رؤية VISION 2030
المملكة العربية السعودية
KINGDOM OF SAUDI ARABIA

وزارة البيئة والمياه والزراعة
Ministry of Environment Water & Agriculture
Kingdom of Saudi Arabia المملكة العربية السعودية

National Environment Strategy

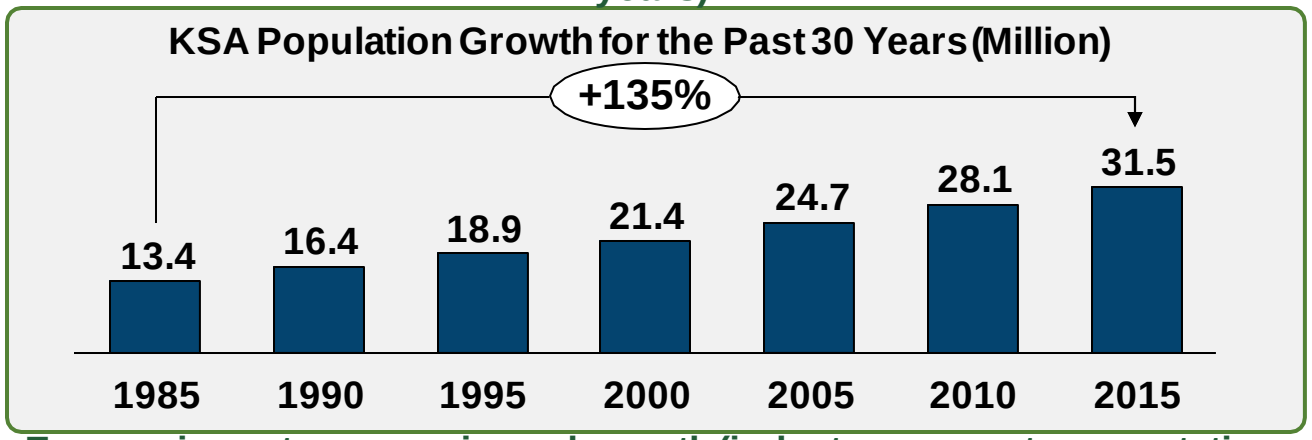
Executive Summary for the Council of Economic and Development Affairs

December 15, 2017

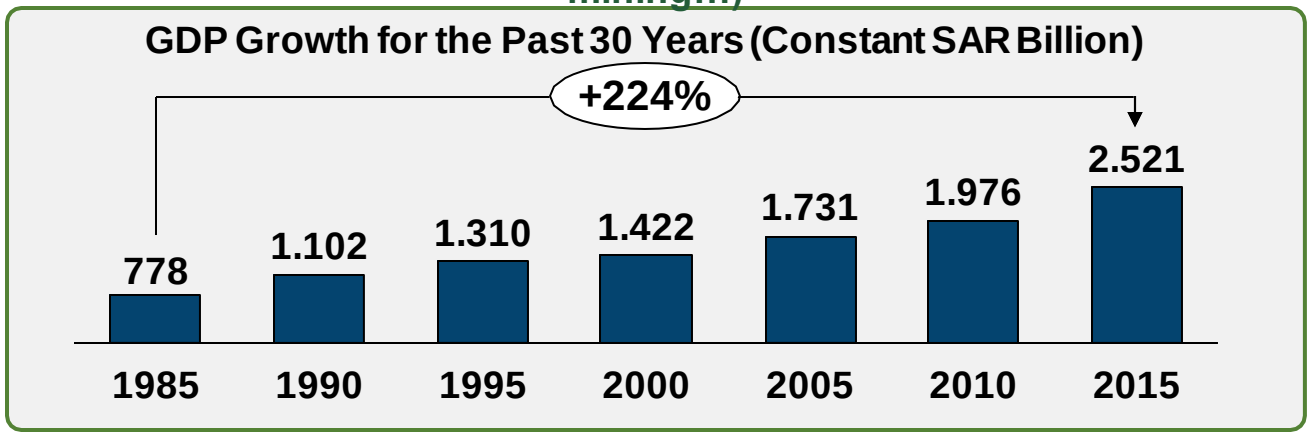
The need for a National Environment Strategy

Throughout the past decades, pressures on environment and natural resources have exacerbated…

Population experienced tremendous growth (+136% over the past 30 years)



Economic sectors experienced growth (industry, energy, transportation, mining…)



… however the environment protection apparatus did not adapt to this change…

- Lack of environmental compliance
- Limited environmental awareness and widespread of bad practices
- Degradation of the environment (sources of pollution, waste, degradation of vegetation and wildlife)

86 Environmental Performance Index – 2017 rank among 180 countries

… The situation calls for the development of a national environment strategy that sets a comprehensive framework for the implementation of radical solutions to raise the performance of the sector and the protection and sustainability of the environment

Ambitions of the National Environment Strategy

- Enhance the effectiveness of the sector (institutional setting, governance, operating model, regulations, economic sustainability of the sector)
- Raise environmental compliance across all sectors and reduce pollution and adverse impacts on environment
- Develop the natural vegetation and combat desertification
- Protect wildlife and conserve biological diversity
- Promote private sector participation to ensure sector sustainability and drive economic growth and innovation
- Strengthen the national capability to adapt to climate change
- Raise environmental awareness and enhance the role of NGOs and volunteers
- Improve the quality and the coverage of meteorological services

Agenda

- The methodology for developing the strategy
- The diagnostic of the current state
- The proposed institutional framework
- Environment sector economic requirements
- The components of the National Environment Strategy
- The implementation roadmap of the strategy and the quick win initiatives
- Next steps

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MEWA is following an eight-step Approach to develop its environmental strategy

1. Develop Project Plan and Validate Objectives
2. Conduct the Baseline Assessment
3. Derive Lessons Learned from Benchmarks & International Best Practices
4. Develop a Diagnostic of the Current Situation and Define the Target State
5. Articulate the National Environmental Strategy
6. Develop Institutional Setup and Key Enablers for Sector Reforms
7. Develop the Implementation Roadmap and the Performance Management Framework
8. Engage Stakeholders

Governance of the study

Governance Structure of the Study

1 The Steering Committee, chaired by H.E. the Minister of Environment, Water and Agriculture and the membership of 20 members representing all relevant sectors

- 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
- General Authority for Meteorology and Environmental Protection
- Saudi Wildlife Authority
- Royal Commission for Jubail and Yanbu
- Saudi Commission for Tourism and National Heritage
- 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

2 The scientific committee consists of 19 members

- Ministry of Environment, Water and Agriculture (Environment, Water, Agriculture, Planning, Privatization and Vision Realization Office)
- Saudi Wildlife Authority
- General Authority for Meteorology and Environmental Protection
- King Abdullah University of Science and Technology
- King Fahd University of Petroleum and Minerals
- King Saud University
- Food and Agriculture Organization
- Saudi environmental experts

3 The study team consists of 18 members

- The team of the Ministry of Environment, Water and Agriculture consists of 8 persons
- The advisory team consists of 10 persons
- International experts

4 25 local and foreign experts in 17 fields

- Environmental strategies
- Biodiversity and desert wildlife
- Marine environment
- Emergency response and oil spills
- Soil and desertification
- Air quality
- Climate change
- Water resources and groundwater pollution protection
- Solid and hazardous waste
- Meteorology
- Environmental governance and institutional setting
- Privatization and investment in the environment sector
- Environmental legislation and regulations
- Environmental and social economics
- Rehabilitation, sustainability and recycling
- Human capital in the environment sector
- Technology and information in the environment sector

Comprehensive framework of the National Environment Strategy

Objectives

Environmental Sustainability
- Resources & Ecosystem Conservation
- Sustainable Consumption and Production
- Rehabilitation of Degraded Ecosystems

Economic Sustainability
- Economically Sustainable Environmental Sector
- Sustainable Economic Growth
- Public Private Partnership in Delivery of Environmental and Meteorological Services

Social Well-Being
- Protection of Vulnerable Populations
- Quality of Life
- Development of Ecotourism

Environmental Presence
- Participation of Civil Society in Environmental Protection
- Regional and International Presence

Domains

Terrestrial Ecosystems
- Threats to Biodiversity
- Habitats and Species
- Conservation Initiatives

Marine & Coastal Ecosystems
- Threats to Marine Environment
- Habitats and Species
- Conservation Initiatives

Land & Desertification
- Threats and Overconsumption
- State of Desertification and Resources
- Sustainable Land Management Initiatives

Meteorology
- Service Demand
- Service Supply
- Service Delivery

Air Quality & Climate Change
- Sources of Air Pollution, GHG Emissions and Dust
- Ambient Air Quality & Carbon Footprint
- Mitigation & Adaptation Strategies

Water Resources
- Water Demand & Sources of Pollution
- Water Availability and Quality
- Integrated Water Resources Management

Waste Management & Chemical Safety
- Waste & Chemicals Sources and Infrastructure
- Integrated Waste Management & Chemicals Safety Initiatives

Enablers

Institutional Setting
- Sector Structure
- Mandate by Entity
- Private Sector Participation
- Civil Society Role
- International/Regional Cooperation

Policies & Regulations
- Technical and Economic Regulations (Fees, Violations, Tariff)
- Licensing
- Monitoring, Compliance, Enforcement, Penalty

Economic Requirements
- Sector Revenue Streams
- Private Sector Participation
- Environmental Fund
- Incentives for Economic Sectors

Capabilities
- Human Capital & Education
- Technology and Systems
- Planning, Risk Management, and Emergency Readiness
- R&D and Innovation
- Awareness and Behavior Change

Performance Management
- Implementation Plans
- Measurements and Verification
- Monitoring and Control

Stakeholder engagement methodology

Stakeholders were involved throughout the diagnostic and strategy development phases

Data Collection Phase

- Reviewed 206 relevant document (e.g., strategies, regulations, initiatives, environmental standards, environmental reports, etc.)
- Reviewed 57 advanced country in the environment and meteorology sectors and deep-dived in 12 of them
- Conducted 5 workshops to diagnose the current situation
- Interviewed 80 relevant authorities

Discussion and Deliverable Review Phase

- Conducted 8 workshops to review the diagnostic of the current situation
- Held 6 workshops to develop the vision, mission and the strategic objectives
- Held 9 workshops to develop the institutional setting of the sector
- Conducted two workshops with the Steering Committee to review the deliverables

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Diagnosis of the current situation and its comparison with best practices

We diagnosed the current situation and compared it with international best practices based on the Following:

Domains

- Terrestrial Ecosystems
- Marine & Coastal Ecosystems
- Land & Desertification
- Air Quality
- Climate Change
- Water Resources
- Waste Management & Chemical Safety
- Meteorology

Enablers

- Institutional Setting
- Policies and Regulations
- Economic Requirements
- Capabilities
- Performance Management

Benchmarking – Comparison to 57 countries out of which 12 were selected for a deep dive

1 Shortlisted Countries

Global (50)

Regional (7)

2.1 Country Relevance to KSA

2.2 Environmental Performance Within the Domain

						Selected Countries (12)
Terrestrial Ecosystems	Climate Aridity	Comparable Terrestrial Ecosystems	Agricultural Practices	Wildlife Species Protection	Ecosystem Vitality - Agriculture	Jordan, California, Australia
Marine and Coastal Ecosystems	Comparable Marine and Coastal Ecosystems	Intense Marine Transport.	Existence of Desalination Facilities	Protected Marine Areas	Fish Stocks	Australia, Texas, UAE, Spain
Land & Desertification	Country Affected by Desertification and Drought	Similarity in Land Cover and Land Use		Effectiveness in Combatting Desertification	Natural Resource Depletion	Australia, Arizona, Morocco
Air Quality & Climate Change	Climate Similarity to KSA	Large Oil & Gas Industry		EPI / AQI	Pollutant Concentration	Texas, UAE
Water Resources	Renewable Water per Capita	Total Agricultural Output		Total Water Used / Renewable Water	% Wastewater Treated	Australia, Singapore, UAE, Spain
Waste Management & Chemical Safety	Industrial Sector Size	Municipal Waste Generation per Capita		MSW Diversion Rate from Landfills	MSW Recycling Rate	International Treaties for Chemical Safety	Sweden, Australia, Germany, UK
Meteorology	Large Maritime Façade	Vast Countries		Quality and Breadth of Services	Use of State of the Art Technology	Involvement of the Private Sector	USA, UK, Netherlands, Japan

Diagnostic of the terrestrial ecosystems domain

The terrestrial environment in the Kingdom is endowed with a rich biodiversity encompassing 79 mammal species, 99 reptile species, 432 bird species, and 3099 invertebrates species

Main Pressure on the Domain

- Hunting
- Loss of habitats due to degradation of vegetation cover and urban development
- Bad practices in agriculture

SWA deployed numerous efforts to conserve terrestrial ecosystems

- SWA's efforts mainly focus around protected areas
- KSA is ahead of benchmarks in planning terrestrial protected areas, while it lags behind in designating them
- In terms of managing protected areas, SWA suffers from the lack of human and technical capabilities. In addition, protected areas are subject to numerous violations committed by economic sectors and individuals
- SWA established three breeding centers located in Ta'if, Al-Qassim and Thumamah

Numerous fauna species became extinct
656 flora and 111 fauna species are threatened


Asiatic Lion


Onager


Asiatic Cheetah


SaudiGazelle


Arabian Oryx (being reintroduced)


Aries


Spiny-Tailed Lizards

Threatened | Extinct

Birds are threatened

- The Kingdom hosts 432 bird species and is an important birds pathway crossed by about 3 billion migrating birds annually
- 12 million birds are hunted each year in the Kingdom


Houbara

Diagnostic of the marine & coastal ecosystems domain

The marine and coastal environment in the Kingdom is endowed with a rich biodiversity encompassing 1280 fish species, 44 shark species, 317 coral species, 113 avifauna species, and more than 2000 mollusks species

Main Pressure on the Domain

- Reclamation and dredging
- Development of Marine Transport and industrial plants on the coastline
- Solid and liquid wastes
- Bad practices in fishing and growth of acquaculture

Marine and coastal ecosystems are degrading

- Mangroves decreased by 75% between 1985 and 2013
- Reclamation, dredging and fishing practices destroyed a lot of coral reefs
- The oil spills during the Gulf War affected mangroves, saltmarshes and seaweed

Bleached Corals

Marine & coastal fauna are threatened

- Sharks are threatened by the shark fin market
- Three fish groupers are overfished
- Butterfly fish and angelfish (ornamental fish) are threatened by increased global demand

Sea Turtle

Dugong

Focus areas of best practices in wildlife

Terrestrial Ecosystems | **Marine & Coastal Ecosystems** | Land & Desertification | Air Quality | Climate Change | Water Resources | Waste Management & Chemical Safety | Meteorology

Lessons learned from the analysis of global best practices

Focus Areas of Best Practices	Key Initiatives	KSA Performance
Conservation of Habitats and Species	Expand and manage protected areas, and maintain habitats and biomes outside protected areas through the propagation and re-launch of threatened species	**Weak**
Sustainable Use of Resources	Promote ecotourism and its activities, including water sport facilities, desert resorts and others	**Weak**
Pollution Prevention and Control	Develop and implement plans to prevent and respond to all types of pollution by monitoring development activities in ecosystems, developing pollution control plans, etc.	**Weak**
Rehabilitation of Degraded Sites	Rehabilitate degraded sites through habitat reconstruction, coral reef rehabilitation, etc.	**Weak**
Climate Change Adaptation	Assess the impacts of climate change on ecosystems (coastal vulnerability index, etc.) and develop action plans to adapt to climate change	**Weak**

Diagnostic of the lands & desertification domain

Main Pressures on the Domain

- Grazing and logging
- Mining and quarrying
- Recreational activities and urban development
- Bad practices in agriculture
- Drought

Rangelands
73% of the Kingdom surface (146 Million Ha)

- 70% of rangelands are affected by desertification and considered average to extremely degraded
- Rangelands suffer from a widespread erosion intensified by drought

Forests
1.1% of the Kingdom surface (2.1 Million Ha)

- 6,500 ha are affected annually by disturbances caused by pests and diseases
- Juniper forests are increasingly affected by dieback
- Forests suffer loss of tree cover and plant diversity: Al-Bahah governorate faced 10% loss of Juniperus woodlands between 1984 and 2014
- Invasive alien species are continually increasing and reached 52 species

Agricultural Areas
1.7% of the Kingdom surface (3.42 Million Ha)

- While arable lands cover 3.42M ha (1.7% of KSA), 1.18M ha (0.6% of KSA) are used for agriculture
- 40% of agricultural land suffer from salinity due to improper irrigation methods
- 67% of agricultural land suffer from soil erosion due to wind

Focus areas of best practices in land & desertification

Lessons learned from the analysis of global best practices

Focus Areas of Best Practices	Key Initiatives	KSA Performance
Rangeland Management	Monitoring and evaluation of rangeland, rehabilitation of degraded pastures, stabilization of sand dunes, reduction of overgrazing through grazing, etc.	**Weak**
Forest Management	Afforestation and reforestation, integrated pest management, fire prevention and control through pruning, firebreaks and others	**Weak**
Sustainable Agricultural Practices	Promotion of organic farming, proper management of dams, and regulation of the use of pesticides and fertilizers in agriculture	**Moderate**
Drought Preparedness and Mitigation	Strengthening drought monitoring systems and early warning systems, developing a drought response and mitigation plan (restrictions on development activities, etc.)	**Weak**
Responsible Mining and Quarrying	Development of procedures for selecting the appropriate location and technology for mining and quarrying activities and for rehabilitation of sites (gradual rehabilitation, etc.)	**Weak**

Diagnostic of the air quality domain

Main Pressures on the Domain

- Increased emissions from the energy and industry sector
- Increased density of cars especially in large cities
- Fugitive emissions
- Dust storms

Facts Related to Emissions and Air Quality

- The sector suffers from ineffective monitoring of stack emissions and ambient air quality
- Reported air quality data is incomplete and not reliable and there is no monitoring of emissions sources (Source Emissions Monitoring & Inventory)
- **NO_2 concentrations are** below GAMEP standards in Riyadh (95 µg/m³ vs. 100), but **way above WHO** standards (40 µg/m³)
- **Ground level ozone** yearly exceedances are high in **cities like Riyadh** (160 µg/m³)
- **Exposure to SO_2 in major cities remains within acceptable** limits
- **$PM_{2.5}$ concentration is high in major cities**: 71 µg/m³ in Riyadh vs. a GAMEP standard of 15 and a World Bank standard of 10 (Note: $PM_{2.5}$ is mainly associated to anthropogenic sources whereas PM_{10} is mainly associated to natural sources such as sand storms)

Diagnostic of the climate change domain

Main Pressures on the Domain

- The steady growth in energy consumption:
  - Electricity
  - Transportation
  - Industry
  - Desalination
- Emissions from landfills

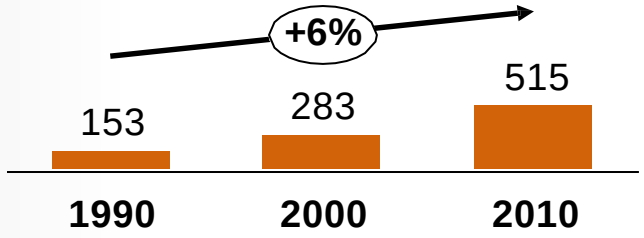
Facts Related to Climate Change

Establishment of the CDM National Committee which Successfully Fulfilled its Duty Including:

- Effectively participating in international negotiations
- Defending the global oil market and mitigating the economic impact of decisions related to climate change

Increase of Greenhouse Gas Emissions

(Million tons of $CO2_{eq}$; Source: First, Second, and Third National Communication)



Initiatives to Reduce Emissions by 130 Million Tons of $CO2_{eq}$ by 2030

- Reducing industrial emissions
- Transitioning to renewable energy
- Driving energy efficiency by reviewing building codes and electrical appliances' standards, expanding district cooling,…
- Developing public transportation (e.g., metro, buses)

Weak Understanding of the Impacts of Climate Change in KSA

Climate Change Adaptation not Mainstreamed into National Strategies

Potential Impacts of Climate Change on:

- Water Resources
- Desertification and Wildlife
- Health
- Infrastructure and Economic Sectors (e.g., agriculture)

Focus areas of best practices in air quality & climate change

Terrestrial Ecosystems | Marine & Coastal Ecosystems | Land & Desertification | Air Quality | **Climate Change** | Water Resources | Waste Management & Chemical Safety | Meteorology

Lessons learned from the analysis of global best practices

Focus Areas of Best Practices	Key Initiatives	KSA Performance
Transitioning to Renewable Energy	Gradual transformation towards renewable energy through the establishment of solar power plants, wind farms and others	**Weak**
Optimizing Ground Transportation	Enhance the efficiency of the transport sector by promoting mass transport such as metro and buses	**Weak**
Reducing Industrial Emissions	Adopt equipment to reduce emissions from power and water plants, and incentives to apply more effective measures in the industrial sector	**Moderate**
Reducing Vehicles Emissions	Improve fuel quality and provide incentives to use environmentally friendly mechanisms	**Weak**
Increasing Green Areas	Allocation of sites for parks and forests, establishment of green belts, and increasing green areas	**Weak**

Diagnostic of the water resources domain

Main Pressures on the Domain

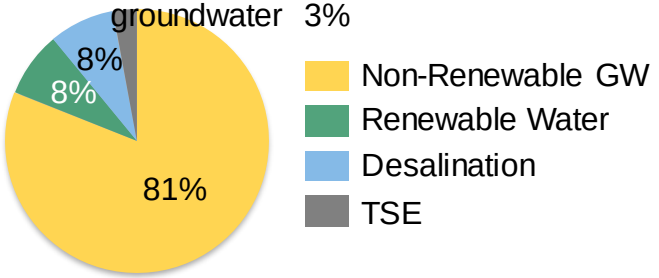
- Increased consumption of non-renewable water resources by:
  - Agriculture sector
  - Municipal sector
  - Industry
- Growing sources of water pollution

Human activities are contributing to water pollution and pollution monitoring is weak

- **Gas Stations**
- **Waste**
- **Wastewater Systems**
- **Solid and Liquid Industrial Waste**
- **Wells**
- **Agriculture**

Groundwater is suffering from over-abstraction

- KSA's high water consumption is driven by agriculture (84% of total consumption)
- KSA relies heavily on groundwater



- Illegal wells are proliferating
- Groundwater abstraction is not properly monitored
- Limited water reuse (17%) results in TSE being dumped into the sea and in valleys
- Total exploitable KSA groundwater resources are estimated at 1,180 B m^3, equivalent to 60 years of consumption at actual rates

Focus areas of best practices in water resources

Lessons learned from the analysis of global best practices

Focus Areas of Best Practices	Key Initiatives	KSA Performance
Optimizing Management of Conventional Water Resources	Diversify the mix of water resources and prioritize their use, and take action to monitor the abstraction of groundwater resources	Moderate
Monitoring and Preventing Pollution	Monitoring pollution from human activities and waste management, and adopting measures to reduce water pollution	Weak
Increasing Wastewater Service and Reuse	Improve wastewater treatment and gray water and promote re-use	Moderate
Curbing the Municipal and Industrial Demand	Reduce consumption of households and industrial and commercial activities through rationalization initiatives and policies and revision of tariffs	Moderate
Curbing the Agricultural Demand	Reducing water demand in agriculture through the proper management of food safety, improving crop composition and developing infrastructure to ensure irrigation efficiency	Moderate

Diagnostic of the waste management domain

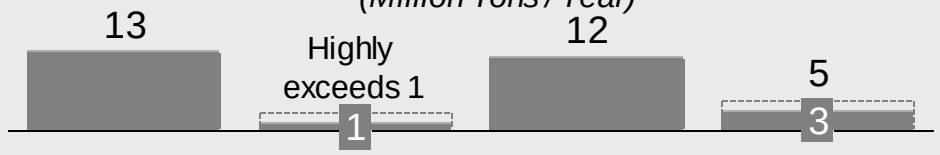
Challenges in Waste Management

- Shortage in monitoring waste collection, treatment, and disposal
- Municipal waste not segregated at source which hinders recycling and leads to large biodegradable waste quantities being landfilled instead of composted: For instance, the municipal waste in Riyadh is approximately 55% organic
- Non-regulated recycling sector and low recycling rates : Around 90% of municipal waste is disposed of in landfills or dumpsites and the remaining 10% is recycled
- Non compliance of 97.3% of landfills: EIA studies are not conducted, technologies do not meet the standards, landfills are lacking methane collection and leachate treatment which results in environmental pollution (e.g., groundwater pollution)
- Treated industrial hazardous waste is estimated to be 16% in 2016
- Large quantities of CDW are dumped illegally in undeveloped lands outside cities
- Lack of accurate national or regional data

A committee designated by His Royal Highness is currently developing the institutional setting for the waste sector along with the required enablers; the committee includes representatives from the Ministry of Economy and Planning, the Ministry of Environment, Water and Agriculture, the Ministry of Municipal and Rural Affairs and other relevant entities

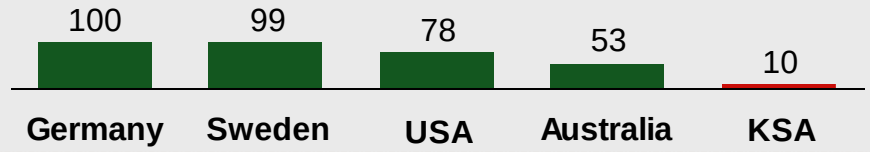
Quantity of Waste Generated by Type

(Million Tons / Year)



Diversion Rate from Landfills (including recycling and conversion to energy)

(% of Collected Municipal Solid Waste)



Diagnostic of the chemical safety domain

Challenges in Chemical Safety

- Absence of a national database covering chemicals across their value chain:

Production / Import → Transportation → Storage → Usage → Disposal

- Lack of emergency readiness plans for addressing chemical accidents
- Weak compliance with ratified international treaties
- Lack of guidelines and procedures for handling chemical substances
- Lack of systematic inspections of facilities storing and using chemicals
- Lack of awareness of safe transport guidelines, and weak ability to respond to incidents occurring during the transportation of hazardous chemicals
- Non-compliance with requirements pertaining to the transportation of hazardous chemicals (e.g., drivers not qualified)

- The initiative aims to achieve the safe management of chemical substances
- Key stakeholders include: MEWA, MOI, GAMEP
- Key responsibilities include:
  - Development of a central database for chemical substances
  - Development of an emergency plan
  - Activation of ratified international treaties
  - Elaboration of standards and guidelines for transportation and storage of chemical substances
  - Institutionalize systematic inspections
  - Development of guidebooks for chemical substances

Focus areas of best practices in waste management & chemical safety

Lessons Learned from the Analysis of Global Best Practices

Focus Areas of Best Practices	Key Initiatives	KSA Performance
Waste Generation	Reduce the production of all types of waste by providing incentives or charging the generated quantity and by imposing standards for packaging materials and methods	**Weak**
Waste Collection	Improve waste collection and sorting procedures from the source to facilitate recycling and treatment	**Weak**
Diversion from Landfills	Reduce random disposal and drive diversion of waste from landfills through reuse, recycling or recovery of materials or energy	**Weak**
Chemical Safety	Establish a system for the follow-up of chemicals through the stages of production, import, transport, storage and use and develop procedures and standards to mitigate related risks	**Weak**

Diagnostic of the meteorology domain

Services and Technology

- The meteorological sector is currently meeting the Kingdom's basic needs

Services

Public Safety &Awareness	**Aviation**	**Defense**	**Maritime**
Climate Change Scenarios	Agriculture	Water	Energy
Ground Transportation	Media	Insurance & Claims	Offshore

- Services cover about 32% of the Kingdom's area - *excluding the Empty Quarter* - with a resolution ranging between 6 x 6 km^2 and 2 x 2 km^2
- The network consists of weather stations, observatories, radars, and wind shear stations
- The system can accurately forecast the weather for up to 5 days

Available | Not Available

Human Capabilities

- Employees' affiliation to Meteorology and Environment within GAMEP is unclear
- Critical functions (e.g. modeling) are understaffed and recruitment plans are absent
- The General Relations Department focuses on environmental awareness at the expense of the promotion of meteorological services

Focus areas of best practices in meteorology

Lessons Learned from the Analysis of Global Best Practices

Focus Areas of Best Practices	Key Initiatives	KSA Performance
Data Acquisition	Establish meteorological stations, air quality stations, radar stations and rely on satellite imagery. Develop communication networks and establish information management and analysis centers	**Weak**
Modeling and Data Analysis	Develop modeling capabilities through infrastructure development and development of meteorological forecasting systems	**Moderate**
Service Provision	Analysis of the market for meteorological services, identification of appropriate services for the local market, development of information platforms and electronic applications to provide meteorological services to the public and customers	**Weak**

Challenges under the current institutional setting and lessons learned from best practices

Challenges for the Current Institutional Setting

Fragmentation of Responsibilities, Overlap and Lack of Ownership

- Stacking and overlapping of tasks
- Absence of actors responsible for key roles

Siloed Operations

- The multiplicity of issuers of regulations and weak coordination
- Limited effectiveness due to duplication of initiatives

Lack of Performance Monitoring

- Limited focus on performance monitoring
- Potential conflicts of interest

Distraction from Core Activities

- Focus on meteorology at the expense of environmental protection
- Weak focus on implementing strategies and plans

Ineffective International Cooperation

- Weak international representation and negotiation coordination
- Lack of follow-up on compliance with treaties

Potential Solutions Based on Lessons Learned from Best Practices

- Limit the development of policies, strategies and regulations to the Ministry
- Assign the responsibility for operational tasks such as meteorology, environmental licensing, environmental compliance monitoring, forest management, protected area management, rangeland management, etc. to specialized governmental entities with regional ramifications. The entities are affiliated to the Ministry
- Assign responsibilities for internal coordination and sector performance monitoring to the Ministry
- Assign responsibilities for international cooperation to the Ministry. The Ministry draws on relevant expertise within and outside the sector to achieve its remit

Challenges under the current policies & regulations and lessons learned from best practices

Analysis of Current Regulations

Based on an analysis of 106 environment-related regulations and standards

- High number of policy makers and lack of coordination
- Complexity and difficulty in applying regulations
- Fines are generally low and non-deterrent
- Ambiguity of some regulations (e.g., "areas surrounding reserves" are not defined)
- Omission of certain activities and standards (e.g., lack of regulations for off-road activities or regulations for integrated water resources management, lack of criteria for the confiscation of species products, lack of standards for mining, lack of standards for the treatment of certain solid waste types such as tires and electronic materials)
- Regulations do not address the relation with industrial cities (e.g., RCJY) and large enterprises
- Regulations do not detail basic processes such as licensing, environmental inspection, penalties. Some of procedures are inadequate (e.g., declaration of protected areas)
- Regulations do not cater for private sector participation
- With the exception of climate change, the KSA fails to meet its international commitments

Potential Solutions Based on Lessons Learned from Best Practices

- Rely on a single regulating authority for environment
- Develop a comprehensive environmental regulation to ensure consistency
- Cater for private sector participation
- Determine the roles and responsibilities of the players in the sector and in the economic sectors
- Detail the key processes such as licensing, environmental inspection and seizure
- Develop comprehensive and integrated standards and put in place mechanisms for periodic reviews
- Adopt deterrent and strict penalties

Challenges under the current policies & regulations and lessons learned from best practices

Key Challenges in Environmental Compliance Monitoring

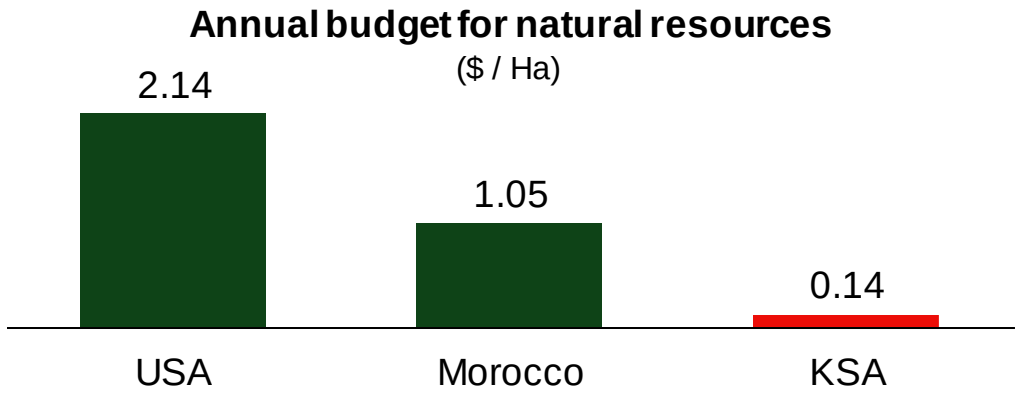
NON-EXHAUSTIVE

- Weak Environmental Impact Assessment studies and weak monitoring of their application
- Inadequate processes for licensing
- Inadequate work procedures and guidelines for environmental inspection
- Limited headcount assigned to environmental inspection
- Shortage in specialized inspection workforce
- Limited technical capabilities for field and remote environmental compliance monitoring: Environmental inspection relies mostly on visual inspection
- Lack of automation: lack of IT systems to manage inspection work
- Low and non-deterrent fines
- Inadequate processes for managing penalties

Challenges under the current economic framework and lessons learned from best practices

Economic Challenges in the Environment Sector

- Low budget for the environment sector, example:



- Sector entities are not empowered to collect revenues; this situation hinders sector development
- Absence of environmental fees for sectoral activities
- Lack of incentives encouraging environmental compliance (e.g., soft loans for projects leading to environmental benefits)
- Absence of frameworks for private sector participation (e.g., in the waste sector and in activities related to environmental compliance monitoring)
- Existence of subsidies for sectors affecting the environment (e.g., water, electricity, gasoline and agriculture)

Potential Solutions Based on Lessons Learned from Best Practices

- Finance the environment sector through violations fees and the collection of fees for permits, products and services. Leverage revenues to develop the environment sector
- Provide direct government support to the environment sector in order to bridge gaps between the sector's requirements and its revenues
- Provide financial incentives and facilities to economic sectors (e.g., decrease custom fees, offer low-interest loans) and reduce taxes on environmental investments
- Increase incentives to support private sector participation in providing environmental and meteorological services
- Reduce subsidies to sectors that constitute pressures on the environment impact

Challenges related to the existing capabilities in the sector and lessons learned from best practices

Analysis of Current Human and Technical Capabilities and Research & Development

- Shortage in workforce in the environment sector: 241 GAMEP employees, most of which work in administrative function, are affiliated to environment, but the number of facilities to be controlled is estimated at tens of thousands
- Shortage in specialized workforce
- Weak ability of the sector to attract adequate talent
- Limited technologies for environmental monitoring
- Absence of work procedures
- Limited research and development activities despite the specificity of the Kingdom in terms of particulate matter issues (PM2.5 and PM10), desertification and climate change

Potential Solutions Based on Lessons Learned from Best Practices

- The sector relies on diverse competencies and employs engineers, scientists, technicians, communication experts and economists
- The sector relies on advanced technologies such as real-time monitoring, data management and analytics
- The sector relies on field devices and laboratories for environmental compliance monitoring
- The sector adopts technologies for natural resources' conservation
- Research and development should focus on the specific challenges of the Kingdom to drive improvement in sector performance
- Work procedures are essential to achieve agility, effectiveness and efficiency in the operations

Challenges related to the existing performance management frameworks and lessons learned from best practices

Current Challenges Related to Performance Management

- Weak implementation capability (e.g., environmental inspection program, management of rangelands, forests and protected areas) due to limited financing, and to gaps in human capabilities
- Weak performance monitoring and weak compliance of economic sectors due to overlap in responsibilities, conflict of interests and to the absence of an entity tasked with sector oversight

Potential Solutions Based on Lessons Learned from Best Practices

- The Ministry is responsible for sector coordination and for performance monitoring
- A Strategy Management Office (SMO) is responsible for driving the implementation of strategies, and initiatives. The SMO relies of IT tools to monitor the implementation
- Leading and lagging Key Performance Indicators are needed to track implementation and to rectify the course when needed
- Change management is a key element for a successful transformation

Total annual cost of environmental degradation

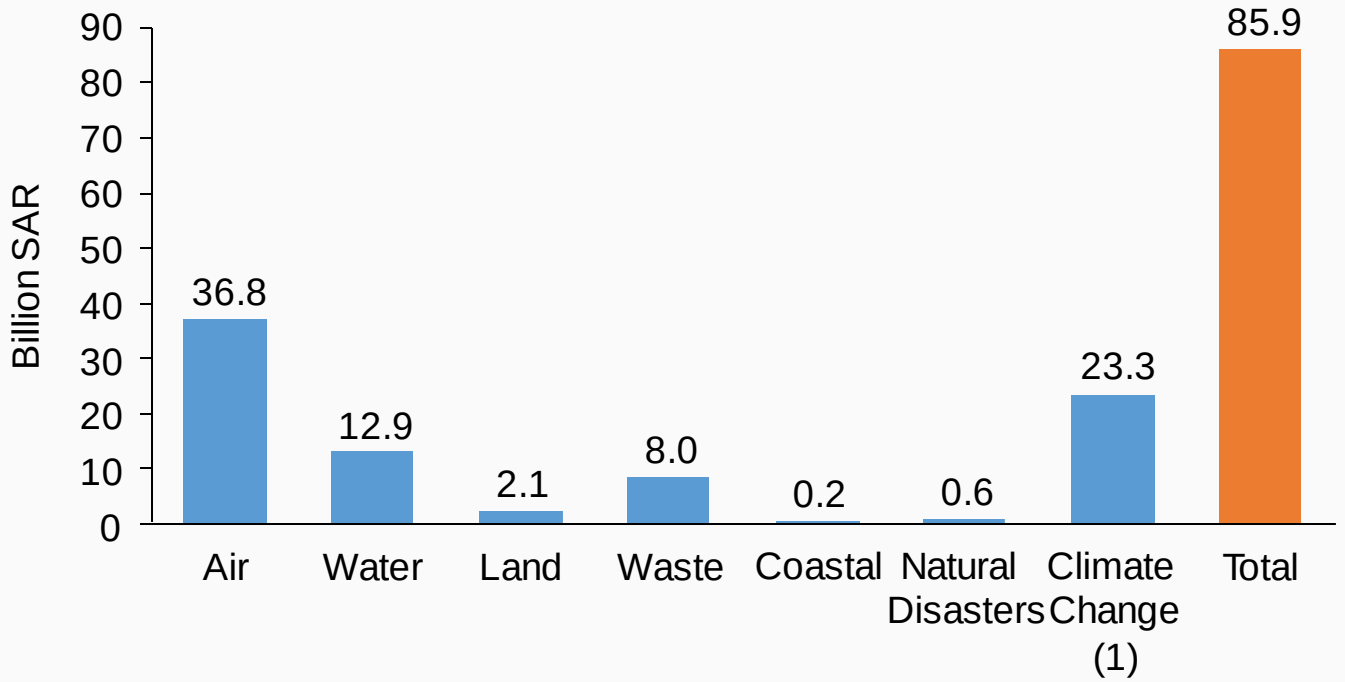
The total annual cost of environmental degradation is estimated at SAR 86 Billion in 2014, equivalent to 3% of GDP *

Main sources of environmental degradation:

- Air pollution
- Water scarcity and pollution
- Strain on land resources
- Unsustainable waste management
- Insufficient conservation of coastal resources
- Damage caused by natural disasters
- Poor energy efficiency and limited reliance on renewable energy

- **48%** of total damage (equivalent to 1.5% of GDP) is attributable to deterioration of health and quality of life
- **52%** of total damage (equivalent to 1.6% of GDP) is attributable to natural resources' degradation

The Cost of Environmental Degradation in 2014



(1)Global damages associated to Climate Change (CC) include floods, sea-level rise, droughts, declining food production, species extinction, species migration, etc.

*Based on a World Bank Study

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Questions considered for the design of the KSA environment and meteorology sectors

Environment Sector

- **1a** What entities are responsible for policy making, planning, regulation development and operation?
- **1b** What are the key executive roles and what is the optimal distribution for these roles?
- **1c** Is there a need for the Saudi Environment Council?

Meteorology Sector

- **2a** Is it better to combine environment and meteorology or to separate these two sectors?
- **2b** What is the recommended operating model for the meteorology sector?

Distribution of roles in the environment sector

1a What entities are responsible for policy making, planning, regulation development and operation?

Key Roles	Responsible Entity	Justification
Development of policies, strategies and regulations for the environment sector	Ministry of Environment, Water and Agriculture	▪ Role should be undertaken by a governmental entity ▪ The entity should not be responsible for operational roles that might lead to conflicts of interests
Licensing, compliance monitoring, wildlife conservation, vegetation cover conservation, combatting desertification	The centers affiliated to MEWA *(details provided in next slide)*	▪ These roles require agility and specialization in order to cover a large number of facilities and large area of rangelands, forests and protected areas ▪ For the effective enforcement of regulations, the entities responsible for these roles should be public entities
Support the public sector in licensing, compliance monitoring, wildlife conservation, vegetation cover conservations and combating desertification	Private environment service providers	Due to the large number of facilities and the vast area of rangelands, forests and protected areas, the public sector relies on the private sector to perform its tasks

This model is aligned with international best practices:

Constituents of the environment sector institutional setting

1b What are the key executive roles and what is the optimal distribution for these roles?

National Environmental Priorities

Biodiversity conservation	Development of the vegetation cover and combatting desertification	Environmental compliance

Proposed Execution Apparatus

National Center for Wildlife Conservation	National Center for Development of the Vegetation Cover and Combating Desertification	Environmental Compliance Center

The proposed model relies on specialized executive entities with high capabilities and clear responsibilities linked to national environmental priorities

Environment Council

Development of Policies, Strategies, and Regulations

Based on the proposed institutional setting, responsibilities were transferred to the Ministry of Environment, Water, and Agriculture

Coordination with Economic Sectors

This role can be achieved more efficiently through sectoral coordination committees overseen by the Ministry

49 out of the 50 top performing countries from an environmental standpoint have a Ministry of Environment

The US has no Ministries, as a result environmental responsibilities fall under the Environment Protection Agency

Environment Councils prevail in countries where environmental matters are not properly represented in the government, however this model was not successful

The Environment Councils in the KSA and in Morocco were only held a few times and have been ineffective in achieving their remit

The strategy recommends the abrogation of the Council and the transfer of its functions to the Ministry

- **Council members' interests conflict with environmental interests leading to deadlocks - majority of members represent regulated sectors**
- **The Environment Council creates redundancy within the current Government structure, particularly with the Council of Ministers and its supporting Bureau of Experts**
- **Assigning environmental responsibilities to the Ministry enhances the effectiveness of decision-making, strategy development and regulation enactment**
- **Assigning environmental responsibilities to the Ministry ensures ministerial level representation for environmental matters and enhances supervision of the environment sector**
- **This recommendation is aligned with best practices**

Recommendation to transfer the role of the Environment Council related to national coordination to sectorial committees reporting to MEWA

1c Is there a need for the Saudi Environment Council?

Sectorial Coordination Committees	
The Committee for Environmental Performance of the Energy Sector	The Committee for Environmental Performance of the Industry Sector
The Committee for Environmental Performance of the Transportation Sector	The Committee for Environmental Performance of the Agriculture Sector
The Committee for Environmental Performance of the Mining Sector	The Committee for Environmental Performance of the Water Sector
The Committee for Environmental Performance of the Municipal Sector	

Key Points

- The committees are part of MEWA's monitoring and coordination apparatus; it contributes to monitoring environmental performance of economic sectors and to coordination with these sectors through the engagement of compliance monitoring and licensing entities
- The committees are headed by the Ministry's Environment Deputy-Ministry to ensure that there is no conflict of interest. Environmental centers, licensing bodies and operators are represented in the committees
- Main objectives of the sectoral committees:
  - Monitoring of economic sectors' environmental compliance and trends
  - Identifying the challenges faced by economic sectors in the context of their implementation of environmental regulations
  - Proposing and implementing solutions to address the challenges of the economic sectors
- Each committee holds a minimum of two regular meetings per year to review environmental compliance and performance of each sector. Extraordinary sessions can be held when needed

Assessment of the Possibility of Privatizing Meteorological Services

We recommend not to privatize the meteorological center given that it is responsible for the delivery of sovereign services and that it relies on government support

In line with the international best practices, including the most liberal economies, basic and sovereign meteorological services that are related to safety and security fall under the responsibility of the public sector

The military **relies heavily on precise weather and climate information** in their operations that range from air and marine operations to basic troop movement and provisioning needs. **Meteorology is thus directly linked to national security** and outsourcing it to **an independent third party represents a considerable risk factor**

Basic weather and climate information, general public forecasts and warnings of severe weather and climate events are **usually seen as a basic community necessity and right**; provision of the basic service is generally accepted as a fundamental responsibility of government

Operation of the meteorological infrastructure falls under the responsibility of the public sector

Government Financing

The multiplicity of meteorological infrastructure is inefficient due to high Capex and the need to integrate the system

Percentage of government funding for the most prominent meteorological services based on a sample of 72 countries

General Services and Alarm	80%	Agricultural Services	73%
Aviation Services	45%	Climate Services	60%
Defense Services	78%	Consulting Services	50%
Marine Services	72%	Others	38%

Recommendation to establish the National Meteorological Center as a standalone entity

2a Is it better to combine environment and meteorology or to separate these two sectors?

Proposed Model	Meteorological activities are conducted by a separate dedicated entity (unbundled from environment protection) ▪ The meteorology entity provides modelling services to the environment protection entity ▪ Weather network data and air quality network data is shared through a platform
International Best Practices Following the Proposed Model	

Specificities of the Proposed Model

- Ensures that meteorology services are provided at arm's length from all beneficiaries
- Increases accountability and transparency in resource allocation and performance monitoring
- Increases focus on both environment (activities requiring significant development) and meteorology (mature activities) resulting in better service
- Ensures focus on proper planning, deployment and O&M of the air quality network and the weather network
- Isolates meteorology from the transformation in the environment sector

We recommend to separate meteorology from environment and to establish the National Meteorological Center as a specialized center that is affiliated to the Ministry of Environment, Water and Agriculture

Distribution of roles in the meteorology sector

2b What is the recommended operating model for the meteorology sector?

Key Roles	Responsible Entity	Justification
Development of policies, strategies and regulations for the meteorology sector	**Ministry of Environment, Water and Agriculture**	▪ Role should be undertaken by a governmental entity ▪ The entity should not be responsible for operational roles that might lead to conflicts of interests
Management of the meteorology infrastructure	**National Meteorological Center**	The responsibility for operating the infrastructure falls under a public operating entity: ▪ Duplication of meteorology infrastructure is not useful given the need for an integrated system and the need to optimize costs ▪ The need for strict adherence to international standards requires long-term investments and direct control and operation of infrastructure by public entities
Delivery of basic meteorological services *(e.g., services related to safety and security)*	**National Meteorological Center**	In line with best practices (including liberal countries), the responsibility for basic and sovereign meteorological services falls under the responsibility of a public entity: ▪ Basic weather and climate information, general public forecasts and warnings of severe weather events are usually seen as a basic community necessity and right ▪ Meteorology is directly linked to national security: The military relies heavily on precise weather and climate information in their operations
Delivery of specialized meteorological services	**Private meteorological service providers**	The core skills, objectives, and comparative advantages of private weather companies and the National Meteorological Center are complementary The private sector is distinguished by its flexibility and ability to innovate and identify new meteorological services, to market specialized services and to use advanced technologies The National Meteorological Center can benefit from the revenues generated by services that incorporate their primary data, through royalties or fixed fees

The proposed institutional setting: Environment and Meteorology Sectors

NON-EXHAUSTIVE

Ministry of Environment, Water and Agriculture

- Develop policies, strategies, regulations, standards and studies
- Coordinate implementation of environmental strategies and monitor KSA's environmental performance
- Manage international representation
- Manage national coordination with civil society, NGOs and economic sectors
- Ensure environmental mainstreaming
- Drive efforts towards achievement of sustainable development goals
- Drive environmental awareness
- Drive environmental research and development

Environmental Compliance Center

- Ensure proper application of regulations and standards
- Deliver permits and licenses
- Monitor quality of environmental media
- Engage the private sector to perform relevant tasks such as compliance inspection
- Ensure environmental compliance
- Drive rehabilitation and restoration efforts
- Report performance

National Center for Development of the Vegetation Cover and Combating Desertification

- Ensure proper application of regulations and standards
- Protection and development of forests
- Sustainable management of rangelands and national parks
- Drive rehabilitation of vegetation cover and afforestation efforts
- Engage the private sector to perform relevant tasks
- Fulfill relevant international commitments
- Report performance

National Center for Wildlife Conservation

- Ensure proper application of regulations and standards
- Plan, designate, and manage protected areas
- Protect habitats, ecosystems and species
- Manage breeding centers
- Fulfill relevant international commitments
- Engage the private sector to perform relevant tasks
- Report performance

National Meteorological Center

- Ensure proper application of regulations and standards
- Develop and operate a network of meteorological stations
- Collect data, run simulations and issue meteorological and air-quality reports
- Conduct climate studies
- Share meteorological data with third-party entities
- Commercialize services and data
- Engage the private sector
- Report performance

Design Philosophy of the Proposed Institutional Framework

Consolidate tasks related to performance monitoring, policy development, strategies and regulations under one single ministerial entity

Separate operational responsibilities from regulatory ones and assign operational responsibilities to empowered executive centers affiliated to the Ministry

Assign each of the environment sector and meteorology sector's national priorities to one specialized executive center in order to guarantee focus on each national priority

Drive private sector participation

The proposed institutional setting: Interaction with the private sector, with NGOs and with other economic sectors

NON-EXHAUSTIVE

Sectorial Ministries

- Mainstream environmental strategies and objectives into economic sectors
- Drive environmental compliance
- Develop and adopt innovative solutions and technologies
- Report environmental data

Civil Society and NGOs

- Undertake advocacy actions
- Conduct awareness and educational campaigns
- Contribute to environment protection and nature conservation initiatives

Environmental Service Providers

- Support MEWA and subordinate entities in fulfilling their roles through the provision of environmental services (e.g., permitting, inspection)

Research Institutes

- Secure funding for research and development
- Collaborate with global research institutes
- Conduct research and development

National Committee for the CDM

- Manage the Clean Development Mechanism
- Mainstream climate change initiatives into all economic sectors
- Report performance

Economic Sectors

- Comply with environmental regulations
- Conduct awareness campaigns
- Report environmental data

Success Factors for the Proposed Institutional Setting

1. Ensure the economic independence and the economic sustainability of environmental entities
2. Development of an agile operating model for the environmental entities
3. Design of a competitive salary scale for the environmental entities
4. Empower the Environmental Compliance Center to monitor all economic sectors

Benefits of the Proposed Institutional Setting

Current Challenges	Benefits of the Proposed Institutional Setting	
Fragmentation of Responsibilities, Overlap and Lack of Ownership	Clear Role Distribution	Sector roles are adequately allocated to sector entities to ensure comprehensive coverage and lack of overlap
Siloed Operations	Coordination at the Ministry Level	The Ministry ensures sector coordination
Lack of Performance Monitoring	Performance Monitoring Driven by Ministry	The Ministry develops policies, strategies, and targets; it also monitors implementation and sector performance
Distraction from Core Activities	Specialization and Focus of Agile Entities	Proposed setting drives specialization and focus of entities on their mandate and promotes agility through the engagement of public entities and the private sector
Ineffective International Cooperation	Effective International Cooperation	The Ministry is the focal point for international cooperation; it relies on technical support from the relevant affiliated environmental entities

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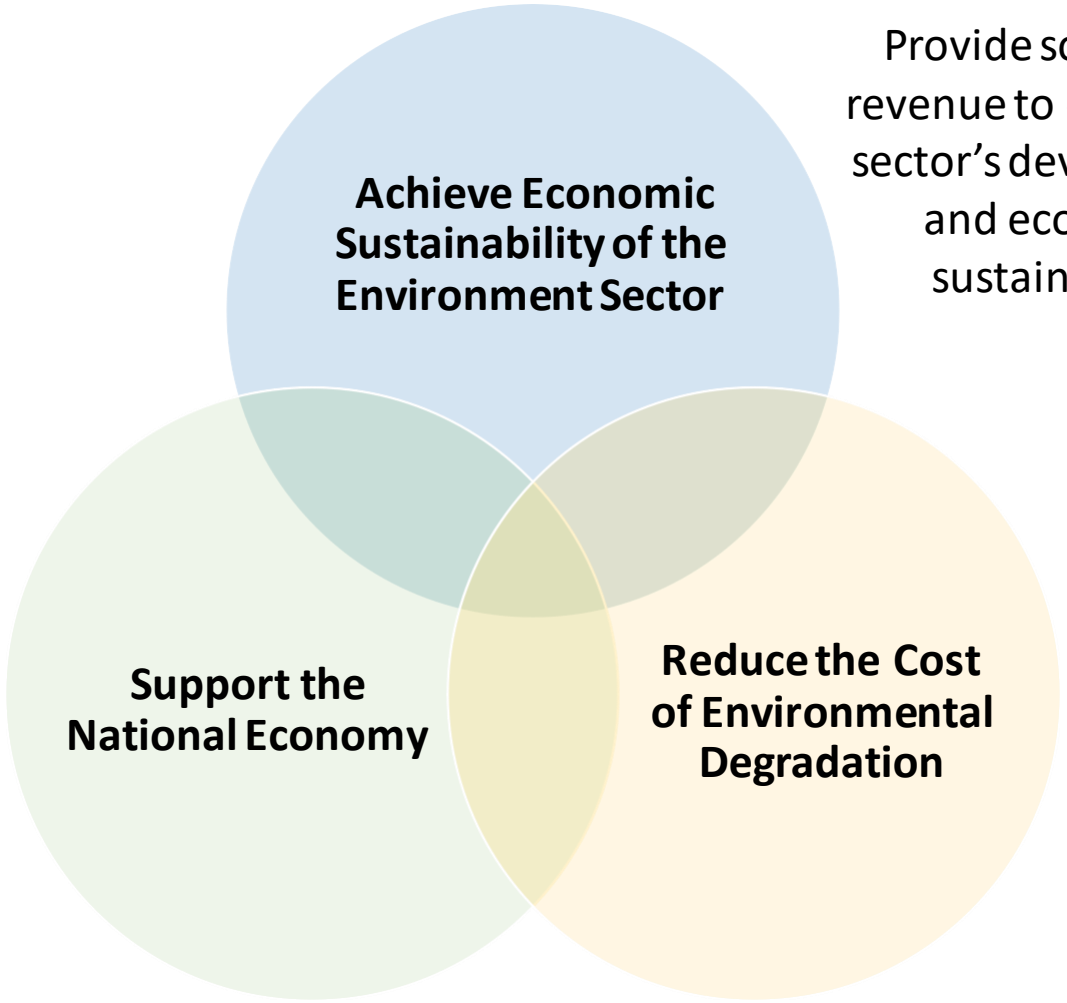
Environment Sector's Economic Aspects



Provide sources of revenue to ensure the sector's development and economic sustainability

Promote private sector participation and create job opportunities

Reduce environmental, public health, and natural resources costs linked to environmental degradation

Establishment of environmental fees to support the sector's economic sustainability

- Enable the sector to collect fees
- Establishment of the Environment Fund to manage revenues in the sector
- Fees aim to recover the costs of the sector. These costs include:
  - Environmental compliance monitoring
  - Inspection
  - Licensing
  - Other activities including program implementation, environmental studies, technical support, research and development

Fee Categories

- Fees for Permits to Operate
- Fees for Permits to Construct
- Fees for Meteorological Services
- Fees for Qualification of Service Providers
- Fees for Hunting Permits
- Fees for Trade of Species
- Revenues from National Parks
- Violation Fees
- Others

Factors for Fee Calculation

Complexity of Operations

Complexity is defined by the type of activities carried out, hazardous material involved, etc.

Emissions and Inputs

This factor takes into consideration the amounts put into and released from the activity (such as emissions, natural resources, etc.)

Site Location

The site location is assessed by its proximity to communities, the type of surface/ground water nearby, etc.

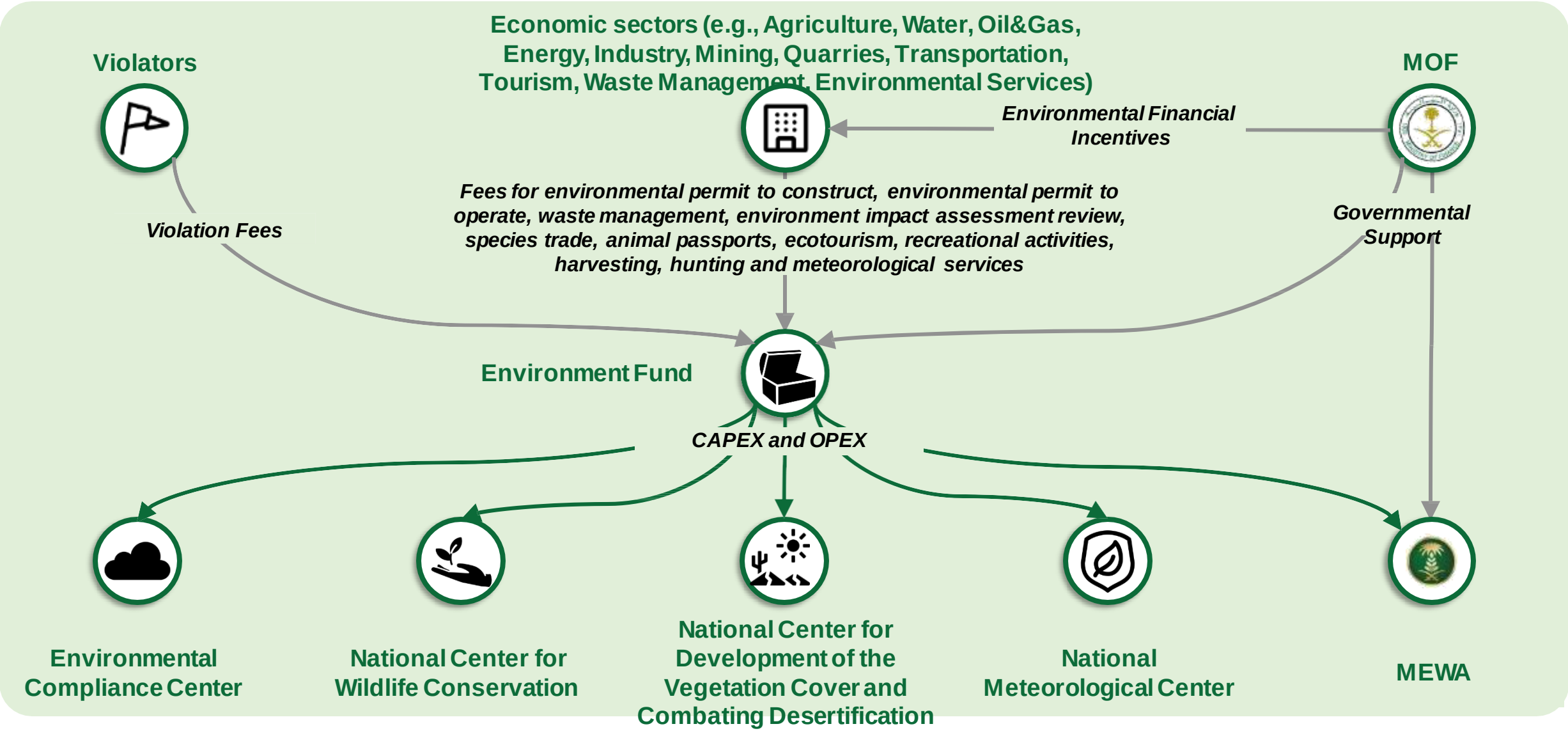
Operator Performance

The operator's performance is reflected in the management systems he has in place to ensure compliance and his enforcement history

Compliance

This factor takes into account the operator's historical compliance with environmental regulations and permit/license conditions

Economic cyle of the environment sector



Economic growth opportunities provided by the environment sector

Activity	Environmental Services	Economic Activities	Awareness, Education and R&D
Opportunities	▪ Environmental service companies (inspection, monitoring, consulting, pollution decontamination, rehabilitation) ▪ Laboratories ▪ Engineering companies ▪ Contractors ▪ Financial institutions	▪ Environmental service companies ▪ Waste management companies ▪ Companies for specialized meteorological services ▪ Financial institutions	▪ Universities ▪ Specialized institutes ▪ Research centers ▪ Media and communication companies

Opportunity to improve the environment in the Kingdom conjunction with:

- The opportunity to develop national capabilities and small and medium enterprises
- The opportunity to develop the educational system, reseach and development capabilities, the engineering sector, the environmental service sector and the financial sector

Propose Privatization Model

A number of local and international companies qualified by the Environment Compliance Center, compete over the provision of environmental services such as inspection

International Benchmarks	
Characteristics of the Proposed Model	▪ Promotes competition in the sector and drives quality improvement and cost reduction ▪ Enhances the bargaining power of the environment sector ▪ Allows access to the services of the most specialized companies ▪ Encourages innovation ▪ Enhances the participation of the private sector ▪ Supports SME development

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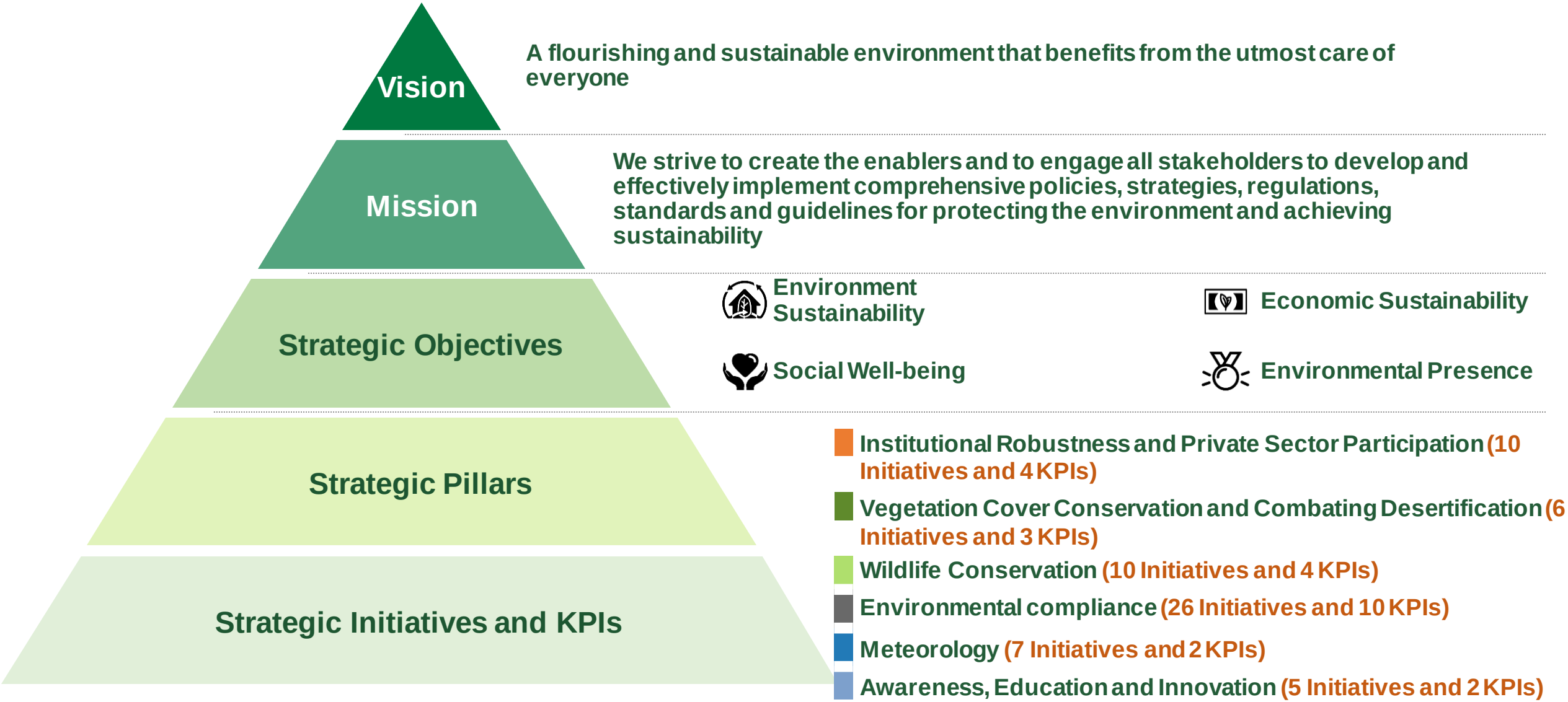
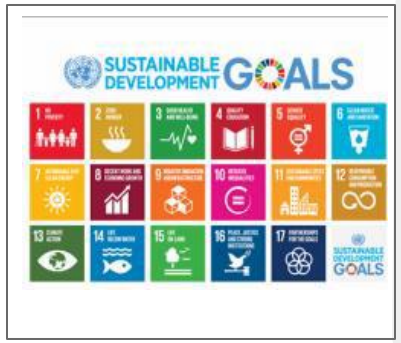
The components of the KSA National Environment Strategy



The strategic objectives for the environment

- Support environmental sustainability through conserving natural resources, minimizing pollution, combating desertification, integrating the environmental agenda in the planning process, and rehabilitating degraded environments
- Establish a robust governance for the environment and meteorology sectors that fosters strong coordination among agile institutions that are technically capable and financially sustainable while engaging the private sector in the provision of cutting-edge environmental services
- Enhance the quality of life for all and maximize resilience to climate change
- Adopt highest ethical standards in governing and operating the environment and meteorology sectors, engage civil society in environmental matters, raise environmental awareness in the Kingdom, and fulfill international commitments

Link between strategic objective and Sustainable Development Goals



Sustainable Development Goals that are Linked to the Environment Strategy	Environmental Sustainability	Economic Sustainability	Social Well-Being	Environmental Presence
3. Good health and well-being			✓	
6. Clean Water and Sanitation	✓		✓	
7. Affordable and Clean Energy	✓	✓	✓	
8. Proper Work for Economic Growth		✓	✓	✓
9. Industry, Innovation and Infrastructure	✓	✓		✓
11. Sustainable Cities and Communities	✓	✓	✓	✓
12. Responsible Consumption and Production	✓	✓	✓	
13. Climate Action	✓	✓	✓	✓
14. Life Under Water	✓	✓	✓	✓
15. Life on Land	✓	✓	✓	✓
16. Peace, Justice and Strong Institutions	✓	✓	✓	✓
17. Partnerships for the Goals	✓	✓	✓	✓

Strategic Pillar Number 1: Institutional Robustness and Private Sector Participation

Strategic Initiatives

SP1.I.01	Implementation of Environment and Meteorology Sectors' Institutional Setting
SP1.I.02	Economic Sustainability of Environment Sector
SP1.I.03	Effective Management of International and Regional Treaties
SP1.I.04	Enactment of Comprehensive Environmental Regulations
SP1.I.05	Enactment of Environment Regulation Enforcement Body (Environmental Police)
SP1.I.06	Assessment of Environmental Economics
SP1.I.07	Development of Advanced Air Quality and Climate Change Standards
SP1.I.08	Development of Advanced Water Quality Standards
SP1.I.09	Enactment of Comprehensive Meteorology Regulations
SP1.I.10	Drive Private Sector Participation in the Environment and Meteorology Sectors

KPIs

	KPI	Baseline	Target (2030)
SP1.K.01	Environment Sector Economic Sustainability	0	90%
SP1.K.02	Meteorology Sector Economic Sustainability	0	50%
SP1.K.03	Percentage of National Strategies that Consider Climate Change Adaptation	TBD	100%
SP1.K.04	Ranking of the Kingdom in the Environmental Performance Index	86	50

Strategic Pillar Number 2: Vegetation Cover Conservation and Combating Desertification

Strategic Initiatives

SP2.I.01	Drought Preparedness and Mitigation
SP2.I.02	Revision and Implementation of the Rangeland Strategy
SP2.I.03	Implementation of the National Forest Strategy
SP2.I.04	Assessment and Remediation of Degraded Sites
SP2.I.05	Development and Implementation of National Plan to Combat Desertification and Reduce Sand Encroachment
SP2.I.06	Establishment of a System for the Development and the Sustainable Management of National Parks

KPIs

	KPI	Baseline	Target (2030)
SP2.K.01	Forest Growth Rate	TBD	TBD
SP2.K.02	Grazing Sustainability	>3.2	1
SP2.K.03	Surface Area of Rehabilitated Sites	18,000 ha	300,000 ha

Strategic Pillar Number 3: Wildlife Conservation

Strategic Initiatives

SP3.I.01	Development of the Comprehensive Framework for Biodiversity Conservation
SP3.I.02	Monitoring Biodiversity
SP3.I.03	Operational Excellence in Ex-Situ Conservation
SP3.I.04	Development of the System for Trading Wild Species and Their Products
SP3.I.05	Planning of Protected Areas
SP3.I.06	Operational Excellence in Managing Protected Areas
SP3.I.07	Operational Excellence in Preserving and Managing Coastal Zones
SP3.I.08	Development of Guidelines for Sustainable Management of Biological Resources
SP3.I.09	Development and Roll Out of a Strategy for a Sustainable Nature-based Tourism
SP3.I.10	Development of a Framework for Organized and Sustainable Hunting

KPIs

	KPI	Baseline	Target (2030)
SP3.1.	Terrestrial Protected Areas (PA) Coverage	4.5%	17%
SP3.2.	Marine Protected Areas (PA) Coverage	TBD	10%
SP3.3.	Protected Biodiversity Hotspots	25%	75%
SP3.4.	Species Genetic Conservation	0%	75%

Strategic Pillar Number 4: Environmental Compliance

Strategic Initiatives

SP4.I.01	Operational Excellence in Licensing, Inspection, and Violations	SP4.I.09	Deployment of Capability for Emissions and Ambient Air Quality Monitoring and Analysis	SP4.I.24	Waste Prevention and Minimization
SP4.I.02	Deployment of an Environmental Emergency Response Capability	SP4.I.10	Deployment of Capability for Ground/Surface Water Quality Monitoring and Analysis	SP4.I.25	Optimization of Waste Collection Service
SP4.I.03	Deployment of the National Environmental Data Center	SP4.I.11	Monitoring of Economic Sectors' Environmental Compliance	SP4.I.26	Waste Treatment and Valorization
SP4.I.04	Mapping of Pollution Sources	SP4.I.12	Decommissioning and Rehabilitation of Dumpsites		
SP4.I.05	Deployment of the Environmental Spatial Planning Capability	SP4.I.13	Revisit and Reactivate the National Program for Chemical Safety		
SP4.I.06	Mapping of Environmental Radiation	SP4.I.14	Development and Roll Out of the POPs1 Assessment and Implementation Plan		
SP4.I.07	Elaboration of a Comprehensive Waste Database	SP4.I.15-I.23	Development and Roll Out of Strategies for Responsible Economic Sectors: Transportation, Desalination, Dam Management, Mining & Quarries, Agriculture, Energy, Industry, Oil & Gas		
SP4.I.08	Development and Roll Out of the Climate Change Adaptation Strategy				

KPIs

	KPI	Baseline	Target (2030)
SP4.K.01	Percentage of Surveyed Area	0%	90%
SP4.K.02	Efficiency of Environmental Compliance Services	TBD	90%
SP4.K.03	Percentage of Licensed Facilities	TBD	100%
SP4.K.04	Percentage of Corrective Actions Completed on Time	TBD	80%
SP4.K.05	Number of Dumpsites in Need of Rehabilitation	TBD	TBD
SP4.K.06	Number of Major Cities Compliant with Air Quality Standards	20	1
SP4.K.07	Percentage of Agriculture Water Consumption out of Total Renewable Water	416%	350%
SP4.K.08	Percentage of Sewage Water Treated in Compliance with Quality Standards	TBD	95%
SP4.K.09	Diversion Rate from Landfills and Dumpsites	TBD	50%
SP4.K.10	Treated and Properly Disposed of Hazardous Waste	TBD	90%

Strategic Pillar Number 5: Meteorology

Strategic Initiatives

SP5.I.01	Development and Roll Out of the Meteorology Marketing Strategy
SP5.I.02	Service and Operational Excellence in Meteorology
SP5.I.03	Resilience of Meteorology Operations
SP5.I.04	Deployment of Capability for Emergency Readiness in Meteorology and Air Quality
SP5.I.05	Deployment of Capability for Air Quality Modelling
SP5.I.06	Deployment of Capability for Climate Modelling
SP5.I.07	Deployment of Capability for Marine Modeling

KPIs

	KPI	Baseline	Target (2030)
SP5.K.01	Time Span of Weather Forecast	5 days	15 days
SP5.K.02	Weather Warning Index	TBD	8.00

Strategic Pillar Number 6: Awareness, Education and Innovation

Strategic Initiatives

SP6.I.01	Raising Environmental Awareness in the Kingdom
SP6.I.02	Development of Environmental Education
SP6.I.03	Development of a Reliable Network of Environmental NGOs
SP6.I.04	Development and Roll Out of an Environmental R&D Strategy
SP6.I.05	Operational Excellence in Biodiversity and Wildlife Research Centers

KPIs

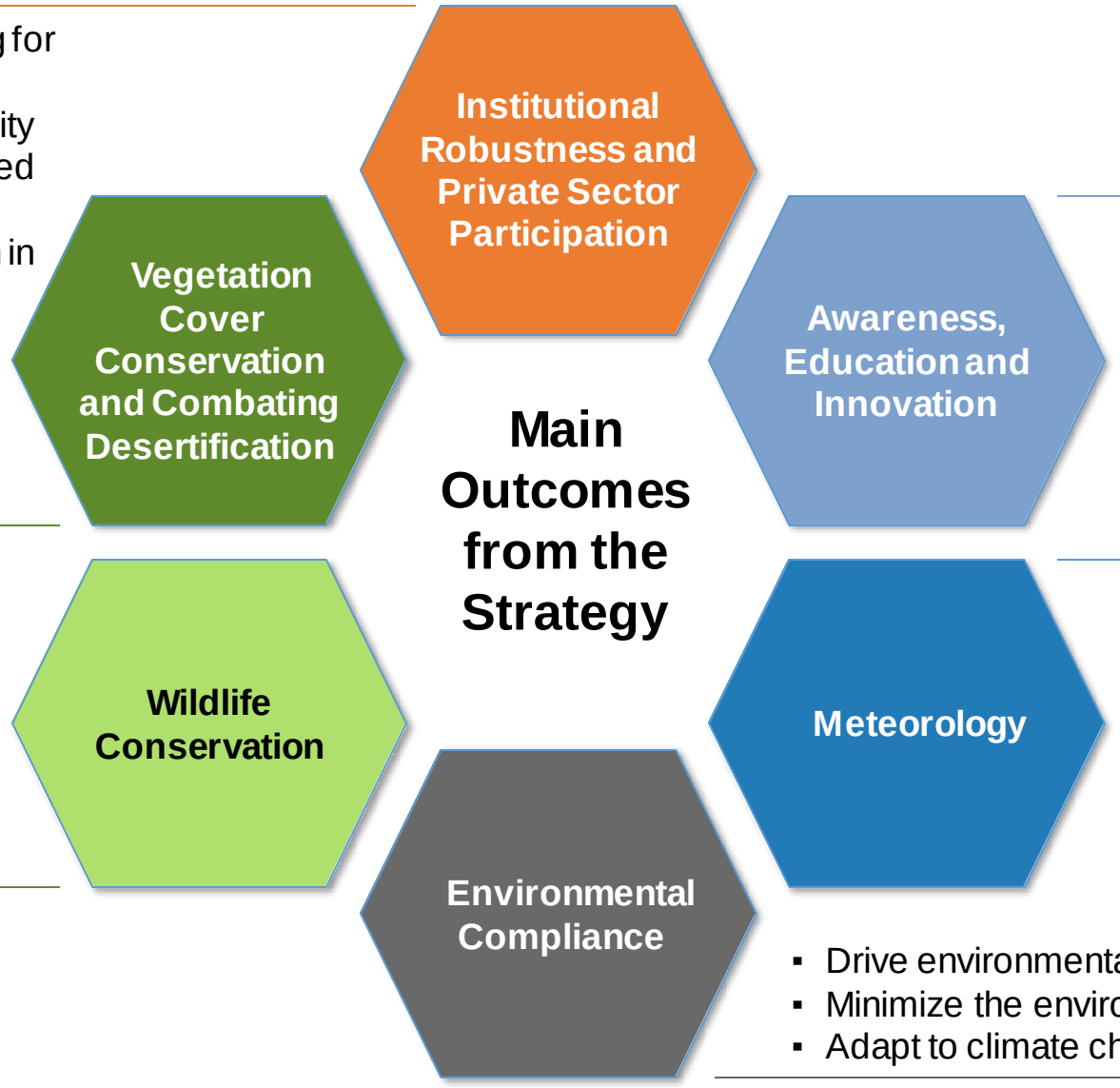
	KPI	Baseline	Target (2030)
SP6.K.01	Mainstreamed Environmental Education	No	Yes
SP6.K.02	R&D Funds Allocated to the Environment and Meteorology Sectors	TBD	100 Mn. SAR

Main outcomes from the strategy

- Enable effective institutional setting for the environment and meteorology sectors that creates complementarity between the Ministry and specialized centers with executive role
- Activate private sector participation in the environment and meteorology sectors

- Develop the natural vegetation cover and combat desertification

- Conserve and develop wildlife inside and outside protected areas



- Raise environmental awareness throughout the KSA society
- Generalize environmental education
- Innovate in environment and meteorology

- Determine and develop meteorological services to fulfill KSA requirements

- Drive environmental compliance
- Minimize the environmental impact of economic sectors
- Adapt to climate change

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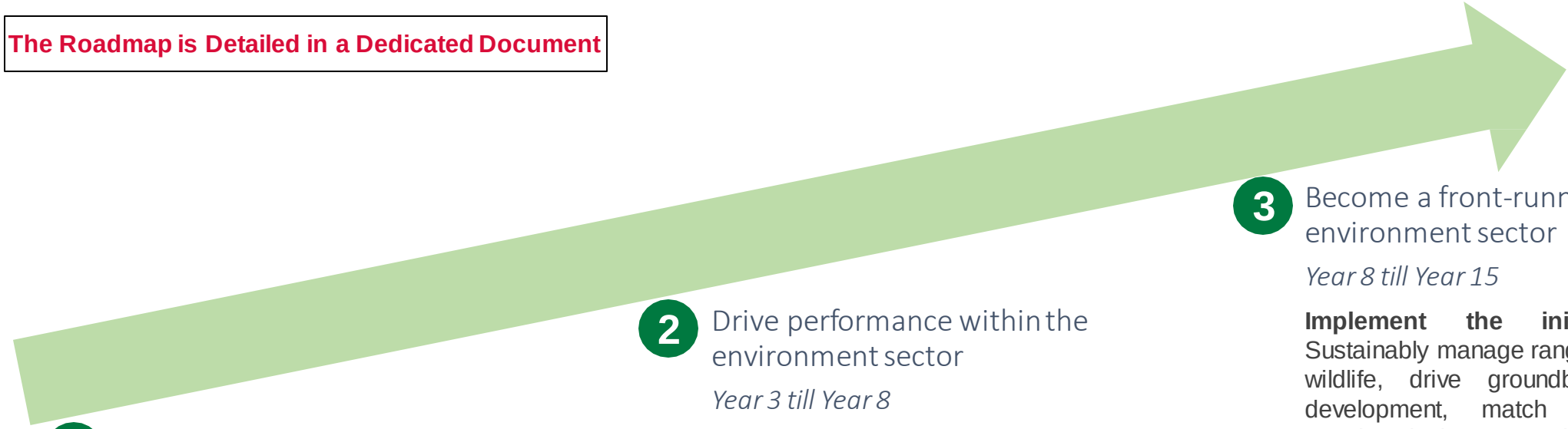
Roadmap for strategy implementation

The Roadmap is Detailed in a Dedicated Document



1 Build the foundation of the environment sector

Year 1 till Year 3

Implement the initiatives aiming to: apply the new institutional setting, develop comprehensive environmental regulations and meteorology regulations, enable environmental compliance monitoring, build an environmental database and define the baseline, restructure work procedures, develop human capabilities, adopt state-of-the-art technologies for environmental monitoring, initiate the development of KSA's wildlife and vegetation cover, raise awareness, drive environmental education, and enhance meteorological services

2 Drive performance within the environment sector

Year 3 till Year 8

Implement the initiatives aiming to: optimize the efficiency of environment sector entities, enhance the economic sectors' environmental compliance and performance, regulate grazing activities and further develop KSA's wildlife and vegetation cover, combat desertification, effectively engage the private sector and the civil society in environmental matters, further develop meteorological services

3 Become a front-runner in the environment sector

Year 8 till Year 15

Implement the initiatives aiming to: Sustainably manage rangelands, forests and wildlife, drive groundbreaking research and development, match performance of best practices in the meteorology and environment sectors (including services provided by the private sector), contribute to the environmental development of other countries

Quick win initiatives

Initiatives to Drive Environmental Compliance Monitoring and to Reduce Pollution

- Update and expand the national air quality monitoring network
- Establish an emission stack monitoring center to monitor emissions from factories, power plants and cement plants
- Establish a program to protect ground and surface water from pollution and to monitor leaks from gas stations
- Establish of a wastewater monitoring program and a program to monitor pollution in the marine environment
- Establish of a program to control landfills
- Implement the national program for chemical safety

Initiatives for the Development of the Vegetation Cover

- Plant 10 million trees
- Rehabilitate of 40 thousand hectares of rangelands
- Implement the Green Kingdom program:
  - Rehabilitation of rangelands and tree areas
  - Rehabilitation and development of forests
  - Establishment of green belts
  - Seawater agriculture

Agenda

- The methodology for developing the strategy
- The diagnostic of the current state
- The proposed institutional framework
- Environment sector economic requirements
- The components of the National Environment Strategy
- The implementation roadmap of the strategy and the quick win initiatives
- Next steps

Required from CEDA

- Approval of the National Environment Strategy
- Establishment of the Environment Fund to support and sustain the sector
- Approval of the proposed institutional setting for the environment and meteorology sectors including:
  - The establishment of the Environmental Compliance Center to which all activities related to monitoring of environmental compliance are assigned (including environmental licenses, environmental inspection, pollution monitoring) across all sectors (including energy, industry, transportation, mining, agriculture, …)
  - The establishment of the National Center for the Development of the Vegetation Cover and Combating Desertification to which all activities related to protection and development of natural vegetation cover and combating desertification are assigned (including management of forests, rangelands, national parks, rehabilitation of vegetation cover, combating desertification)
  - The establishment of the National Meteorological Center to which all activities related to meteorology are assigned
  - The establishment of the National Center for Wildlife Conservation to which all activities related to protection and development of wildlife are assigned (e.g., protected areas management, breeding centers and biodiversity protection)

Next steps

Depending on the decisions taken by CEDA with respect to the National Environment Strategy and to the proposed institutional setting for the environment and meteorology sectors, the Ministry will:

- Develop and submit, within four months from the date of approval of the strategy, a detailed budget for implementing the strategic initiatives
- Prepare, within ten months from the date of approval of the strategy, the adequate plan for the establishment of the four centers, their budgets, their technical and human resources requirements, their detailed organizational structures, their strategic programs and the mechanism for transitioning from the existing authorities to the proposed centers
- Propose and submit, within six months from the date of approval of the strategy, an appropriate mechanisms for the governance of the Environment Fund and the necessary controls to organize its activities