment?

Research Scope:

The topic of the environment in Qatar is among the most important subjects that scholars and researchers have focused on. Thus, our research will be limited to studying the environmental issue in Qatar by analyzing the current environmental situation in this country through various indicators and challenges. It will cover different strategies adopted by the State of Qatar in the field of environment, biodiversity, and climate change, leading to a presentation of the country's results and achievements in environmental protection.

Research Methodology:

The researcher approached the study topic from a multimethodological perspective rather than a nonmethodological one, meaning analyzing the phenomenon from more than one entry point. Therefore, given the nature of the environmental subject, the descriptive analytical method was followed, which allows for the description and diagnosis of Qatar's environmental situation. Additionally, the statistical method was adopted, assisting in the quantitative treatment of the topic. I also attempted to follow a historical approach by studying

official charters related to the environment, biodiversity, and climate change through various historical epochs that Qatar has gone through.

1. The Environmental Situation in the State of Qatar and Existing Challenges

a. Environmental Indicators

- Water Resources

There are no freshwater surface water resources in Qatar, making rainwater and groundwater the primary sources of fresh water. The country's main water resources come from desalination, groundwater, and the reuse of treated sewage water, with the total water production from these three sources rising from 220 million cubic meters in 1990 to 912 million cubic meters in 2016.

In 2017, groundwater extraction reached 250.8 million cubic meters/year, while the safe withdrawal of groundwater was 55.8 million cubic meters/year, leading to the depletion of aquifers, seawater intrusion, and increased salinity. About 230 million cubic meters/year of the extracted groundwater – approximately 92% of the total withdrawal – is used for agricultural purposes.

Desalinated seawater supplies at least 50% of the country's water. It is primarily used for municipal and industrial purposes, currently meeting about 99% of domestic water needs. In 2015, the amount of desalinated water was 533 million cubic meters, compared to 362 million cubic meters in 2010. By 2019, the total water provided by desalination was 671 million cubic meters per day, and Qatar has invested in several desalination plants across the country, with a production capacity of 2.27 million cubic meters/day.

Besides desalination, treated sewage water has been an important source of non-traditional water in Qatar since its introduction in 2004. According to the Ministry of Development Planning and Statistics, 50% of sewage water is collected, and 60% of it is treated at a basic level. In 2019, the amount of treated sewage water reached 276 million cubic meters on average (about 99.3% of the total sewage water collected). In 2015, the amount of treated sewage water reached 194 million cubic meters (about 98.2% of the total sewage water). (<https://tinyurl.com/bddux3cz>)

- Air Quality

Qatar's national network for monitoring air quality consists of 40 stationary and mobile stations spread across different regions of the country. Other entities such as "Qatar Energy, the Meteorological Authority, Public Works Authority, Ministry of Health, and others" join and are linked to this network for easy and smooth information transfer among these entities for monitoring and analyzing the observed data.

These stations cover the basic global indicators and standards for air quality and are equipped with the latest devices and technologies. The environmental data monitoring and analysis unit in Qatar represents the protection

and sustainability of the Qatari environment by monitoring any environmental pollution. The environmental sector is always working to develop its tools, mechanisms, and programs as part of the operational management plans included in the ministry's sustainable strategy. (<https://tinyurl.com/e68v5x8h>)

The unit provides high-accuracy air quality data in Qatar, identifies sources of pollutants and their impact on air quality, whether from stationary or mobile sources like measuring the impact of transportation and vehicle movement on air quality, and identifies Qatar's exposure to transboundary pollution. This represents an important step in starting to know air quality forecasts in the country and supporting the early warning system for air quality, as well as current and future air quality modeling.

The environmental data monitoring and analysis unit is one of the most important units in the region, including the latest technologies, tools, devices, and stations present in the world, data automation processes, modeling, and the real-time prediction and early warning system. The monitoring network provides a better understanding of the causes affecting air quality in Qatar, including sources and types of pollutants, factors of unnatural changes, and how these factors contribute to the transport of polluted air masses to Qatar, thereby providing a basis for developing sustainable methodologies for adapting to climate change in the future. (<https://tinyurl.com/4uajwms4>)

The Qatari authorities consider the presence of suspended dust in the air not a major concern because dust is not an industrial pollutant but a natural pollutant present in varying proportions in all countries of the world, noting that the ministry is working to reduce this percentage and improve air quality more and more.

- Soil and Land Condition

96.2% of the country's total population is concentrated in five cities: Doha, Al Rayyan, Al Wakrah, Al Khor, and Umm Salal, with a population density of 4868 people per square kilometer. This significant concentration has posed a challenge to the already fragile environment, along with the increase in waste quantities of all kinds. The phenomenon of desertification has emerged due to overgrazing, the construction of roads, the increase in vehicles and cars, and the encroachment of sand on agricultural lands. The country has 1,500 square kilometers of sand dunes, approximately 12% of the total area, in addition to 5% represented in other sandy formations, moving at a rate of 8 kilometers per year.

This phenomenon has led to the loss of about 21,000 acres of land suitable for agriculture or grazing, in addition to the decrease in groundwater levels and the increase in its salinity, which resulted in the barrenness of many agricultural lands. The proportion of agricultural land decreased from 10,039.2 hectares in 1999 to 6,928.3 hectares in 2004, with 356 farms abandoned out of 1265 in the country. Al-Muhannadi, Al-Hiti, 2008, p. 110

- **Biodiversity**

Qatar's environment is rich in various ecological systems. On land, there are 371 species of flowering plants belonging to 236 genera from 61 families, according to the 2003 Qatar Biodiversity Survey. The widespread establishment of animal barns (Al Azba) in pastoral areas has led to significant land degradation. According to the IUCN Red List and the UN Environment Programme database, there are about 26 Qatari species at risk. However, the information on biodiversity in Qatar is not sufficient.

Animal species have faced many pressures, including poaching, the use of modern hunting methods and four-wheel drives, in addition to urban and construction encroachment, leading to the extinction of some species and endangering others. Pollution also has severe negative effects.

The marine environment is a cultural symbol and a natural source of food, water, and wealth for the people of Qatar. 995 documented marine species have been identified. The loss of natural marine habitats through actions such as landfilling, sedimentation, and dredging is the main reason for the increasing number of species threatened with extinction. The mangrove wetlands in Al Khor and Al Dhakira are under significant pressure from villa encroachment, sewage water flow, waste disposal, and "land reclamation." Loss of natural environment results from various factors, such as increased salinity, decreased oxygen levels, and increased water temperature. Pollutants delay the components of biodiversity, causing an increase in mortality rates and a decrease in reproduction. <https://tinyurl.com/2p87n2jp>

b. Environmental Challenges

The main environmental challenges facing the State of Qatar can be highlighted through the following points of environmental stress:

- **Water Management**

- Lack of an integrated water management system allowing for the continuation of environmental impacts.
- High groundwater levels in Doha increase construction costs and threaten marine life.
- Increased salinity in groundwater sources for agriculture harms agricultural productivity.

- **Energy and Climate**

- The intensity of combustion in Qatar and high carbon dioxide emissions contribute to greenhouse gases.
- As a small coastal country, Qatar is vulnerable to an expected rise in sea levels.

- **Pollution**

- Declining air quality due to dust mixed with chemical pollutants.
- Concentration levels exceeding health standards for particulates, nitrogen oxides, and ozone cause: increased rates of asthma and respiratory diseases.

- **Biodiversity**

- Threats to biodiversity have left 31 species identified as at risk of extinction.
- Lack of a comprehensive database on biodiversity limits the establishment of effective policy.
- Low public awareness about biodiversity issues and protected areas lack an effective management plan. <http://tinyurl.com/mr29dfnp>

In addition to the above, there are two main types of challenges facing the State of Qatar : <https://tinyurl.com/mrya4rup>

- **Climatic and Environmental Features:** The Qatari environment is challenging due to the extremely hot climate with high humidity and low rainfall. Indeed, groundwater is the only source of natural fresh water.
- **Population Growth Rate:** The increasing population leads to more urban sprawl and the need for more residential areas, resulting in more pollution and solid waste, negatively impacting natural resources, especially water.

2. Environmental Strategies in the State of Qatar

The State of Qatar pays considerable and increasing attention to environmental issues, having established numerous strategies and initiatives to protect the nation's environment, highlighted as follows:

a. Qatar National Environmental Strategy 2011/2016

The unique and contrasting blend of Qatar's natural resources, consisting of significant oil and gas wealth, represents both a considerable advantage and a set of pressures. It has achieved one of the highest per capita incomes in the world, yet the severe scarcity of water and arable land equally represents an unusual vulnerability and deficiency. The permanent Qatari constitution mandates the state to protect the environment for the benefit of future generations, as stated in Article 33: "*The state shall protect the environment and its natural balance to achieve comprehensive and sustainable development for all generations.*"

From this perspective, the First National Development Strategy introduced an action plan for the period 2011-2016 that balances economic growth with environmental protection. The overarching goal is a sustainable framework that ensures prosperity for future generations without the constraints of deficiencies or inherited environmental damage. (State of Qatar, General Secretariat for Development Planning, National Development, March 2011, pp. 208-209)

This strategy emerged in response to the following environmental constraints: (State of Qatar, General Secretariat for Development Planning, National Development, March 2011, pp. 208-209)

- High groundwater levels in Doha, raising construction costs, compounding the city's environmental challenges, and threatening marine life.
- Increased salinity in groundwater sources used for agricultural purposes, leading to soil quality deterioration and a decrease in already low agricultural productivity due to local farming methods, inappropriate crop and livestock mix, and government subsidies.
- Declining air quality due to chronic increases in dust levels mixed with chemical pollutants, contributing to higher rates of asthma and respiratory diseases.
- Climate change poses special challenges. As a major energy-producing country, carbon dioxide emissions contribute to the increase in greenhouse gases. As a coastal state, Qatar is vulnerable to a projected rise in sea levels.
- Threats against biodiversity, with 31 species identified as at risk of extinction.

The environmental sustainability strategy in the First National Development Strategy (2011-2016), titled "Preserving the Environment for Future Generations," included 12 specific goals (excluding the water sector outcome and its goals), with two achieved and the rest ongoing, some with updated objectives. Various programs and projects under the specified goals were implemented, including: (State of Qatar, Ministry of Development Planning and Statistics, February 2019, p. 279-281)

- First Outcome: Clean Air and Effective Plans to Address Climate Change
- Second Outcome: Waste Reduction, Increased Recycling, and Efficiency in Usage
- Third Outcome: Conservation and Sustainable Management of Natural Heritage
- Fourth Sectoral Outcome: Enhancing Sustainable Urban Expansion and Creating a Healthy Living Environment.
- Fifth Sectoral Outcome: Enhancing Environmental Awareness Among the Population.
- Sixth Outcome: Improving Environmental Management and Cooperation at Regional and International Levels

b. Environmental Sustainability Sector Strategy 2017/2022

The Environmental Sustainability Sector Strategy includes one main outcome: Preserving the Environment for Future Generations, and four intermediate outcomes: (1) An environment with less pollution ensuring human

health and ecosystem integrity, (2) An environment less affected by climate change ensuring sustainable development, human health, and environmental safety, (3) An environment that conserves biodiversity ensuring sustainable development, human health, and well-being, and (4) Enhancing sustainable environmental practices. There are 9 objectives and 9 projects (annex) to achieve the Environmental Sustainability Strategy, as follows: (State of Qatar, Ministry of Development Planning and Statistics, February 2019, p. 283).

First Axis: An Environment with Less Pollution Ensuring Human Health and Ecosystems.

Pollution is a major environmental issue that the state significantly addresses, whether it's air, soil, or water pollution. Polluted air harms humans, animals, and plants, carrying diseases that threaten life, contributing to global warming, and ensuing negative climatic changes. Water and soil pollutants threaten human and animal health and farmers' ability to produce essential food for feeding the population. Marine pollutants threaten many marine organisms.

The correct step in formulating specific objectives related to pollution is identifying the sources and types of pollutants and understanding their negative effects, then preparing and implementing appropriate interventions, programs, and projects, monitored through performance indicators, to reduce all types of pollution for human health and all living beings and to support and enhance the capacity of ecosystems and their biodiversity to ensure sustainable development

Second Axis: An Environment Less Affected by Climate Change Ensuring Sustainable Development, Human Health, and Environmental Safety

Climate change is among the most significant challenges facing the world, especially oil and gas-producing countries with petrochemical projects like Qatar. Climate change is now a reality, with the average annual temperature in Qatar rising by 0.2°C over the past forty years, expected to increase by 1.9 to 3°C by 2050 and by 2.2 to 4.9°C by 2100, causing numerous negative effects. (State of Qatar, Ministry of Development Planning and Statistics, February 2019, p. 283).

The goal is to create a green belt around Doha and its suburbs, playing a significant role in improving environmental and health conditions. Green belts and green spaces act as the "lungs" of cities, absorbing air pollutants, particularly carbon dioxide, through photosynthesis and releasing oxygen. Tree leaves, with their varied shapes and structures, capture airborne solid particles, aiding in air purification essential for human and all living beings' health.

Additionally, green belts significantly affect wind movement and direction, reducing their speed and heat, especially when carrying dust and sand, which occasionally cause considerable environmental and health damages. They also help in moderating local weather conditions by contributing to lowering daytime

temperatures. (State of Qatar, Ministry of Development Planning and Statistics, February 2019, p. 291).

Third Axis: An Environment Preserving Biodiversity Ensuring Sustainable Development, Human Health, and Well-being

Biodiversity is part of Qatar's heritage, culture, and future, essential for sustaining life by providing food, clothing, medicine, livelihoods, and other benefits. To preserve national identity, cultural heritage, food security, local development, and provide a foundation for scientific research among other benefits, biodiversity loss, especially in a harsh desert environment, cannot easily be compensated. Therefore, it is crucial to conserve and protect these vital resources. (State of Qatar, Ministry of Development Planning and Statistics, February 2019, p. 292-293).

This requires achieving the following two goals:

- Enhancing the current situation and sustainability of biodiversity and establishing a biodiversity database by the end of 2022.
- Achieving sustainable management of natural reserves and ecosystems by 2022.

Fourth Axis: Enhancing Sustainable Environmental Practices

Achieving a sustainable and robust environment for future generations requires responsible and effective institutions and entities to manage the environment and enhance community awareness of environmental issues.

The government needs accurate and comprehensive information and data on pollution, climate change, biodiversity, etc., to make appropriate environmental management decisions. Establishing an environmental information and data database for Qatar that provides required data accurately and timely is essential to facilitate decision-making for policymakers. The government will encourage sharing information among different departments within the Ministry of Municipality and Environment, other government entities, the private sector, and the community to provide necessary environmental data and improve environmental management by 2022. (State of Qatar, Ministry of Development Planning and Statistics, February 2019, p. 293).

c. Qatar's Environmental and Climate Change Strategy 2021

In September 2021, the Qatari Cabinet approved the National Climate Change Plan, a strategic framework reflecting the state's long-term ambitions in sustainability and effectively responding to the climate crisis. The plan aligns with the United Nations Sustainable Development Goals and is an integral part of Qatar National Vision 2030, outlining Qatar's commitment to addressing climate change through economic diversification, capacity building, and optimal use of natural resources. The plan sets national climate objectives to enhance resilience to climate change impacts through over 35 different actions

and more than 300 adaptation initiatives focused on mitigation.
(<https://tinyurl.com/2v3wpaif>)

Environmental and climate objectives prioritized in the following areas include: (<https://tinyurl.com/2v3wpaif>)

- **Greenhouse Gas Emissions and Air Quality**

- Reducing greenhouse gas emissions by a percentage against the baseline by 2030.
- Improving public air quality standards and revising the maximum limits by 2024.
- Enhancing indoor air quality standards by 2024 in line with WHO guidelines and the latest scientific developments.
- Establishing a national network of over 30 operational monitoring stations by 2023 to improve ambient air quality monitoring.
- Compiling a comprehensive inventory of air emissions in the country by 2023.

- **Biodiversity**

- Effective protection and management of over 25% of terrestrial areas and striving to protect marine areas in line with the global biodiversity framework.
- Protecting and restoring threatened species with specific conservation and renewal plans.
- Ensuring sustainable fishing operations.
- Improving awareness, participation, and capabilities in biodiversity protection.

- **Water**

- Periodic and effective monitoring of all water sources, including groundwater, seawater, and potable water.
- Desalinating over 55% of water using reverse osmosis or more sustainable technologies.
- Reducing groundwater extraction by 60%.
- Minimizing total water loss to less than 8% and actual loss to less than 4%.
- Reducing water consumption and setting a roadmap to reduce by 33% from 2019 levels to about 310 liters per person per day.
- Reusing 100% of treated sewage water.

d. National Biodiversity Strategy in Qatar

The State of Qatar, represented by the Ministry of Municipality and Environment, emphasized the importance of biodiversity and the necessity of its conservation as it represents the living natural capital supporting economic growth.

It contributes to maintaining the natural ecosystem, including water and food availability, energy necessary for survival on Earth for all living beings, and adapting to environmental disturbances like climate change.

To enhance the conservation and preservation of biodiversity and set visions, goals, and future projects related to biodiversity, the state established its first National Biodiversity Strategy in 2004. This strategy outlined 14 ongoing activities serving biodiversity conservation, genetic resources of animals, combating desertification, and preserving wild plant environments. (<https://tinyurl.com/2n7kr26u>)

The 2004 Biodiversity Strategy focused on 11 goals for the protection and sustainable use of natural biodiversity and promoting planned eco-tourism. The first three goals aim to conserve natural biodiversity and encourage eco-tourism by expanding the national reserve system, developing eco-tourism sites and facilities, and training personnel and guides in this field. The next three strategic goals encourage sustainable use of biodiversity through sustainable marine resource use, improving desert pastures, and revitalizing local agriculture.

The last five strategic goals provide long-term support for biodiversity by implementing environmental legislation, supporting scientific research, enhancing education and public awareness, activating environmental monitoring, assessing environmental impact, and integrating international environmental agreements.

Implementing this strategy requires high-level political support to integrate sector-specific legislations and policies, coordination among institutions, NGOs, and the private sector, and reviewing the comprehensive environmental study and action plan for Qatar's environment prepared by "Aquaterra" Canadian company. (<https://tinyurl.com/2p87n2jp>)

The previous plan was updated in the Second National Biodiversity Strategy (2015–2025) to balance sustainable development components in the state and reduce pressures on biodiversity components, including ecosystems, animals, plants, and fungi, by setting seven strategic goals.

The first goal aims to enhance knowledge of the current and future state of biodiversity in Qatar. The action plan requires establishing a national web-based database and information system for biodiversity to document all aspects related to these resources, such as description, evaluation, conservation, traditional knowledge, etc. Additionally, it involves publishing 25 scientific research papers in scientific journals and conferences on biodiversity issues in Qatar, identifying the population and trends of marine and terrestrial organisms at risk of extinction, identifying key habitats for biodiversity conservation and protection, evaluating and publishing the annual biodiversity status report, and making it accessible in a format easy for policymakers to use. (State of Qatar, Ministry of Environment, 2025, p. 11)

To ensure community participation in biodiversity conservation and raise awareness and interest, the action plan related to the second strategic goal mandates the development of interactive environmental programs. This includes information on desert and marine environments, along with field activities to be incorporated into the curricula of all primary, preparatory, and secondary government schools by 2025. Additionally, at least one annual campaign covering all parts of the state on biodiversity (marine environment, wetlands, deserts, etc.) will be conducted in collaboration with NGOs, governmental institutions, and the private sector.

Achieving the goal requires establishing at least one community volunteer program and scientific education for the community in one of the protected areas (natural reserves). Celebrating at least two biodiversity-related events locally and coordinating activities on global environmental days, such as World Environment Day, World Oceans Day, World Turtle Day, World Day to Combat Desertification, and triathlon events for biodiversity, World Biodiversity Day, along with highlighting biodiversity for at least ten minutes monthly by media or social media, newspapers, and magazines in both Arabic and English, and local TV stations. Hosting at least one international conference on biodiversity in Qatar during the strategy's implementation period is also planned. (State of Qatar, Ministry of Environment, 2015/2025., p. 12)

To achieve the third strategic goal, titled "Conservation of Coastal Ecosystems and Sustainability of Marine Resources," the plan emphasizes the use of sustainable fishing methods for commercial fishing activities in Qatar by 2025. It includes conducting a feasibility study for at least one marine agency or aquaculture licensing council for local fish farms. Steps and action plans for the protection of sea turtles and the development of steps and action plans for marine environmental protection will be developed, including initiatives for the Ecosystem Approach and identifying Ecologically or Biologically Significant Areas (EBSAs) by 2025.

Conservation of terrestrial biodiversity through effective management of protected areas is set as the fourth strategic goal, requiring exploration, collection, characterization, evaluation, and documentation of local wild genetic resources to ascertain the current status by the end of 2025. This includes developing management plans and monitoring programs for all protected areas in Qatar with participation from local communities, stakeholders, and local and international experts. Additionally, three protected areas are to be developed as visitor centers by 2025, employing local community staff and providing eco-tourism activities. (State of Qatar, Ministry of Environment, 2015/2025., p. 12)

The action plan includes increasing the number of visitors to protected areas by 40% by 2025, focusing on school and youth visits. Every three years, a scientific assessment of biodiversity status in protected areas will be conducted to evaluate

the success of conservation activities on wildlife. Two protected areas will be designated under international agreements (WHC, Ramsar, UNESCO marine reserves) to enhance their fame and global status, contributing to Qatar's positive international image and its contribution to biodiversity conservation. By 2025, it is assured that protected terrestrial areas have effectively contributed to combating desertification and soil erosion through conserving the rich local plant diversity in those areas. (State of Qatar, Ministry of Environment, 2015/2025., p. 13)

The strategy highlights the necessity of enhancing national capacities for biodiversity conservation by hiring specialized and qualified staff to work in the biodiversity field by 2025 and increasing the number of Ministry of Environment management staff with master's degrees. Additionally, there will be at least a 25% increase in employee training programs at the Ministry of Environment by 2025.

Enhancing the capacity to implement and facilitate Multilateral Environmental Agreements by comparing, identifying, and promoting synergies between the multilateral environmental agreements signed and ratified by the State of Qatar is an essential element of this strategy. This will improve reporting, coordination, and implementation by increasing the number of qualified staff handling these agreements. (State of Qatar, Ministry of Environment, 2015/2025, p. 18)

The seventh goal of this strategy aims to protect natural ecosystems and humans from invasive species and genetically modified organisms (GMOs) and the loss of local resources. The goal is to ensure fair sharing of benefits arising from the use of genetic resources and access, which can be achieved by establishing documentation programs for imported food products and certifying their origin. The presence of GMOs and invasive species poses a risk not immediately noticeable, such as threats to marine and terrestrial biodiversity due to intensive development and industries, indicating the lack of information on these issues related to biosafety and the need to highlight them. Additionally, there's a need to raise awareness of the concept of access and benefit-sharing and to produce and disseminate information on the Nagoya Protocol and its benefits for the state (State of Qatar, Ministry of Environment 2015/2025., p. 21).

Conclusion:

Qatar has made significant efforts to protect the environment and preserve its natural resources to ensure their sustainability. The country has enacted numerous legislations to ensure the safety of these resources and adopted ambitious national strategies to transition its national economy towards a green economy that conserves its environment and resources.

Through a less polluted environment ensuring human health and ecological systems, an environment less affected by climate change ensuring sustainable development, human health, and environmental safety, along with an environment that preserves biodiversity ensuring sustainable development, health,

and well-being through promoting sustainable environmental practices, Qatar's strategic plans include reducing greenhouse gas emissions relative to the business-as-usual scenario by 2030. Improving general air quality standards and defining maximum limits by 2024. Focusing on effective water management, circular economy, and waste management, and land use through improving agricultural land productivity and reducing water consumption by 40 percent, monitoring soil quality, Qatar has achieved 14 ongoing activities serving biodiversity conservation, animal genetic resources, combating desertification, and wild plant environment.

The strategy also includes enhancing knowledge of the current and future state of biodiversity, ensuring community participation in biodiversity conservation, raising interest and awareness, preserving coastal ecosystems and sustaining marine resources, and effectively managing protected areas to conserve terrestrial biodiversity, along with protecting natural ecosystems and humans from invasive species and genetically modified organisms (GMOs).

References

1. Al-Muhannadi Hassan Ibrahim. Al-Hiti Nozad Abdulrahman. (2008).Sustainable Development in the State of Qatar: Achievements and Challenges. 1st edition, Doha: The Permanent Housing Committee,
2. State of Qatar. (July 9-18, 2018) . Second Voluntary National Review of the State of Qatar for the year 2018 submitted to the High-Level Political Forum on Sustainable Development, New York.
3. State of Qatar. Ministry of Environment.(2015/2025). National Biodiversity Strategy, State of Qatar, Ministry of Environment.
4. Al-Sulaiti Mowafak Abdullah. Environmental Policies in the State of Qatar and Future Data Needs, Planning and Development Unit at the Ministry of Environment.
5. State of Qatar. Ministry of Development Planning and Statistics. (February 2019). Second Development Strategy for the State of Qatar, Towards Qatar Vision 2030, 3rd edition.
6. State of Qatar. Ministry of Development Planning and Statistics.(February 2019). Second National Development Strategy in Qatar, 2016-2022, Doha, Gulf Publishing and Printing Company,.
7. State of Qatar. General Secretariat for Development Planning. (March 2011). National Development Strategy, 2011-2016, Doha: General Secretariat for Development Planning
8. State of Qatar, Government Communication Office. Environment and Sustainability, dated: March 7, 2023, electronic link: <https://bit.ly/421sMi>
9. Lusail Newspaper. Qatar's Distinguished Efforts in the Field of Biodiversity, dated: March 15, 2023, <https://bit.ly/3SIscYK>
10. Al Watan Newspaper. The air quality in Qatar is very excellent, dated: March 17, 2023, electronic link: <https://bit.ly/49jfjvf>
11. Qatar's e-Government. Environmental Sustainability Strategy 2017/2022, dated: March 15, 2023, electronic link: <https://bit.ly/3I3BfOR>

12. El-Badawi, Salah. Qatar Achieves Tangible Progress in 4 Environmental Areas, dated: March 10, 2023, electronic link: <https://bit.ly/49vzoOC>
13. Environment and Development Magazine. Biodiversity in Qatar, dated: March 10, 2023, electronic link: <https://bit.ly/49k1f4v>
14. Marsal Qatar. Qatar's Prominent Achievements and Ambitious Plans, dated: March 16, 2023, electronic link: <https://bit.ly/3T2dE7p>
15. Al Watan Newspaper. Updating the National Biodiversity Strategy, dated: March 5, 2023, electronic link: <https://bit.ly/3uCJIWa>
16. Al Raya Newspaper. The air quality in Qatar is very excellent, dated: March 17, 2023, electronic link: <https://bit.ly/3l61LqO>