Ministry of Environment, Water and Agriculture.

Kingdom of Saudi Arabia.

Vision 2030.

Executive Summary of

The National Environment Strategy

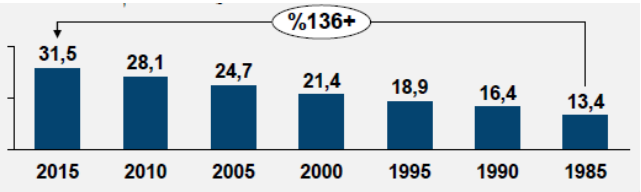
May 2018

Necessity Of A National Environment Strategy

Throughout the past decades, pressures on environment and natural resources have exacerbated as a result of …

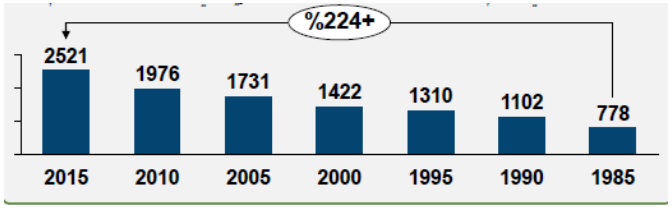
The Steady increase of the Kingdom's population (+136% over the past 30 years)

Population Growth throughout the past 30 years (in million)



The Significant growth witnessed in all sectors (manufacturing, energy, transportation, mining, agriculture ...)

GDP Growth throughout the past 30 years (in SAR billion for constant prices/ year)



…however the Environment Protection Apparatus did not adapt to this significant growth…

Poor compliance with environmental controls and standards.

Poor environmental awareness and prevalence of adverse practices.

Overall environmental degradation (sources of pollutants, wastes, degradation of vegetation cover and wildlife).

Low rank for the Kingdom according to the Environmental Performance Index (EPI) (rank "**86**" for 2017 from among 180 countries)

Such situation necessitated the development of a National Environment Strategy that sets out a comprehensive framework for the implementation of certain radical solutions for the enhancement of the performance of Sector and the protection and sustainability of the environment.

The National Environment Strategy aspires to:

Enhance the effectiveness of the Sector (institutional framework, governance, operating model, environmental regulations, and financial sustainability of the Sector).

Increase environmental compliance across all developmental sectors and reduce pollution and adverse impacts on the environment

Develop the natural vegetation cover and combat desertification.

Protect wildlife and conserve biological diversity.

Promote private sector participation to improve service quality, boost economy and spur innovation.

Reinforce the national capability to adapt to climate change.

Raise environmental awareness and strengthen the role of NGOs and voluntary action.

Improve the quality and the coverage scope of meteorological services.

Contents:

Contents:

Strategy development methodology and study implementation phases.

	(2) Detailed Assessment of the current status of environment and meteorology in KSA.				
(1) Action plan setting.		**(4) Determination of the intended environment status based on the Saudi "Vision 2030".**	**(5) Drafting a National Environment Strategy to advance to the intended status.**	**(6) Development of the institutional framework and hierarchy as well as the key enablers proposed for the Sector.**	**(7) Development of the implementation plan and performance management and monitor framework to achieve the objectives of the strategy.**
	(3) Derivation of the lessons learned through benchmarks with best practices at the international level.				
(8) Stakeholder Engagement.					

Strategy Preparation Supervision.

<table>
<tr><th colspan="4">Strategy Preparation Supervision Governance</th></tr>
<tr><td colspan="3">(A) The Steering Committee, chaired by H.E. the Minister of Environment, Water and Agriculture and the membership of 20 members representing all relevant sectors.</td><td>(D) "25" Experts in "17" domains.</td></tr>
<tr><td>• Ministry of Environment, Water and Agriculture.
• Ministry of Economy and Planning.
• Ministry of Energy, Industry and Mineral Resources.
• Ministry of Health.
• Ministry of Transportation.
• Ministry of Municipal and Rural Affairs.</td><td>• General Authority for Meteorology and Environmental Protection.
• Saudi Wildlife Authority.
• Royal Commission for Jubail and Yanbu.
• Saudi Commission for Tourism and National Heritage.</td><td>• Saudi Energy Efficiency Center.
• National Committee for the Clean Development Mechanism.
• King Abdullah University of Science and Technology.
• King Fahd University of Petroleum and Minerals.
• King Saud University.</td><td rowspan="3">• Environmental Strategies.
• Biodiversity and desert wildlife.
• Marine environment.
• Soil and desertification.
• Air quality.
• Climate change.
• Water resources and groundwater protection against pollution.
• Solid and hazardous wastes.
• Meteorology.
• Environmental governance and institutional framework.
• Privatization and investment in the environment sector.
• Environmental and social economy.
• Rehabilitation, sustainability and recycling.
• Emergency and oil spills response.
• Human capital in the environment sector.
• Information and Technology in the environment sector.</td></tr>
<tr><td colspan="2">(B) A Scientific Committee consisting of 19 members:</td><td>(C) A Study Team consisting of 18 members:</td></tr>
<tr><td>• Ministry of Environment, Water and Agriculture (Departments of Environment, Water, Agriculture, Planning, Privatization and Vision Realization Office).
• Saudi Wildlife Authority.
• General Authority for Meteorology and Environmental Protection.</td><td>• King Abdullah University of Science and Technology.
• King Fahd University of Petroleum and Minerals.
• King Saud University.
• Food and Agriculture Organization (FAO).
• Saudi environmental experts.</td><td>• Team of the Ministry of Environment, Water and Agriculture consisting of "8" persons.
• A Consulting Office Team con consisting of "10" persons.
• International experts.</td></tr>
</table>

General Framework of the National Environment Strategy:

Aspirations	Environmental Sustainability	Economic Sustainability	Social Welfare	Environmental Engagement
	• Conservation of natural resources and ecosystems. • Consumption and sustainable production. • Rehabilitation of deteriorated ecosystems.	• Economically sustainable environment sector. • Sustainable economic growth for developmental sectors. • Public-private partnership for delivery of environmental and meteorological services.	• Pollution reduction and protection of vulnerable populations. • Quality of life enhancement. • Eco-tourism promotion.	• Contribution of the civil society to environmental protection. • Effective regional and international participation.
Domains of Environmental Sustainability	**Terrestrial Ecosystems**	**Marine and Coastal Ecosystems**	**Land and Desertification**	**Meteorology**
	• Threats to biodiversity. • Habitats and Biological Species. • Terrestrial ecosystems conservation initiatives.	• Threats to marine and coastal environments. • Habitats and Biological Species. • Ecosystems conservation initiatives.	• Threats and over-consumption. • Natural resources and desertification. • Sustainable land management.	• Service scope and demand. • Service supply. • Service delivery and quality.
	Air quality and Climate Change	**Water Resources**	**Waste Management and Chemical Safety**	
	• Sources of air pollution; Greenhouse Gases (GHG) emissions and dusts. • Ambient air quality and Carbon Footprint. • Mitigation and adaptation strategies.	• Water demand and sources of pollution. • Water availability and quality. • Integrated water resources management.	• Sources of wastes and chemicals. • Infrastructure. • Integrated solid waste management and chemical safety.	

Implementation Enablers	Institutional Framework	Policies and Regulations	Economic Enablers	Required Capabilities	Implementation programs and Performance Management
	• Sector structure. • Stakeholders' responsibilities. • Private sector participation. • Role of the civil society. • International/regional cooperation.	• Technical and economic regulations (fees, violations, tariffs). • Licensing. • Monitoring, environmental compliance, enforcement, and penalties.	• Enhancement of the revenue sources of the Sector. • Private sector participation. • Environment Fund. • Incentives for developmental sectors.	• Human resources and education. • Technologies and systems. • Planning, risk management, and emergency readiness. • Research, development and innovation. • Awareness and behavior change.	• Implementation programs. • Supervision, coordination and performance management mechanisms. • Monitoring and control plans and mechanisms.

Engagement of Stakeholder and Review of Documents and Benchmarks:

Stakeholders were involved throughout the diagnostic and strategy development phases **Stakeholders were being engaged and documents as well as benchmarks were reviewed across assessment and preparation phases.**	
Data Collection Phase	**Outcomes Discussion and Review Phase**
• Review of **206** relevant documents (e.g., strategies, regulations, initiatives, environmental standards, environmental reports, etc.). • Holding of **5** workshops for assessing the current status. • Making interviews with **80** relevant stakeholders. • Benchmarking against **57** developed countries in terms of the environmental and meteorological sectors and delving into **12** thereof.	• Holding of **8** workshops for reviewing the current status assessment. • Holding of **6** workshops for developing strategic vision, mission and objectives. • Holding of **9** workshops for developing an institutional framework for the sector. • Holding of two workshops in cooperation with the Steering Committee for reviewing the outcomes.

Contents:

Current Status Assessment and Benchmarking Against Global Best Practices:

Current status has been assessed and benchmarked against global best practices based on the following axes:

Environment Domains	• Terrestrial Wildlife. • Marine and Coastal Environment. • Vegetation Cover. • Air Quality. • Climate Change. • Water Resources. • Waste Management and Chemical Safety. • Meteorology	**Implementation Enablers**	• Institutional Framework. • Policies and Regulations. • Economic aspects of the sector. • Human and technological capabilities as well as research and development. • Implementation programs and Performance Management.

Benchmarks – Comprehensive comparison with 57 countries and detailed comparison with 12 countries thereof:

(1) Superior Countries		(2.1) Similarities with the Kingdom			(2.2) Best Performance within the domain			Selected Countries (12)
Globally (50)	**Terrestrial Wildlife**	Dry climate	Similar terrestrial ecosystems	Agricultural practices	Wildlife species protection	Ecosystem Vitality		Jordan – California – Australia
	**Marine and Coastal Environment**	Similar marine and coastal ecosystems	extensive maritime transport	Desalination facilities availability	Protected marine regions	Fish stocks		Australia – Texas – UAE – Spain
	Vegetation Cover	Vulnerability to desertification and drought	Similarity in Land Cover and Land Use		Desertification combating Effectiveness	Natural resources conservation		Australia – Arizona – Morocco
	Air Quality and Climate Change	Climate similar to that of the KSA	Significant oil and gas sector		Air Quality Indicator (AQI)	Pollutants concentration		Texas – UAE
	Water Resources	Renewable water resources per capita	Total agricultural output		Total water used/ renewable water	Percentage of treated wastewater		Australia – Singapore – UAE – Spain
At the Arab country level (7)	**Waste Management and Chemical Safety**	Industrial sector size	Municipal waste generation per capita		Municipal solid waste diversion from landfills	Municipal solid waste recycling rate	Chemical safety	Sweden – Australia – Germany – UK
	Meteorology	Maritime façade availability	vast geographical area		Quality and scope of services	Use of state-of-the-art technology	Private sector engagement	USA – UK – The Netherlands – Japan

Assessment of the Current Status of the Terrestrial Wildlife:

Terrestrial Wildlife > Marine and Coastal Environment> Vegetation Cover> Air Quality> Climate Change> Water Resources> Waste Management and Chemical Safety> Meteorology.

The Kingdom is endowed with a rich and unique floral and fauna biodiversity (encompassing 79 mammal species, 99 reptile species, 432 bird species, and 3099 invertebrate species).

<table>
<tr><th>Main pressures on the domain</th><th>Efforts made by the Saudi Wildlife Authority.</th><th colspan="4">A number of extinct wild animals and endangered species (111 species)</th><th>Endangered Birds</th></tr>
<tr><td rowspan="2">Overhunting.
Loss of natural habitats due to degradation of vegetation cover and roads and urban sprawl.
Agricultural malpractices.</td><td rowspan="2">Efforts of the Authority focused mainly on the announcement and management of the natural reserves.
The Authority follows a distinct approach for the selection of the natural reserves (ranking high globally in this respect), but is facing a difficulty with regards to natural reserves announcement.
The Authority suffers from poor human and technological capabilities in terms of natural reserves management; moreover, natural reserves are vulnerable to violations made by both individuals and developmental sectors.
The Authority runs three research-breeding centers in Al-Ta'if , Al-Qassim, and Thummah provinces.</td><td>Asiatic Lion</td><td>Onager</td><td>Asiatic Cheetah</td><td>Saudi Dorcas Gazelle</td><td>The Kingdom hosts 432 species of domestic and migrating birds since it is a main pathway therefor.
Approximately 12 million birds are being hunted annually in the Kingdom.</td></tr>
<tr><td>Arabian Oryx (being reintroduced)</td><td>Ibex</td><td>Spiny-Tailed Lizards (Uromastyx)</td><td></td><td>Houbara (bustards)</td></tr>
</table>

		– Extinct	**– Endangered**			

Assessment of the Current Status of the Marine and Coastal Wildlife:

Terrestrial Wildlife > **Marine and Coastal Environment**> Vegetation Cover> Air Quality> Climate Change> Water Resources> Waste Management and Chemical Safety> Meteorology.

Marine and coastal environment of the Kingdom is endowed with rich biodiversity (encompassing 1280 fish species, 44 crustacean species, 317 coral species, 113 seabird species, and 2000 mollusk species)

Main pressures on the domain	**Degradation of the marine and coastal ecosystems**		**Endangered fish species, marine mammals and turtles.**
• Reclamation and dredging due to urban sprawl. • Growth of maritime transport and industrial facilities on coastlines. • Liquid and solid wastes. • Fishing malpractices and growth of aquaculture industry.	Coral bleaching	• 75% decrease in the number of the mangrove trees from 1985 to 2013. • Backfilling, dredging, and fishing malpractices all contributed to the destruction of large areas of coral reefs. • Oils pills resulting during the Gulf War adversely affected the mangroves, salt-marshes, and seaweeds.	• Sharks are endangered because of trafficking threats. • Overfishing endangered at least three species of commercial fish groups. • Butterfly fish and angelfish (both are ornamental fish) are endangered because of the increase of the global demand thereof.
			Dugong **Turtle**

Focus Areas of Global Wildlife Management Best Practices:

Terrestrial Wildlife > Marine and Coastal Environment> Vegetation Cover> Air Quality> Climate Change> Water Resources> Waste Management and Chemical Safety> Meteorology.

Lessons derived from analyzing global best practices.		
Focus Areas of Global Best Practices	**Examples of Typical Initiatives.**	**KSA Performance**
Conservation of Natural Habitats and Biological Species	Expansion and management of the natural reserves, conservation of the natural habitats and biological species outside the natural reserves through propagation and reintroduction of the endangered species.	**Poor**
Sustainable Management of Resources	Promotion of eco-tourism and the activities thereof, including water sports facilities, desert resorts, and etc.	**Poor**
Pollution Prevention and Environmental Compliance Monitoring	Reinforcement of the environmental monitoring means in terms of terrestrial, marine and coastal environments; monitoring the developmental activities, sources of pollution; and setting the necessary pressure mitigation plans.	**Poor**
Rehabilitation of Degraded Locations	Rehabilitation of the locations deteriorated as a result of the developmental activities and natural disasters through natural habitats reconstruction, coral reefs rehabilitation, and etc.	**Poor**
Climate Change Adaptation	Assessment of the impacts of climate change on ecosystems (coastal vulnerability index, etc.) and development of action plans for adaptation to climate change and mitigate the consequences thereof.	**Poor**

Assessment of the Current Status of the Vegetation Cover:

Terrestrial Wildlife > Marine and Coastal Environment> **Vegetation Cover**> Air Quality> Climate Change> Water Resources> Waste Management and Chemical Safety> Meteorology.

Main pressures on the domain		
• Overgrazing and firewood-gathering. • Mining and quarrying. • Random recreational activities and urban sprawl. • Agricultural malpractices. • Periods of drought.	**Pasturelands:** 37% of the total area of KSA; that is, 146 million hectares.	• 70% of the pasturelands are affected by desertification and are in a degraded condition. • Pasturelands suffer from widespread soil erosion exacerbated by drought.
	Forestlands: 1.1% of the total area of KSA; that is, 2.1 million hectares.	• More than 6000 hectares of forestlands are affected annually by issues of pests and diseases. • Phenomenon of dieback is increasing among Juniper forests. • Forestlands suffer loss of tree cover and biodiversity; Al-Baha province lost 10% of the Juniper forests from 1984 to 2014. • 656 flora species are becoming endangered. • Invasive alien species are increasing as they reached 52 species.
	Arable lands: 1.7% of the total area of KSA; that is, 3.42 million hectares.	• Arable lands cover 3.42 million hectares (1.7% of the total area of the KSA), while 1.18 million hectares (0.6% of the total area of the KSA) are already used for agriculture. • 40% of agricultural lands suffer from salinity due to improper irrigation methods. • 67% of agricultural lands suffer from soil erosion due to wind.

Focus Areas of Global Vegetation Cover Management Best Practices:

Terrestrial Wildlife > Marine and Coastal Environment> **Vegetation Cover**> Air Quality> Climate Change> Water Resources> Waste Management and Chemical Safety> Meteorology.

Lessons derived from analyzing global best practices. 		
Focus Areas of Global Best Practices	**Examples of Typical Initiatives.**	**KSA Performance**
Sustainable Management of Pasturelands	Pastureland monitoring and evaluation; environmentally-degraded pastures rehabilitation; sand dunes stabilization; and overgrazing reduction through rotational grazing, etc.	**Poor**
Forestland Management	Afforestation and reforestation; integrated pest management, fire-prevention and control through pruning, firebreaks and etc.	**Poor**
Sustainable Agricultural Practices	Promotion of organic farming; proper management of dams; and regulation of the use of pesticides and fertilizers in agriculture.	**Average**
Preparedness for Combating Drought and Mitigating the Consequences Thereof	Reinforcement of drought monitoring systems and early warning systems; development of a drought response and mitigation plan (imposing restrictions on the developmental activities, etc.)	**Poor**
Responsible Mines and Quarries	Setting procedures for selecting the appropriate location and technology for mining and quarrying activities in addition to the rehabilitation of locations (gradual rehabilitation, etc.)	**Poor**

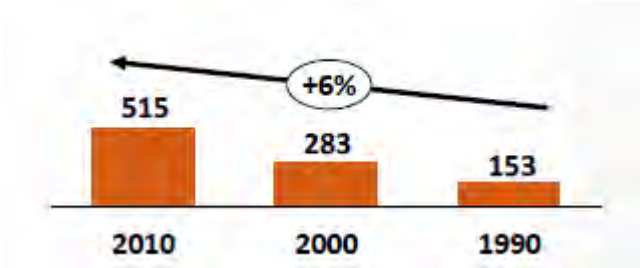
Assessment of Environmental Performance in Terms of Air Quality:

Terrestrial Wildlife > Marine and Coastal Environment> Vegetation Cover> **Air Quality**> Climate Change> Water Resources> Waste Management and Chemical Safety> Meteorology.

Main pressures on the domain		
• Increasing emissions from the energy and manufacturing sectors. • Increasing vehicle density, particularly within large cities. • Increasing emissions from minor sources. • Dust storms.	**Data on emissions and air quality.**	• The Sector suffers from poor pollution sources control and poor pollution monitoring systems. • Available data on air quality are incomplete and not highly reliable; moreover, there is no Source Emission Monitoring and Inventory. • Average concentration of NO_2 is below the standard of the "General Authority of Meteorology and Environment Protection" (95 µg/m^3 vs. 100), yet it is exceeds the limit permitted by the World Health Organization (40µg/m^3). • Annual average concentrations of O_3 exceed standards in cities such as Riyadh (160 µg/m^3). • Rates of exposure to SO_2 in major cities fall within acceptable limits due to the reduction of the sulfur content in diesel. • Average concentration of $PM_{2.5}$ is high within large cities: (71 µg/m^3) Riyadh while the standard of the "General Authority of Meteorology and Environment Protection" is [15 µg/m^3], the standard of the World Bank is [10 µg/m^3] (**Note**: Non-natural sources significantly contribute to $PM_{2.5}$, unlike PM_{10} which is contributed to by natural sources such as dust).

Assessment of the Current Status of Climate Change:

Terrestrial Wildlife > Marine and Coastal Environment> Vegetation Cover> Air Quality> **Climate Change**> Water Resources> Waste Management and Chemical Safety> Meteorology.

<table>
<tr><td>Main pressures on the domain</td><td></td><td colspan="2">Establishment of the "Clean Development Mechanism National Committee" that successfully took over the duties thereof including:
Effective participation in international negotiations.
Advocating the global oil market and mitigating the economic impacts of decisions related to climate change.</td></tr>
<tr><td>Steady growth of energy consumption:
Electricity.
Transportation.
Industry.
Desalination.
Emissions from waste landfills.</td><td>Assessment of activities related to climate change.</td><td>Greenhouse Gases Emissions Increase
(Million tons of CO_{2eq}; Source: National Communication, 1, 2, and 3).
 
</td><td>Effective Initiatives for the reduction of emissions by 130 million tons of CO_{2eq} by 2030.
Reduction of industrial plants emissions.
Renewable energy projects.
Energy consumption rationalization.
Upgrading energy efficiency through reconsidering building standards, electrical devices standards, and upgrading region cooling systems.
Projects for the development of means of mass transportation (e.g., metro, buses)</td></tr>
<tr><td></td><td></td><td colspan="2">Poor knowledge of the impacts of climate change on the Kingdom.</td></tr>
<tr><td></td><td></td><td colspan="2">Exclusion of climate change adaptation from national strategies.</td></tr>
<tr><td></td><td></td><td colspan="2">Potential impacts of climate change on:</td></tr>
<tr><td></td><td></td><td>Water resources.</td><td>Health.</td></tr>
</table>

		• Desertification and Wildlife.	• Infrastructures and developmental sectors (e.g. agriculture).

Focus Areas of Global Air Quality and Climate Change Management Best Practices:

Terrestrial Wildlife > Marine and Coastal Environment> Vegetation Cover> **Air Quality> Climate Change**> Water Resources> Waste Management and Chemical Safety> Meteorology.

Lessons derived from analyzing global best practices.		
Focus Areas of Global Best Practices	**Examples of Typical Initiatives.**	**KSA Performance**
Transition towards Renewable Energy	Gradual transitioning towards renewable energy through the establishment of solar power plants, wind farms and others.	**Poor**
Optimization of the Means of Land Transportation	Upgrading of the transportation sector efficiency through the promotion of the means of mass transportation such as metro and buses, as well as the enhancement of fuel quality.	**Poor**
Reduction of Industrial Emissions	Adoption of the use of special equipment for the reduction of the emissions of water and power plants; and the provisions of incentives to promote the application of more effective measures within the industrial sector.	**Average**
Reduction of Waste Landfill Emissions	Recycling and provision of incentives to promote the use of environmental-friendly technologies.	**Poor**
Vegetation Cover Development	Allocation of sites for parks and forests; establishment of green belts; and green areas increase.	**Poor**

Assessment of Environmental Performance in Terms of Air Quality:

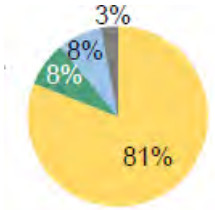
Terrestrial Wildlife > Marine and Coastal Environment> Vegetation Cover> Air Quality> Climate Change> **Water Resources**> Waste Management and Chemical Safety> Meteorology.

<table>
<tr><th>Main pressures on the domain</th><th colspan="2">Poor monitoring of pollution sources</th><th>Groundwater is suffering from over-abstraction</th></tr>
<tr>
<td>
• Increasing consumption of non-renewable water resources by:
- Agriculture sector.
- Municipal sector.
- Industry.
• Growing sources of water pollution.
</td>
<td>
Gas stations

Wastewater Systems

Water Wells
</td>
<td>
Municipal Wastes

Solid and Liquid Industrial Wastes.

Agriculture Sector.
</td>
<td>
• The high water consumption within the Kingdom is attributed to agriculture sector (84% of the total consumption).
• KSA relies heavily on groundwater 3%:
• High reliance on groundwater for fulfilling the water needs of the Kingdom:


Non-renewable Groundwater.
Renewable Groundwater.
Desalination Water.
Treated Wastewater.
• Proliferation of unlicensed water wells.
• Lack of strict monitoring of groundwater abstraction processes.
• Limited reuse of treated wastewater (17%) and dumping thereof in valleys and seas.
• Total exploitable groundwater resources in the Kingdom are estimated at "1,180" B m^3, sufficient for "60" years of consumption at actual rates.
</td>
</tr>
</table>

Focus Areas of Global Air Quality and Climate Change Management Best Practices:

Terrestrial Wildlife > Marine and Coastal Environment> Vegetation Cover> Air Quality> Climate Change> **Water Resources**> Waste Management and Chemical Safety> Meteorology.

Lessons derived from analyzing global best practices.		
Focus Areas of Global Best Practices	**Examples of Typical Initiatives.**	**KSA Performance**
Optimization of Water Resources Management	Diversification of the water resources mix, prioritization of the use thereof, taking actions to monitor and minimize the illegal groundwater abstraction.	**Average**
Pollution Reduction and Monitoring	Monitoring of the pollution resulting from developmental activities and waste management activities, and adopting measures for water pollution reduction.	**Poor**
Wastewater Services Improvement and Water Reuse	Improvement of wastewater and gray water treatment and promotion of the reuse thereof.	**Average**
Municipal and Industrial Sectors' Consumption Rationalization	Reduction of the water consumption of households and industrial and commercial activities through rationalization initiatives and policies as well as through reconsidering the tariffs.	**Average**
Agriculture Sector's Consumption Rationalization	Curbing the agriculture sector's demand of water through proper management of food safety, improvement of the crop composition, and development of the infrastructure to ensure irrigation efficiency.	**Average**

Assessment of the Current Status in the Waste Management Sector:

Terrestrial Wildlife > Marine and Coastal Environment> Vegetation Cover> Air Quality> Climate Change> Water Resources> **Waste Management and Chemical Safety**> Meteorology.

Indicators of Poor Waste Management

- The Sector suffers from poor data at both regional and national levels.
- The Sector suffers from poor monitoring and control of the processes of waste collection, treatment, and disposal.
- Municipal wastes are not sorted at the source which hinders recycling and makes significant quantities of biodegradable wastes buried in landfills: around 55% of municipal wastes in the city of Riyadh are organic wastes.
- Recycling sector lacks for organization and recycling rates are low; less than 10% of municipal wastes is recycled while 90% thereof is sent to landfills.
- 97.3% of waste landfills are environmentally non-compliant; Environmental Impact Assessments have not been carried out, technology do not fulfill standards, and landfills lack for methane capturing and leachate treatment which eventually leads to environmental pollution (groundwater pollution, etc).
- Total treated industrial hazardous wastes is estimated at only 16% in 2016.
- Large quantities of construction and demolition wastes are illegally sent to landfills.

A Committee designated by His Majesty the King, formed from representatives of the Ministry of Economy and Planning; the Ministry of Environment, Water and Agriculture; the Ministry of Municipal and Rural Affairs as well as other relevant bodies, is currently developing an institutional framework and necessary enablers for the waste management sector.

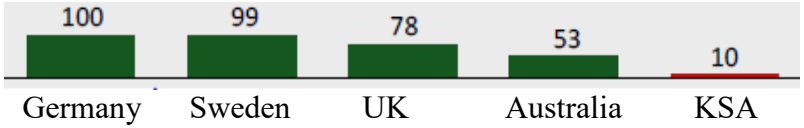
Quantity of Some Types of Waste Generated

(million tons of wastes/ year)

13 Municipal Wastes	**Highly exceeds 1 Hazardous Wastes**	**12 Construction and Demolition Wastes**	**5 Special Wastes.**
Maximum limit of the estimated quantity.			
Maximum limit of the estimated quantity. **Estimates vary by source.**		Data is limited to quantities of wastes generated in "5" cities only (Riyadh, Jeddah, Mecca, Medina and Dammam).	Data is limited to the Waste Electrical and Electronic Equipment (WEEE)" generated.

Rate of diversion from landfills (including recycling and conversion to energy).

(% of municipal solid wastes collected)



Assessment of the Current Status in Terms of Chemical Safety:

Terrestrial Wildlife > Marine and Coastal Environment> Vegetation Cover> Air Quality> Climate Change> Water Resources> **Waste Management and Chemical Safety**> Meteorology.

Reality of Chemical Safety Management	
• Absence of a comprehensive national database that covers all links related to chemicals value chain: **Production.** **Importation. Transportation Storage Usage Disposal.**	**National Chemical Safety Programme Activation Initiative**
• Lack of an emergency plan for addressing critical chemical accidents. • Poor adherence by the Kingdom to the approved international treaties. • Lack of guidelines and procedures for chemicals handling. • Limited and poor periodic inspection of storage facilities and chemicals use. • Poor awareness of safe transportation controls and poor ability to respond to accidents occurring during chemicals transportation. • Poor compliance with the hazardous chemicals transportation requirements (e.g., unqualified drivers).	• The Initiative aims to achieve sound management of chemicals. • A number of bodies participate in the Initiative, including the Ministry of Environment, Water and Agriculture, the Ministry of Interior, and the General Authority of Meteorology and Environment Protection. • Key activities of the Initiative include: - The development of a central database on chemicals. - The development of an emergency plan. - Activation of ratified international treaties. - The development of standards and guidelines for transportation and storage. - Activation of periodic inspection. - The development of a guidebook on chemicals.

Focus Areas of Global Waste Management and Chemical Safety Best Practices:

Terrestrial Wildlife > Marine and Coastal Environment> Vegetation Cover> Air Quality> Climate Change> Water Resources> **Waste Management and Chemical Safety**> Meteorology.

Lessons derived from analyzing global best practices. 		
Focus Areas of Global Best Practices	**Examples of Typical Initiatives.**	**KSA Performance**
Waste Generation	Reduction of the generation of all types of wastes through providing incentives, through imposing charges according to the quantity generated, or through imposing specifications for the packaging methods and materials.	**Poor**
Waste Collection	Enhancement of waste collection methods and sorting wastes at the source to facilitate the recycling and treatment thereof.	**Poor**
Landfill Diversion	Reduction of random waste disposal and diversion of wastes from landfills through reuse, recycling or material or energy recovery.	**Poor**
Chemical Safety	Development of a chemical tracking system to track chemicals across stages of production, importation, transportation, storage, and use as well as setting procedures and standards for mitigating relevant risks.	**Poor**

Assessment of Performance Within the Meteorology Sector:

Terrestrial Wildlife > Marine and Coastal Environment> Vegetation Cover> Air Quality> Climate Change> Water Resources> Waste Management and Chemical Safety> **Meteorology**.

<table>
<tr><th colspan="5">Data on Services and Technology</th><th>Data on Human Resources Capabilities</th></tr>
<tr><td colspan="5">• Meteorology sector is currently fulfilling the fundamental needs of the Kingdom.</td><td rowspan="5">• Functional categories within the General Authority of Meteorology and Environment Protection, as well as manpower distribution among environment and meteorology domains are both inaccurate.
• Fundamental functions (e.g., modeling) suffer from shortage in the number of specialized staff and lack of recruitment initiatives.
• Poor marketing of meteorological services due to the fact that the public relations department focuses only on the environment domain.</td></tr>
<tr><td rowspan="3">services</td><td>Public Weather Forecasts</td><td>Aviation</td><td>Defense</td><td>Maritime Navigation</td></tr>
<tr><td>Climate change scenarios and models</td><td>Agriculture</td><td>Water Resources</td><td>Energy</td></tr>
<tr><td>Land Transportation</td><td>Media</td><td>Insurance</td><td>Offshore</td></tr>
<tr><td colspan="5">• Services cover about 32% of the total area of the Kingdom – except for the "Rub' al Khali (Empty Quarter)" area – with an accuracy ranging from (6X6km^2) to (2X2km^2).
• The network contains weather stations, observatories, radars, and wind observation stations.
• The system can accurately forecast weather for up to "5" days.</td></tr>
<tr><td colspan="2">Available</td><td>Unavailable</td><td></td><td></td></tr>
</table>

Focus Areas of Global Meteorological Best Practices:

Terrestrial Wildlife > Marine and Coastal Environment> Vegetation Cover> Air Quality> Climate Change> Water Resources> Waste Management and Chemical Safety> **Meteorology**.

Lessons derived from analyzing global best practices. 		
Focus Areas of Global Best Practices	**Examples of Typical Initiatives.**	**KSA Performance**
Data Collection	Establishment of weather stations, air quality stations, radar stations, and reliance on satellite imagery, as well as the development of communications networks and the establishment of data management and analysis centers.	**Poor**
Modeling and Data Analysis	Development of modeling capabilities through the development of infrastructure and a weather forecasting network.	**Average**
Meteorological Services Provision	Analysis if the meteorological services market, identification of the most appropriate services for the domestic market, and development of informational platforms and electronic applications to provide the public as well as customers with meteorological services.	**Poor**

Challenges Facing the Current Institutional Framework and Lessons Derived form the Best Practices:

Institutional Framework> Policies and Regulations> Economic Enablers> Human, Technological Capabilities and R&D> Implementation Programs and Performance Management.

Challenges facing the Current Institutional Framework		Available Solutions Basing on Lessons Derived From Global Best Practices
Fragmentation of Responsibilities, overlap of roles and lack of accountability.	• Accumulation and overlap of tasks within relevant bodies. • Lack of bodies accountable for key roles.	• Development of policies and strategies should be limited to the Ministry. • Operational functions such as weather forecasting, environmental licensing, environmental compliance monitoring, forest management, natural reserves management, pastureland management, etc., should all be assumed by specialized governmental agencies spread across various provinces and are affiliated to the Ministry. • Internal coordination and sector performance monitoring tasks should all be assumed by the Ministry. • International cooperation should be the responsibility of the Ministry that should seek the assistance of appropriate relevant expertise whether from within the Sector or outside thereof.
Lack of coordination.	• Multiplicity of regulation issuers and poor coordination among them. • Ineffectiveness due to duplicity of initiatives.	
Almost complete lack of performance monitoring.	• Limited focus on performance monitoring. • Potential conflict of interests.	
Distraction from core activities	• Focusing on meteorology at the expense of environment protection. • Poor focusing on the implementation of strategies and plans.	
Ineffective international environmental cooperation	• Poor international representation and negotiation coordination. • Poor follow-up of adherence to international treaties.	

Challenges Facing the Regulations and Lessons Derived form the Best Practices:

Institutional Framework> **Policies and Regulations**> Economic Enablers> Human, Technological Capabilities and R&D> Implementation Programs and Performance Management.

Analysis of Current Regulations **Based on an analysis of 106 environment-related regulations and standards**	**Available Solutions Basing on Lessons Derived From Global Best Practices**
• Multiplicity of regulation issuers and poor coordination among them. • Complexity and difficulty of regulation enforcement. • Penalties are generally weak and non-deterrent. • Ambiguity of certain articles of the laws and regulations (e.g., the areas surrounding natural reserves are not clearly defined). • Omission of certain activities and standards (e.g., lack of a law regulating off-road activities or a law regulating the management of water resources, lack of criteria for the confiscation of endangered species products, lack of criteria for mining activities, lack of criteria for the treatment of some types of solid wastes such as damaged/consumed tires and electronics). • Laws do not address the way or interacting with industrial cities and large facilities (e.g., RCJY). • Laws do not provide for the details of fundamental procedures such as licensing and environmental inspection, setting penalties, and some articles of such laws are inadequate (e.g., natural reserves announcement procedures). • Laws do not address the participation of the private sector. • Poor adherence to the international commitments and ineffective representation except in issues related to climate change.	• Adoption of a single entity for issuing environmental laws and regulations. • Development of a comprehensive environmental law to ensure consistency among regulations. • Organizing the participation of the private sector. • Identification of the rights and duties of the actors within the sector and those who carry out the development activities. • Setting the details of the key procedures (such as licensing, environmental inspection and violation detection). • Development of comprehensive and integrated standards and setting guidelines for the period review thereof. • Adoption of deterrent and strict penalties.

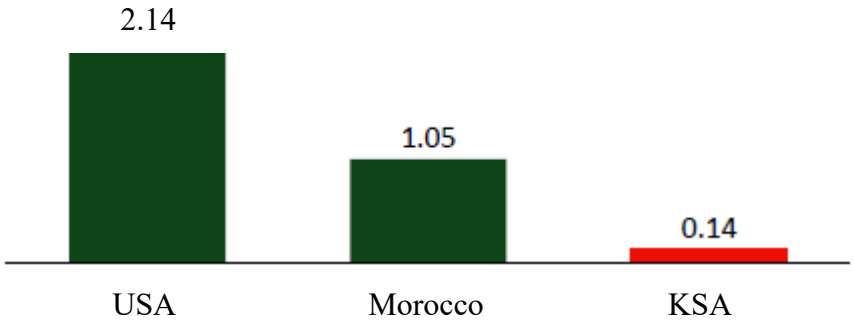
Assessment of the Current Status in Terms of Environmental Compliance:

Institutional Framework> **Policies and Regulations**> Economic Enablers> Human, Technological Capabilities and R&D> Implementation Programs and Performance Management.

	Key Challenges Facing Environmental Compliance Monitoring	
		Concise
Poor "Environmental Impact Assessments" and poor monitoring of the application thereof.		**Poor licensing procedures**
Poor work procedures ad environmental inspection guidelines.		**Limited headcount assigned to environmental inspection activities.**
Lack of specialized human resources.		**Poor technical field capability and poor remote environmental compliance monitoring technologies:** e.g.,: environmental inspection relies heavily on visual inspection.
Lack of automation e.g.: lack of an IT system for the management of the environmental inspection activities.		**Penalties are generally weak and non-deterrent.**
	Procedures of the enforcement of penalties and fines are inadequate.	

Economic Enablers for the Environment sector and Lessons Derived form the Best Practices:

Institutional Framework> Policies and Regulations> **Economic Enablers**> Human, Technological Capabilities and R&D> Implementation Programs and Performance Management.

Economic Challenges Facing The Environment sector and Lack of Incentives for The Enhancement of The Environmental Performance of the Developmental Sectors.	Available Solutions Basing on Lessons Derived From Global Best Practices
• Low budget for the environment sector, for instance: **Annual Natural Resource Budget** **($/Ha)**  • Inability of the environment sector to collect the financial resources required for the development thereof. • Lack of environmental fees to be imposed on sectoral activities. • Lack of incentives encouraging developmental sectors to be environmentally compliant (e.g., provision of soft loans for projects with environmental benefits) • Lack of a framework for encouraging private sector participation (e.g., in waste management sector, and activities related to environmental compliance monitoring). • Availability of subsidy for sectors affecting the environment (e.g., water, electricity, gasoline and agriculture)	• Financing the environment sector through fines and collection of fees imposed on licenses, products, and services and using the revenues thereof for the development of the Sector. • Provision of financial subsidies by the government for the environment sector so as to bridge the gap between the needs of the sector and the income thereof. • Provision of financial incentives and facilitations for the developmental sectors so as to achieve the desired environmental objectives (e.g., reducing customs fees, and provision of low-interest loans), and reduction of taxes on environmental investments. • Increasing the incentives to encourage the private sector to participate in the provision of the services of the environment and meteorology sectors. • Reduction of government subsidy to sectors with adverse impact on the environment.

Analysis of Various Capabilities Within the Environment sector and Lessons Derived form the Best Practices:

Institutional Framework> Policies and Regulations> Economic Enablers> **Human, Technological Capabilities and R&D**> Implementation Programs and Performance Management.

Analysis of The Current Human, Technical Capabilities and Research and Development Capabilities.	Available Solutions Basing on Lessons Derived From Global Best Practices
• Shortage in the number of manpower working in the environment sector: for example, the total number of the employees of the "General Authority of Meteorology and Environment Protection" is only "241" employees, while the number of the entities to be monitored is estimated at tens of thousands. • Limited number of human resources specialized in environmental activities. • Weak ability to attract human competencies. • Limited environmental compliance monitoring technologies. • Absence of systematic and documented work procedures. • Limited environmental research activities due to the exclusivity of the Kingdom in terms of the issues of particulate matters (PM10 and PM2.5), desertification and climate change.	• The Sector should appoint diverse human competencies including engineers, scientists, technicians, communication experts and economists. • Real-time monitoring and data management and analysis technologies should be adopted. • There should be adoption of field equipment and laboratories for monitoring environmental compliance. • There should be adoption of technologies for natural resources conservation. • There should be support for research and development activities for the enhancement of the sector's performance. • Work procedures that would achieve flexibility and effectiveness of work should be designed.

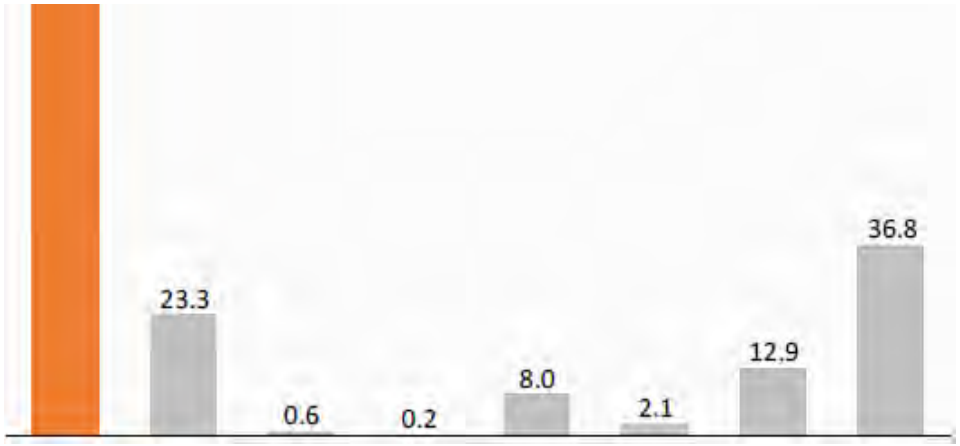
Analysis of Various Capabilities Within the Environment sector and Lessons Derived form the Best Practices:

Institutional Framework> Policies and Regulations> Economic Enablers> Human, Technological Capabilities and R&D> **Implementation Programs and Performance Management**.

Current Challenges Facing Performance Management	Available Solutions Basing on Lessons Derived From Global Best Practices
• Poor financing and poor human and technical capabilities led to poor implementation programs (e.g., programs of environmental compliance monitoring, as well as programs of pasturelands, forestlands and natural reserves management). • Accumulation and overlap of tasks within relevant bodies and lack of a supervising body, leading to poor monitoring of the performance of the environment sector and the environmental compliance of the developmental sectors.	• Internal coordination and sector performance monitoring should be the responsibility of the Ministry. • A task management office should assume the responsibility for monitoring the implementation of strategies and initiatives and seek the assistance of electronic tools for the same. • Leading and lagging Key Performance Indicators contribute to the monitoring of implementation progress and correct the path when needed. • Change management is a key element for the success of transformation.

Total Annual Cost of Environmental Degradation:

The total annual cost of environmental degradation was SAR 86 billions in 2014, equivalent to 3% of GDP *

Major sources of environmental degradation are:	**The Cost of Environmental Degradation in 2014**
• Air pollution. • Pressures on and pollution of water resources. • Pressures on land resources. • Unsustainable management of wastes. • Insufficient conservation of coastal resources. • Damages caused by natural disasters. • Inefficiency of energy and limited reliance on renewable energy sources.	(in billion SAR) 
• Health and quality of life degradation accounts for 48% of the total damages (equivalent to 1.5% of GDP). • Natural resources degradation accounts for 52% of the total damages (equivalent to 1.6% of GDP).	1. Global damages associated with climate change include floods, sea-level rise, droughts, food production declination, species extinction, species migration, etc.

*Source: National Bank study.

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Questions Adopted for The Design of The Institutional Framework of Meteorology and Environment Sectors.

Environment Sector	**(1-a) What are the entities responsible for the development of policies, strategies, and regulations and accountable for operation?**
	(1-b) What are the key executive functions and the optimal institutional breakdown thereof?
	(1-c) Is there a need for a Saudi Environment Council?
Meteorology Sector	**(2-a) Is it better for both sectors to continue combining environmental and meteorological activities together or to separate them?**
	(2-b) What is the optimal operating model for the meteorology sector?

Distribution of Functions Within Environment Sector.

(1-a) What are the entities responsible for the development of policies, strategies, and regulations and accountable for operation?

Key Functions	Competent Body	Justification
Development of environmental policies, strategies and regulations, and supervising the environment sector.	**Ministry of Environment, Water and Agriculture**	• **A government body.** • **Does not assume any functions that may lead to conflict of interests.**
Licensing, environmental compliance monitoring, wildlife and vegetation cover development, and combating desertification.	**Implementation Centers affiliated to the Ministry of Environment, Water and Agriculture** **(*details to be provided on next slide*)**	• **Such functions require flexibility of work and high specialization to cover a large number of facilities, and vast areas of pasturelands, natural reserves, and forestlands.** • **For the effective enforcement of laws, bodies responsible for such functions should have a governmental capacity.**
Providing assistance to the public sector in terms of licensing, environmental compliance monitoring, wildlife and vegetation cover development, and combating desertification	**Private sector companies providing environmental services**	• **Due to the multiplicity of facilities and the vast areas of pasturelands, natural reserves and forestlands, the public sector relies on the private sector in the performance of the tasks thereof.**
This model is consistent with the global best practices.		

Distribution of Functions Within Environment Sector.

(1-b) What are the key executive functions and the optimal institutional breakdown thereof?

National Environmental Priorities.

d	**Strengthening environmental compliance monitoring**	**Development of the vegetation cover and combating desertification.**	**Development of wildlife**
The Proposed Executive Apparatus	**National Center for Environmental Compliance Control (NCECC)**	**National Center for Vegetation Cover Development and Combating Desertification (NCVCDCD)**	**National Center for Wildlife Development**
	The proposed model is based on specialized implementation centers with high capabilities and clear-cut functions each of which is linked to a national environmental priority.		

Environment Council.

<table>
<tr><td>Development of policies, strategies, and regulations:

Basing on the proposed institutional framework, functions are transferred to the Ministry of Environment, Water and Agriculture.</td><td>Coordination with development sectors:

This can be achieved with more efficiency through sectoral coordination committees to be supervised by the Ministry.</td></tr>
<tr><td>49 out of the world's most advanced 50 countries in terms of environmental performance rely on their respective ministries of environment.

  </td><td>The strategy recommends the abolition of the Environment Council and transferring all functions thereof to the Ministry.</td></tr>
<tr><td>Due to the absence of ministries in the USA, the Environment Protection Agency (EPA) assumes full responsibility of environment protection.

This model has not been successful in the countries that have adopted it.</td><td rowspan="2">• In alignment with global best practices.
• Conflict of the interests of the Environment Council with environmental objectives since the most prominent members of the Council belong to development sectors subject to environmental laws.
• The Environment Council creates duplicity repeating the same current mechanism adopted in the country for the review and adoption of regulations (Consultative Assembly, Bureau of Experts, and Council of Ministers).
• Assigning environmental functions to the Ministry enhances the effectiveness of decision-making, as well as the process of developing the strategies and regulations.
• Transferring environmental functions to the Ministry ensures effective ministerial representation in the environmental issues and enhances the supervision of the environment sector.</td></tr>
<tr><td> 

Environment Councils in both KSA and Morocco were convened only few times and were not successful in fulfilling their respective duties due to conflicts or interests.</td></tr>
</table>

Recommendation to Transfer the Functions of the Environment Council Related to Coordination With Various Sectors to Sectoral Committees Under the Supervision of the Ministry of Environment, Water and Agriculture.

(1-c) Is there a need for a Saudi Environment Council?

<table>
<tr><th colspan="2">Sectoral Coordination Committees</th><th>Key Points</th></tr>
<tr><td>Energy Sector's Environmental Performance Committee</td><td>Industry Sector's Environmental Performance Committee</td><td rowspan="4">• Sectoral coordination committees are tools that enable the Ministry to supervise the environmental performance of the developmental sectors and to coordinate with such sectors and create a dialogue and cooperation platform between regulatory bodies, licensing bodies, and operators.
• The Undersecretariat of Environment shall preside over all such committees to ensure there is no conflict of interests. Environmental centers, licensing bodies, and operators shall all be represented in such committees.
• Key functions of the sectoral coordination committees include:
- Review and monitoring of the environmental performance of each sector and the general trends therein.
- Assessment of the challenges facing the developmental sectors in the context of their implementation of the environmental regulations.
- Proposing and implementing solutions to address the challenges facing the development sectors.
• Each committee shall hold periodic meetings at least twice a year to review the environmental compliance and general performance of each sector and may also held extraordinary meetings if needed.</td></tr>
<tr><td>Transportation Sector's Environmental Performance Committee</td><td>Agriculture Sector's Environmental Performance Committee</td></tr>
<tr><td>Mining Sector's Environmental Performance Committee</td><td>Water Resources Sector's Environmental Performance Committee</td></tr>
<tr><td>Municipality Sector's Environmental Performance Committee</td><td></td></tr>
</table>

Assessment of the Possibility of Privatizing Meteorological Services.

Meteorological Center may not be privatized given that it is both responsible for the fulfillment of certain sovereign functions and relies heavily on government subsidy.

<table>
<tr><th colspan="2">In line with the global best practices including those of liberal countries, fundamental and sovereign meteorological functions related to public safety and national security shall fall under the responsibility of a public entity.</th><th colspan="2">Operating the meteorological infrastructures shall fall under the responsibility of a public entity.</th></tr>
<tr><th>National Security</th><th>Public Safety</th><th colspan="2">Government Funding</th></tr>
<tr><td>Military Armed Forces relies heavily on the preciseness of climate and weather forecasts in their operations including air and marine operations as well as troop movements.
Meteorology is directly associated with national security and assigning the functions thereof to third parties represents considerable risk factor so all countries avoid the privatization thereof.</td><td>Basic climate and weather information and forecasts, public warnings of severe climate and weather events are usually seen as a fundamental need and right of the society, accordingly the provision of the basic service shall fall under the responsibility of the government.</td><td colspan="2">The multiplicity of the meteorological infrastructure is not useful due to the high capital costs and the necessity of an integrated system.</td></tr>
<tr><td></td><td></td><td colspan="2">Percentage of governmental funding of the key meteorological services* based on a sample of 72 countries.</td></tr>
<tr><td></td><td></td><td>Public services and warnings 80%</td><td>Agricultural services 73%</td></tr>
<tr><td></td><td></td><td>Aviation services 45%</td><td>Climate services 60%</td></tr>
</table>

		Defense services 78%	Consulting services 50%
		Marine services 72%	Others 38%

Recommendation to separate the Meteorology Sector from the Environment Sector?

(2-a) Is it better for both sectors to continue combining environmental and meteorological activities together or to separate them?

The Proposed Model	**A certain independent entity shall assume the responsibility of the meteorological activities (in isolation of the environment protection activities).** • **Such competent meteorological entity shall provide the modeling services to the competent environmental entity as well as to other entities.** • **Weather network data and air quality network data shall be mutually shared between the two competent entities through a special platform.**	**Benefits of the Proposed Model**	• **Ensures the equal provision of meteorological services to all beneficiaries.** • **Increases the transparency in the allocation of resources.** • **Increases focus on the environment sector (particularly activities requiring development) and the meteorology sector (particularly mature activities) leading to the enhancement of services.** • **Ensures focusing on proper planning of the weather and air quality networks, and also ensures focusing on the operation and maintenance of both networks.** • **Isolates the meteorology sector from the transformations taking place in the environment sector.**
International Experiences with the Proposed Model			

It is recommended to separate meteorology sector from environment sector and convert meteorology into a specialized center affiliated to the Ministry of Environment, Water and Agriculture.

<u>Distribution of Functions Within Environment Sector.</u>

(2-b) What is the optimal operating model for the meteorology sector?

Key Functions	Competent Body	Justification
Development of meteorological policies, strategies and regulations.	**Ministry of Environment, Water and Agriculture**	• **A government body.** • **Does not assume any functions that may lead to conflict of interests.**
Management of the infrastructure of the meteorology sector.	**National Center for Meteorology (NCM)**	**The operation of the infrastructures falls under the responsibility of an operating governmental entity:** • **The multiplicity of the meteorological infrastructure is not useful due to the high capital expenditures and the necessity of an integrated system.** • **The need for strict compliance with international standards requires long-term investment and extensive government supervision including direct control and management of the infrastructures.**
Provision of the fundamental meteorological services **(*e.g., services related to public safety and national security*)**	**National Center for Meteorology (NCM)**	**In line with the global best practices including those of liberal countries, fundamental and sovereign meteorological functions related to public safety and national security shall fall under the responsibility of a public operating entity:** • **Climate and weather forecast services and public warnings of sever climate and weather events are fundamental need and right of the society.** • **Meteorology is directly associated with the national security: Military Armed Forces relies heavily on the weather information.**
Provision of specialized meteorological services	**Private sector companies providing meteorological services**	**There is integration between the capabilities of the private sector companies providing meteorological services and public sector meteorological entities.** **Private sector is characterized by its flexibility and ability to innovate, identify new pioneering meteorological services, market specialized services, and use sophisticated technologies.** **The competent meteorological entity shall benefit from the revenues through the provision of data and services to the sector for fees.**

Distribution of Responsibilities Within the Proposed Institutional Framework.

Concise

The Ministry of Environment, Water and Agriculture	
• Development of policies, strategies, regulations, standards and studies. • Coordination of the implementation of the environmental strategies, supervision of the sector, and monitoring the environmental performance within the Kingdom. • International representation. • National coordination with the civil society, NGOs and developmental sectors.	• Ensuring the inclusion of the environmental issues in the sectoral strategies. • Activation of efforts towards the achievement of sustainable development goals. • Raise the environmental awareness. • Enhancement of the research and development capabilities within the environment sector.

National Center of Meteorology	National Center for Wildlife Development	National Center for Vegetation Cover Development and Combating Desertification	National Center for Environmental Compliance Control
• Ensuring the application of the relevant regulations and standards. • Issuance of permits and licenses. • Monitoring the quality of the environmental components. • Engagement of the private sector to fulfill relevant functions such as environmental inspection. • Ensuring the environmental compliance. • Rehabilitation of the deteriorating locations. • Compliance with relevant international agreements. • Reporting performance.	• Ensuring the application of the relevant regulations and standards. • Protection, development and sustainability of forestlands. • Sustainable management of pasturelands and national parks. • Rehabilitation of the vegetation cover and afforestation. • Engagement of the private sector to fulfill relevant functions. • Compliance with relevant international agreements. • Reporting performance.	• Ensuring the application of the relevant regulations and standards. • Planning, announcement and management of natural reserves. • Protection of ecosystems and biological species. • Management of the breeding centers. • Compliance with relevant international agreements • Engagement of the private sector to fulfill relevant functions. • Reporting performance.	• Ensuring the application of the relevant regulations and standards. • Development and operation of the meteorological stations network. • Collecting data, conducting simulations, issuing meteorological and air-quality reports on weather forecasts. • Conducting climate studies. • Sharing meteorological data. • Providing data to private sector for fees. • Engagement of the private sector to fulfill relevant functions. • Reporting performance.

Design Philosophy of the Proposed Institutional Framework.

Assigning the responsibility of the functions related to supervision of the sector and the development of the policies, strategies and regulations to one single ministerial entity.
Separation of the operational functions from the regulatory functions, avoidance of conflicts of interests, and assignment of operational functions to implementation centers empowered under the supervision of the Ministry.
Assignment of each of the respective national priorities of the environment and meteorology sectors to a specialized empowered center so that each priority can be paid considerable attention and focus.
Activation of the private sector's participation.

The Proposed Institutional Framework – Interaction with the Private Sector, NGOs, and Other Sectors.

Concise

<table>
<tr><th>Ministries responsible for the developmental sectors</th><th></th><th></th><th>Civil Society and NGOs</th></tr>
<tr><td>• To include the environmental objectives into the mainstream of the activities of the developmental sectors.
• To promote environmental compliance.
• To report environmental data.</td><td colspan="2">Environment Sector</td><td>• To undertake advocacy actions.
• To conduct awareness-raising campaigns.
• To participate in the environment protection and nature conservation initiatives.</td></tr>
<tr><th>Environmental Service Providers</th><th>Research Institutes</th><th>National Committee for the Clean Development Mechanism</th><th>Development Sectors</th></tr>
<tr><td>• To support of the Ministry of Environment, Water and Agriculture, as well as of the entities affiliated thereto in fulfilling their respective functions.</td><td>• To conduct research and development activities.</td><td>• To manage the Clean Development Mechanism and climate change.
• To report performance.</td><td>• To comply with the environmental regulations.
• To conduct awareness-raising campaigns.
• To report on environmental data.</td></tr>
</table>

Success Factors for The Proposed Institutional Framework.

1	Ensure the economic independence and economic sustainability of the environmental entities.
2	Development of a flexible operational model for the environmental entities.
3	Ensure that a competitive salary structure is available for the environmental entities.
4	Empowerment of the "National Center for Environmental Compliance Control" to monitor all developmental sector.

Benefits of The Proposed Institutional Framework.

Challenges facing the current institutional framework		Benefits of the Proposed Institutional Framework
Fragmentation of Responsibilities, overlap of roles and lack of accountability.	**Accurate and integral distribution of role and responsibilities**	**Roles within the sector are adequately allocated among environmental entities to ensure comprehensive coverage and reduce overlapping of roles.**
Lack of coordination	**Coordination to be carried out by the Ministry**	**The Ministry ensures coordination among various environmental entities.**
Almost complete lack of performance monitoring	**Performance monitoring to be carried out by the Ministry**	**The Ministry shall develop policies, strategies, and objectives; the Ministry shall also monitor implementation progress as well as the performance of the environment sector.**
Distraction from core activities	**Specialized and effective entities focusing on the implementation programs**	**The Proposed Framework encourages the environmental entities to focus on the functions thereof, and promotes flexibility through the engagement of the public sector.**
Ineffective international environmental cooperation	**Effective international representation in environmental treaties.**	**The Ministry shall coordinate matters related to international cooperation and shall involve the competent environmental entities in the same.**

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Economic Aspects of the Environment Sector.

Provision of revenue sources for the development and sustainability of the Sector.				
		Economic Sustainability of the Environment Sector.		
	National Economy Support.		**Reduction of the Environmental Cost Degradation.**	
Promotion of the private sector participation and creation of job opportunities.				Reduction of costs consequent to the impacts on environment, public health and natural resources.

Revenue Sources for the Environment and Meteorology Sectors.

• Empowering the Sector to collect fees.	***Examples of the revenue source***	**Factors affecting the calculation of the fees of environmental permits**
• Establishment of the Environment Fund to manage the process of benefiting from the revenues of fees and fines.	***Fees of environmental permits for construction***	**Complexity of operation:**
• Fees contributes to the recovery of the costs of the sector, including:	***Fees of environmental permits operation***	Degree of complexity is defined depending on the type of activities being carried out and hazardous materials being used, etc.
o Environmental Performance Monitoring.	***Fees of meteorological services***	**Emissions and inputs:**
o Inspection.	***Accreditation Fees***	This factor takes into account the amounts invested in and resulted from the activity (such as emissions, natural resources, etc.).
o Licensing.	***Fishing and Hunting Licensing Fees***	**Site Location:**
o Meteorological services.	***Species Trading Licensing Fees***	The location is evaluated depending on its proximity to residential communities, surface/ground water resources, natural reserves, etc.
o Other activities including environmental programs and studies as well as technical support and research and development activities.	***Revenues of National Parks***	**Performance of the Operator:**
	Fines	This factor reflects the performance of the operator in terms of the enforcement of the environmental management laws to ensure compliance.
	Others	**Compliance:**
		This factor takes into account the operator's compliance history with the environmental laws and requirements of licenses/ permits.

Economic Circle of the Environment and Meteorology Sectors.

<table>
<tr><td>Ministry of Finance</td><td colspan="3">Economic Sectors (e.g., agriculture, water resources, oil and gas, energy, manufacturing, mining, quarrying, transportation, tourism, waste management, environmental services, etc.)</td><td>Fees and Fines</td></tr>
<tr><td></td><td colspan="3">Environmental financial incentives</td><td></td></tr>
<tr><td>Government subsidy</td><td colspan="3">Fees of environmental permits for construction and for operation, and waste treatment licensing fees, environmental studies review fees, species trading licensing fees, pet passports fees, eco-tourism fees, recreational activities fees, harvesting licensing fees, fishing and hunting licensing fees, and meteorological services fees.</td><td></td></tr>
<tr><td></td><td colspan="3">Environment Fund</td><td></td></tr>
<tr><td></td><td colspan="3">Operation and Construction Fees</td><td></td></tr>
<tr><td>Ministry of Environment, Water and Agriculture</td><td>National Center of Meteorology (NCM)</td><td>National Center for Vegetation Cover Development and Combating Desertification (NCVCDCD)</td><td>National Center for Wildlife Development (NCWD)</td><td>National Center for Environmental Compliance Control (NCECC)</td></tr>
</table>

Opportunities Made Available to The Economy of The Kingdom as a Result of The Growth of The Meteorology and Environment Sectors.

<table>
<tr><td>Activity</td><td>Environmental Services</td><td>Development Activities</td><td>environmental awareness, education and research</td><td colspan="3">Proposed Model of Privatization</td></tr>
<tr><td>Available Opportunities</td><td>• Environmental services companies (control, monitoring services, consultations, decontamination, and rehabilitation).
• Laboratories.
• Engineering Companies.
• Contractors.
• Financial Institution.</td><td>• Environmental services companies.
• Waste treatment companies.
• Specialized meteorological services companies.
•Financial Institution.</td><td>• Universities.
• Specialized Institutes.
• Research Centers.
• Media Companies.</td><td colspan="3">Several (local and international) companies licensed by the competent entity responsible for environmental compliance monitoring compete for the provision of environmental services (e.g., inspection).</td></tr>
<tr><td></td><td></td><td></td><td></td><td colspan="2">International Experiences with the Proposed Model</td><td>  </td></tr>
<tr><td></td><td></td><td></td><td></td><td>Benefits of the Proposed Model</td><td colspan="2">• Promotes competitiveness within the sector and allows quality improvement and cost reduction.
• Allows access to more specialized companies.
• Encourages innovation.
• Promotes private sector participation.
• Supports the development of SMEs.</td></tr>
<tr><td></td><td colspan="6">An opportunity to improve the status of the environment within the Kingdom in conjunction with:
• An opportunity to develop national capabilities and develop SMEs.
•An opportunity to develop the education, research and development sectors, the engineering sectors, the environmental services sector and the financial sector.</td></tr>
</table>

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Components of the National Environment Strategy

Vision	A flourishing and sustainable environment enjoying the utmost care of everyone.
Mission	We strive to provide the necessary enablers and engage all stakeholders to the development and implementation of comprehensive policies, strategies, regulations, standards and guidelines to ensure the protection and sustainability of the environment.
Strategic Objectives	**Environment sustainability** **Economic sustainability**
	Social Well-being **Environmental Presence**
Strategic Pillars	• Institutional strength and private sector participation (10 initiatives and 4 KPIs). • Conservation of the vegetation cover and combating desertification (6 initiatives and 3 KPIs).
Strategic Initiatives and Key Performance Indicators	• Wildlife Conservation (10 initiatives and 4 KPIs). • Environmental compliance (26 initiatives and 10 KPIs). • Expanding and enhancing the quality of meteorological services (7 initiatives and 2 KPIs). • Awareness, Education and Innovation (5 Initiatives and 2 KPIs).

Strategic Environmental Objectives.

Support of the environmental sustainability through natural resources conservation, pollution reduction, desertification combating, inclusion of the environmental agenda into the mainstream of the national planning, and rehabilitation of the degrading ecosystems.
Achievement of robust governance for the environment and meteorology sectors, reinforcement of coordination among flexible, efficient and financially-sustainable entities, and engagement of the private sector to provide distinct environmental services of high quality.
Enhancement of the quality of life for all and achievement of the utmost climate adaptation.
Adoption of the highest professional and ethical standards when managing and operating the environment and meteorology sectors, engagement of the civil society in environmental issues, raising the environmental awareness within the Kingdom, and adherence to the international treaties.

Linking the Strategic Environmental Objectives to the Sustainable Development Goals.

Sustainable Development Goals linked to The Environment Strategy.	Environmental Sustainability	Economic Sustainability	Social Welfare	Environmental Participation
3- Good Health and Well-Being			√	
6- Clean Water and Sanitation	√		√	
7- Affordable and Clean Energy	√	√	√	
8- Decent Work and Economic Growth		√	√	√
9- Industry, Innovation, and Infrastructure	√	√		√
11- Sustainable Cities and Communities	√	√	√	√
12- Responsible Consumption and Production	√	√	√	
13- Climate Action	√	√	√	√
14- Life Below Water	√	√	√	√
15- life on Land	√	√	√	√
16- Peace, Justice and Strong Institutions	√	√	√	√
17- Partnerships for the Goals	√	√	√	√

Strategic Pillar No. (01): Institutional Strength and Private Sector Participation.

	Strategic Initiatives						KPIS	
SP1 1.01	Implementation of the institutional framework of the environment and meteorology sectors.	SP1 1.08	Setting high standards for water quality.			KPI	Baseline	Target (2030)
SP1 1.02	Economic Sustainability of the Environment Sector.	SP1 1.09	Development and application of the comprehensive meteorological law.		SP1 K.01	Economic Sustainability of the Environment Sector	0	90%
SP1 1.03	Effective management of the regional and international treaties.	SP1 1.10	Activation of private sector participation in the environment and meteorology sectors.		SP1 K.02	Economic Sustainability of the Meteorology Sector	0	50%
SP1 1.04	Development and implementation of the comprehensive environmental law.				SP1 K.03	Percentage of the national strategies that take into consideration the adaptation to climate change.	Not determined	100%
SP1 1.05	Development and implementation of the law of the Environmental Law Enforcement Body (Environmental Police).				SP1 K.04	Ranking of the Kingdom on the Environmental Performance Index.	95	50
SP1 1.06	Assessment of the economic components of the environment.							
SP1 1.07	Setting high standards for air quality and climate change.							

Strategic Pillar No. (02): Conservation of the vegetation cover and combating desertification.

	Strategic Initiatives						KPIS	
SP2 1.01	Development of the ability to prepare for drought and mitigate the severity thereof.					KPI	Baseline	Target (2030)
SP2 1.02	Adoption and implementation of the pastures development strategy.				**SP2 K.01**	Forest growth rate.	Not determined	Not determined
SP2 1.03	Implementation of the national forests development strategy.				**SP2 K.02**	Sustainable grazing.	>3.2	1
SP2 1.04	Assessment and rehabilitation of the degrading location.				**SP2 K.03**	Surface area of the rehabilitated locations.	18,000 Ha	300,000 Ha
SP2 1.05	Development and implementation of a national plan for combating desertification and reducing sand encroachment.							
SP2 1.06	Creation of a system for the development and sustainable management of the national parks.							

Strategic Pillar No. (03): Wildlife Conservation.

	Strategic Initiatives						KPIS	
SP3 1.01	Development of the comprehensive framework for biodiversity conservation.	**SP3 1.09**	Development and implementation of a sustainable tourism strategy.			KPI	Baseline	Target (2030)
SP3 1.02	Conducting a comprehensive survey of biodiversity.	**SP3 1.10**	Development of a framework for organized and sustainable fishing and hunting.		**SP3 K.01**	Coverage of the natural terrestrial reserves.	4.5%	17%
SP3 1.03	Operational excellence in the management of wild species research-breeding centers.				**SP3 K.02**	Coverage of natural marine reserves.	Not determined	10%
SP3 1.04	Development of a system for trading in wild species and products thereof.				**SP3 K.03**	Hotspots of conserved biodiversity.	25%	75%
SP3 1.05	Planning of the natural reserves.				**SP3 K.04**	Conservation Genetics.	0%	75%
SP3 1.06	Operational excellence in the management of the natural reserves.							
SP3 1.07	Operational excellence in the conservation and management of coastal areas.							
SP3 1.08	Setting guidelines for sustainable management of the biological resources.							

Strategic Pillar No. (04): Environmental Compliance.

	Strategic Initiatives							KPIS	
SP4 1.01	Operational excellence in environmental licensing and inspection and violations detection.	SP4 1.09	Emission monitoring and air quality analyzing capabilities deployment.	SP4 1.24	Waste generation reduction.		KPI	Baseline	Target (2030)
SP4 1.02	Enhancement of the capabilities of environmental emergency response.	SP4 1.10	Surface/ ground water quality monitoring and analysis capabilities deployment.	SP4 1.25	Enhancement of waste collection services.	SP4 K.01	Survey coverage rate	0%	90%
SP4 1.03	Establishment of the National Center of Environmental Data.	SP4 1.11	Monitoring environmental sustainability across sectors.	SP4 1.26	Waste treatment and valorization.	SP4 K.02	Efficiency of the services provided by the "National Center for Environmental Compliance Control"	Not determined	90%
SP4 1.04	Conducting a comprehensive survey of pollution sources.	SP4 1.12	Decommissioning and rehabilitation of the random waste landfills.			SP4 K.03	Percentage of licensed facilities.	Not determined	100%
SP4 1.05	Enhancement of the capabilities of environmental mapping of the geographical spaces.	SP4 1.13	Reviewing, updating and reactivating the National Program for Chemical Safety.			SP4 K.04	Percentage of corrective measures completed on time.	Not determined	80%
SP4 1.06	Conducting a comprehensive survey of environmental radioactivity.	SP4 1.14	Development and implementation of the Persistent Organic Pollutants (POPs) assessment plan.			SP4 K.05	Number of landfills requiring rehabilitation.	Not determined	Not determined
SP4 1.07	Creation of a comprehensive waste database.	SP4 1.15-23	Development and implementation of strategies to raise the environmental performance of the developmental sectors: maritime transportation, desalination, dam management, mining, quarrying, agriculture, land transportation, energy, manufacturing, and oil and gas.			SP4 K.06	Number of major cities noncompliant with the ambient air quality standards.	20	1
SP4 1.08	Development and implementation of the climate change adaptation strategy.					SP4 K.07	Percentage of water consumption by agriculture out of total renewable water resources.	416%	350%
						SP4 K.08	Percentage of treated wastewater compliant with environmental standards.	Not determined	95%
						SP4 K.09	Rate of landfill diversion.	Not determined	50%
						SP4 K.10	Proper treatment and disposal of hazardous wastes.	Not determined	90%

Strategic Pillar No. (05): Meteorology.

	Strategic Initiatives						KPIS	
SP5 1.01	Development and implementation of a strategy for marketing meteorological services.					KPI	Baseline	Target (2030)
SP5 1.02	Operational excellence and excellence of services within the meteorology sector.				**SP5 K.01**	Time span of weather forecasts.	5 days	15 days
SP5 1.03	Robustness of meteorological operations.				**SP5 K.02**	Weather warning index.	Not determined	8.00
SP5 1.04	Enhancement of the capabilities of air-quality and meteorological emergency response.							
SP5 1.05	Enhancement of the capabilities of air quality modeling.							
SP5 1.06	Enhancement of the capabilities of climate modeling.							
SP5 1.07	Enhancement of the capabilities of marine meteorology modeling.							

Strategic Pillar No. (06): Awareness, Education and Innovation.

	Strategic Initiatives						KPIS	
SP6 1.01	Raising environmental awareness within the Kingdom.					KPI	Baseline	Target (2030)
SP6 1.02	Development of the environmental education.				SP6 K.01	Popularization of Environmental Education	No	Yes
SP6 1.03	Development of a reliable network of environmental NGOs.				SP6 K.02	Research and development budget of the environment and meteorology sectors.	Not determined	100 Mn. SAR
SP6 1.04	Development and implementation of a research and development strategy for the environment sector.							
SP6 1.05	Operational excellence of the biodiversity and wildlife research centers.							

Key Outcomes of The Strategy.

• An effective and sustainable institutional framework for the environment and meteorology sectors that achieves integration among various roles played by the Ministry and effective specialized implementation centers. • Activation of the private sector participation in both sectors of environment and meteorology.		**Institutional Strength and Private Sector Participation**		• Raise environmental awareness across all segments of the society. • Popularization of Environmental Education. • Innovation in the environment and meteorology sectors.
• Development of the natural vegetation cover and combating desertification.	**Conservation of the vegetation cover and combating desertification**	**Key outcomes of the Strategy**	**Awareness, Education and Innovation**	• Development and extending the scope of the meteorology services to meet the growing needs of the Kingdom.
	Wildlife Conservation		**Meteorology**	
• Conservation and development of wildlife whether inside or outside the natural reserves.		**Environmental Compliance**		• Environmental compliance promotion. • Mitigation of the environmental impact of the activities of the developmental sector. • Climate change adaptation.

Contents:

- Strategy development methodology.
- Current status assessment.
- Proposed institutional framework.
- Economic requirements.
- Components of the National Environment Strategy.
- **A roadmap for the implementation of the strategy and the fast-paced initiatives.**

A Roadmap for the Implementation of The Strategy.

The roadmap is detailed in a separate document.

(01) Setting the foundations of an effective environment sector: (Year 1 till Year 3)	**(02) Achieving improvement within the environment sector:** (Year 3 till Year 8)	**(03) Achieving leadership in the environment sector"** (Year 8 till Year 15)
This step focuses on the implementation of the initiatives related to the development of the institutional framework, the development of the comprehensive environmental and meteorological laws, enforcement of the environmental compliance mentoring procedures, creating comprehensive environmental databases including the determination of baselines, restructuring the work procedures, development of human resources, adoption of state-of-the-art environmental compliance monitoring technologies, development of the vegetation cover and wildlife, raising environmental awareness and education, and enhancement of the meteorological services.	This step focuses on the implementation of the initiatives related to the maximization of the efficiency of the entities working within the environment sector, improvement of the environmental compliance and performance of the developmental sectors, regulation of grazing activities, expanding in the development of wildlife and vegetation cover, combating desertification, effective engagement of the private sector and the civil society in environmental issues, and expanding in the meteorological service packages.	This step focuses on the implementation of the initiatives related to the sustainable management of pasturelands; forestlands; and wildlife, support of cutting-edge studies; research and innovation, raising meteorological and environmental services (including those provided by the private sector) to match global best practices, and sharing expertise with other countries.

The Fast-Paced Initiatives:

Environmental compliance monitoring enforcement and pollution reduction initiatives	Vegetation cover development initiatives
• Updating and expanding the span of the national ambient air quality monitoring network. • Establishment of an emission monitoring center to monitor emission sources such as factories, power plants, and cement kilns. • Establishment of a program to protect surface/ ground water resources against pollution and to monitor leaks form fuel stations. • Establishment of a program to monitor wastewater and a program to monitor marine ecosystem pollution. • Establishment of a program to monitor waste landfills. • Activation of the National Program for Chemical Safety.	• Plantation of 10 million trees. • Rehabilitation of 40,000 hectares of pasturelands. • Green Kingdom Program: - Rehabilitation of pasturelands and tree areas. - Rehabilitation and development of forests. - Establishment of greenbelts. - Irrigation using seawater.

Required:

- **Approval of the National Environment Strategy.**
- **Establishment of the Environment Fund to support and sustain the Sector.**
- **Approval of the institutional framework proposed for governing the environment sector as follows:**
  - Establishment of the "National Center for Environmental Compliance Control (NCECC)" to which all executive functions related to environmental compliance monitoring (such as environmental licensing – environmental inspection – pollution monitoring) across all sectors (e.g., energy, manufacturing, transportation, mining, and agriculture sectors) shall be assigned.
  - Establishment of the "National Center for Vegetation Cover Development and Combating Desertification (NCPCDCD)" to which all executive functions related to the protection and development of the natural vegetation cover and combating desertification (e.g., management of forests, pasturelands, and notational parks – rehabilitation of the vegetation cover– combating desertification – establishment of greenbelts) shall be assigned.
  - Establishment of the "National Center of Meteorology (NCM)" to which all executive functions related to meteorology shall be assigned.
  - Establishment of the "National Center for Wildlife Development (NCWD)" to which all executive functions related to the protection and development of the wildlife (e.g., management of the natural reserves, research-breeding centers, and biodiversity conservation) shall be assigned.