Environmental Dimension

Ninth Pillar: Environment

Overview of Current Situation

During the last three decades of the 20th Century and the first decade of the 21st Century, the concept of "Environment" has been significantly changed. After it was associated to the pollution of environmental systems only, the concept has become more comprehensive. Green economy has become the talk of the day and how to integrate this concept into the development of strategies, policies, plans, and programs. Thus, emerged the new global trend, as many global countries adopted the approach of preparing policies in order to activate this concept in various sectors, including sustainable societies, eco-friendly cities, green buildings, sustainable and organic agriculture, in addition to less polluting manufacturing and production in the industrial field, rationalization of consumption of water, energy, and renewable energy resources, investing in energy-saving and eco-friendly public means of transportation, environmental tourism promotion, and reusing and recycling of wastes in order to achieve sustainable development and achieve the economic, social, and environmental objectives within a proper governance framework, that ensures social contribution, transparency, and accountability.

Accordingly, and due to the fact that the main objective is to ensure the rights of next generation to the use of natural resources and development, the environment pillar framework is divided into two sections: S**ection 1** addresses the main elements of managing natural resources--air, water, and wastes—in addition to the ecological systems and biological diversity. As for the other elements included in managing natural resources, such as energy and mineral resources and lands, coordination has been made with other concerned pillars to ensure that their strategies would lead to rationalized management of these resources and their sustainability**. Section 2** covers the environmental impacts of all the developmental sectors. The environmental dimension of energy, urban development, transportation, and all economic activities such as industry, agriculture, and tourism is discussed with the various concerned pillars in order to achieve integrity with those pillars as a main element to ensure that the strategy achieves the comprehensive sustainable development concept.

Generally, the environment strategy copes with the UN sustainable development goals, particularly the goals of environmental activity, underground water, and on-land life, clean energy at reasonable prices, clean water, and healthy hygiene goals, and other goals.

Review of the current situation of the environment reveals a number of facts about water, air, ozone, biological diversity, mineral resources, coastal environment, wastes, and international conventions in these areas, which we will review, in detail, as follows:

- **Water:** In 2015, per capita of renewed fresh water has reached 650m^3 per person annually, making Egypt one of the nations suffering from water scarcity,[1] The agricultural sector has the biggest share of water consumption with a percentage of 85% of total consumption. On the other hand, the non-traditional water resources represent 20% only

[1] Central Agency for Public Mobilization and Statistics, Egypt, Statistics of the Year 2015

of the total water resources in Egypt in 2013-2014.[2] Climate change is expected to have an impact on the water sector, resulting in more demand especially in the agricultural sector in addition to the impact of high sea level on groundwater reservoirs in the Nile Delta, which increases its salinity and makes it non-consumable.

- **Air and Ozone**: Industrial and technological developments have resulted in introducing new chemical substances, leading to the increase of gas emissions from ozone depletion-causing substances. According to the estimates of the World Bank, **environmental deterioration resulting from air pollution costs Egypt about 5% of the annual GNP, or about LE 2.42 billion annually**.[3] Egypt has successfully overcome the challenges dictated by the commitment to the provisions of the Montreal Protocol and its various amendments to protect the ozone layer. Many ozone-depleting substances, which have been used in consumable, industrial, and agricultural products, have been gradually disposed of. A national strategy has been prepared for banning the use of HCFCs used in various sectors, in particular the foam and thermal insulation industry sector and manufacturing of refrigerators and air-conditioners.

- **Biological Diversity:** Egypt is a nation that contains various environmental systems in addition to aquatic life and wildlife. Various plant and animal species in Egypt represent tropical and Mediterranean environments dating back millions of years. Egypt is one of the leading nations in caring for the protection of the biological diversity as proven by entering into international conventions, which promote such trends led by the Convention of Biological Diversity in 1992. Egypt has been one of the first countries that prepared and carried out a national strategy and national work plan in the biological diversity field over 20 years (1997-2017) through governmental, civil, and popular contributions. In 2014, Egypt announced 30 natural reserve areas covering more than 149,000 km^2 or about 14.7% of Egypt's total area. Thirteen natural reserves have an approved and activated management plan.[4]

- **Mineral Resources**: Egypt owns huge natural mineral resources. However, most of them have not yet been perfectly utilized, resulting in low contributions from the mineral resources sector to the GDP.

- **Coastal Environment**: Coastal and marine areas in Egypt have a strategic significance due to the availability of food resources and raw materials, which are the fundamentals of economic development. In addition, the coastal area is considered as a vital source for maritime transport and trade. These areas include a number of significant environmental resources that are the main resource for entrainment and tourist attraction. Coastal areas in Egypt include about **22%** of the total population and they are where more than **60%** of the industrial, economic, commercial, and maritime developmental activities are being practiced on coastal areas, in addition to the Nile Delta, which covers about **60%** of the

[2] Ibid
[3] World Bank, 2002
[4] Central Agency for Public Mobilization and Statistics, Egypt, Statistics of the Year 2015

agricultural production in Egypt. Moreover, coastal areas in Egypt, especially the Red Sea, produce about **85%** of the total crude oil production.[5]

- **Wastes**: As part of achieving sustainable development, there is an urgent need to deal with solid wastes in terms of resources management rather than wastes management. Wastes constitute an essential resource for reuse and recycling operations in addition to their role in providing new job opportunities in what is known as green jobs. Moreover, the role of integrated and sustainable management of wastes in limiting the emissions of global warming gases causing the climate change phenomenon. According to the estimates of **2011**, the total amount of municipal solid wastes annually generated is about **20 million tons**, representing **250 kg** per person annually. This is a very low rate compared to the countries of the Organization for Economic Cooperation and Development (OECD), in which such rates amount to about **530 kg** per person annually,[6]

- **International Conventions**: Egypt has signed **68 environmental conventions and affiliated protocols for protecting the environment**, human health, and the various environmental resources. Like many other countries, Egypt participates in the negotiations for the development of these conventions. The scope of these conventions expands to include protection, preservation, and promotion of natural capital, transfer to a low-carbon green economy, enhancement of the efficiency of use of resources, and protection of citizens from environmental pressures and health risks. The challenge currently facing Egypt, as it is for most developing countries, is to reach a compromise between its international obligations and national policies.

Following is a review of the vision, strategic objectives, KPIs, challenges and development programs for environment until 2030.

[5] Egyptian Environmental Affairs Agency (EEAA), 2015
[6] Information and Decision Support Center (IDSC), Egypt's Waste Problem, 2012

Strategic Vision for Environment to 2030

Environment is integrated in all economic sectors to preserve natural resources and support their efficient use and investment, while ensuring the next generations' rights. A clean, safe and healthy environment leading to diversified production, resources, and economic activities, supporting competitiveness, providing new jobs, eliminating poverty, and achieving social justice.

Accordingly, it is evident that the strategy vision for the environment until **2030** aims at identifying the mechanisms for encouraging investment in natural resources and ecological systems in order to support the economy and provide new job opportunities. This strategic vision identifies the ways for achieving comprehensive economic development without prejudice to the rights of the next generations to natural resources and a clean environment. In addition, the strategic vision addresses the key issues that have priority until the year **2030** and ways to address them. Given the regional and international leading role of Egypt, the strategic vision focuses on Egypt's role and its attitude towards environmental issues at the international level.

This vision is consistent with the UN sustainable development goals after **2015,** which considers environment as one of the dimensions of sustainable development, in addition to identifying a set of issues that are addressed through the 13th, 14th, and 15th goals, relating to facing climate change and its impact; preserving oceans, seas, and maritime resources; and protecting and restoring wild ecological systems and promoting their sustainable usages and protecting biological diversity.

Strategic Objectives for Environment to 2030

Based on the strategic vision, the strategic objectives for environment until 2030 include the following:

Objective	Definition
Rational and sustainable management of the assets of natural resources to support the economy, increase competitiveness, and provide new job opportunities	This objective addresses the rationalization of the use of natural resources and finding non-traditional alternatives to ensure their sustainability, while focusing on water resources, to ensure water security
Reduction of pollution and integrated management of wastes	This objective addresses the reduction of the rates of air pollution and pollution resulting from untreated wastes resulting in hazardous environmental and health impacts, while increasing the benefit from natural resources through the utilization of solid wastes and focusing on municipal solid wastes
Maintaining the balance of ecological systems, biological diversity, and the rational and sustainable management of these systems	This objective includes the protection of the distinguished biological diversity in Egypt and raising the efficiency of its management through natural reserves, thus ensuring continuity and sustainability of this biological diversity

Objective	Definition
Egypt meets its international and regional obligations for environmental conventions and develops the necessary mechanisms, while ensuring their consistency with local policies	This objective ensures Egypt's commitment to its international and regional environmental conventions and developing the necessary mechanisms, while ensuring their consistency with local policies

The **first objective** addresses the achievement of rationalized and sustainable management of the assets of natural resources, including air, water, energy, and lands with the natural and mineral resources they contain, while focusing on water resources and achieving water security given the great impact of this issue on national security, especially after Egypt has entered the water scarcity phase, in addition to the impacts of climate change and the expected increase in population, which will result in increasing demand with fixed available water resources. This will also lead to the failure to meet the needs of the citizens and production activities.

The **second objective** addresses the reduction of environmental pollution. In this objective, focus is placed on two main issues: the first issue is to eliminate air pollution by reducing air pollution rates. The second issue is environmental pollution resulting from wastes, with a focus on solid municipal wastes and hazardous wastes in order to change the manner of dealing with solid municipal wastes, which represent a heavy burden on the State, to an economically sustainable system that enhances the use of natural resources. Hazardous wastes include significant health risks for citizens and environmental safety, especially because the amount that is disposed of in a healthy manner constitutes an insignificant percentage of not more than 10%. With the anticipated developmental enhancement, it has become a necessity to monitor and develop hazardous waste management systems to limit their impact on public health and the environment.

The **third objective** addresses the biological diversity and ecological systems, including natural environments, whether wild, aquatic, or coastal. In this objective, focus is placed on developing natural reserves that are the most important and effective tool for maintaining biological diversity.

The **fourth objective** addresses Egypt's commitment to international and regional environmental conventions. The priority conventions have been classified according to the importance of our international commitments, national priority, and number of projects and activities associated with each convention. The first set includes the Rio Convention of 1992, which includes the conventions of the United Nations on Climate Change, biological diversity, and desertification and the importance of integration and interaction among these conventions to promote sustainable development in the countries that signed these conventions. The second set of conventions covers hazardous materials and wastes, ozone depletion, and marine pollution as another tool for completion of pollution elimination along with the conventions on preserving natural resources. The level of Egypt's progress in international conventions is measured through the number of conventions in force.

Key Performance Indicators for Environment to 2030

Quantitative Indicators

S.N	Indicator Category	Indicator	Definition	Current Status	2020 Target	2030 Target
1	Strategic Results	Ratio of total water consumption (%)	It shows the total volume of fresh water consumed by humans (agriculture, industry, and home) as a percentage of total renewable fresh water resources available for the State	107%(1)	100%	80%
2		Fresh water resources per capita (renewable)	It shows the sufficiency of renewable fresh water resources (internal and external) for the population needs	650 m3/ year(2)		750 m3/year
3		Percentage of decreased pollution caused by fine airborne dust (%)	It shows the percentage of air polluters including fine airborne dust, while focusing in this indicator on PM_{10}	157 micro-gram/m3(3)	-15%	-50%
4		Percentage of municipal solid waste regularly collected and managed in a suitable manner (%)	It shows the percentage of domestic solid waste (does not include construction, agricultural, or hazardous waste) that is collected, whether officially or unofficially. It shall be recycled or disposed of through sanitary landfill or other healthy means. The collection will be considered regular if it happens at least once weekly.	20% collection efficiency: 60%(3)	40% collection efficiency: 80%	80% collection efficiency: 90%
5		Percentage of hazardous wastes safely disposed (treatment, recycling, final disposal) (%)	It measures the level of disposing of hazardous wastes that have bad impacts on environment and health.	Percentage of hazardous wastes, safely disposed (treatment, recycling, final disposal)	It measures the level of disposing of hazardous wastes, which have bad impacts on environment and health.	Percentage of hazardous wastes, safely disposed (treatment, recycling, final disposal)

S.N	Indicator Category	Indicator	Definition	Current Status	2020 Target	2030 Target
				(%)		(%)
6		Composite biodiversity and environment indicator of 3 sub-indicators: (1) the area of nature reserves/ total area of land and watercourses, (2) area of marine and coastal natural reserves/marine and coastal total area, (3) ratio of protected sites classified as AZE to total sites classified.	It consists of 3 sub-indicators: The area of natural reserves/total area of wild regions and internal watercourses. Area of marine and coastal natural reserves/total area of marine and coastal regions. Percentage of sites classified as AZE protected of total sites classified as AZE.	Composite Biodiversity and environment indicator of 3 sub-indicators: (1) the area of nature reserves/ total area of land and watercourses (2) area of marine and coastal natural reserves/ marine and coastal total area, (3) ratio of protected sites classified as AZE to total sites classified.	It consists of 3 sub-indicators: The area of natural reserves/ total area of wild regions and internal water-courses. Area of marine and coastal natural reserves/ total area of marine and coastal regions. Percentage of sites classified as AZE protected of total sites classified as AZE.	Composite Biodiversity and environ-ment indicator of 3 sub-indicators: (1) the area of nature reserves/ total area of land and water-courses, (2) area of marine and coastal natural reserves/ marine and coastal total area, (3) ratio of protected sites classified as AZE to total sites classified.
7		Rate of reduction of ozone-depleting materials	It includes the following materials: HCFC-22 HCFC-141b HCFC-142b HCFC-123 HCFC-124	Rate of reduction of ozone-depleting materials	It includes the following materials: HCFC-22 HCFC-141b HCFC-142b HCFC-123 HCFC-124	Rate of reduction of ozone-depleting materials
8		Rate of reduction of the expected increasing rates of	It shows the level of progress in the State's efforts to maintain reasonable increase rates in greenhouse emissions, which cause global	276 equivalent tons of carbon dioxide(5)		

S.N	Indicator Category	Indicator	Definition	Current Status	2020 Target	2030 Target
		greenhouse gas emissions	warming phenomenon and climate change			
9	Output	Ratio of non-traditional water resources to total water resources usage	It shows how far the State depends on utilization of non-traditional water resources in reduction of dependence on available traditional water resources.	20%(1)	30%	40%
10		Sanitation as percentage of total sewage (%)	It shows the efficiency of the State's utilization of its sewerage water resources, whether agricultural or industrial	50%(4)	60%	80%
11		Illegal industrial sewage into the Nile River as a percentage of the total industrial sewage(%)	It shows the State's success in banning disposal of industrial wastes in a manner not in conformity with the specifications, in the Nile River, which causes huge water pollution (direct and indirect disposal).	21%(3)	16%	0%
12		Sanitation percentage according to the national standards, disposed in the Nile River (%)	It shows how far the sewerage water, which is disposed of in the Nile River, is in conformity with national standards, which guarantee that the quality of fresh water resources has not been affected.	50%(3)	70%	100%
13		Number of natural reserves, with an approved and activated management plan (reserve)	It shows the extent of progress in designing and executing management plans for natural reserves, which help in achieving their sustainability and increasing benefit from them.	13(3)	20-15	30
14		Percentage of progress in the commitment to ratified conventions (%)	It shows Egypt's adherence to international conventions in the following fields: desertification – climate change – biological diversity – hazardous materials and		100%	100%

S.N	Indicator Category	Indicator	Definition	Current Status	2020 Target	2030 Target
			wastes – marine pollution, through calculating the percentage of conventions in force.			
15	Input	Percentage of loss in water transfer networks (%)	It shows the efficiency of water distribution networks and amount of water wasted as a result of their damaged infrastructure	15%(6)	Less than 10%	Less than 5%
16		Percentage of loss in water treatment plants (%)	It shows the efficiency of water treatment stations and amount of water wasted in such stations	30%(6)	Less than 20%	Less than 10%
17		Number of national plants monitoring air pollutants	It shows the State's ability to monitor air polluters through the number of stations of a national network	87 plants(3)	92 plants	120 plants
18		Number of monitoring sites at the national network of monitoring industrial emissions	It shows the State's ability to monitor industrial emissions through the number of stations of the national network.	164 sites 40 companies(3)	250 sites	500 sites

(1) Central Agency for Public Mobilization and Statistics (CAPMAS), Egypt, Statistics of the Year 2015
(2) Ministry of Water Resources and Irrigation, 2015
(3) Egyptian Environmental Affairs Agency (EEAA), 2015
(4) Environmental Performance Index Report, 2014
(5) World Bank database on the internet
(6) Ministry of Housing, Utilities and Urban Development, 2015
*The identified quantitative target is temporary until it is declared by the responsible authority (Ministry of Water Resources and Irrigation, Ministry of Housing, Utilities and Urban Development, and Ministry of Environment)

Suggested New Indicators

S.N	Indicator Category	Indicator	Definition	Measurement Mechanism
1	Outputs	Environmental deterioration cost	This indicator has been introduced to reveal the economic cost incurred by the State as a result of environment deterioration and irrational use of resources	This indicator will be measured in cooperation with the Ministry of Environment and the Ministry of Planning, Monitoring and Administrative Reform using the method of calculating the cost of alternative opportunity

Challenges of Environment

Challenges facing the environment are divided into **three main groups**.

The first group of challenges has great impact and is easily controlled. Therefore, it will have the biggest share of attention due to the ability to face and overcome it quickly and easily more than the other challenges. This group includes the following:

- Failure to adopt an integrated and participatory approach that ensures integration of social and environmental dimensions into the economic dimension. There is no integration of the policies and strategies of the various ministries, neither is there participation of stakeholders in the development of policies, plans, and programs.

- **Water loss.** The failure to rationalize water consumption in all consuming sectors, particularly the agricultural, industrial, and housing sectors, represents a high risk for the State's water resources and a threat to its water security. On the other hand, due to the expected increase in the rates of water usage demands resulting from overpopulation and the probable impact of climate change along with the fixed share of Egypt in the water of the Nile River, the efforts to rationalize water consumption and searching for other non-traditional resources have become a national necessity.

- **Poor retributive policies and economic incentives** for encouraging the private sector to reconcile its environmental conditions. This leads to increasing non-sustainable production and consumption patterns. However, if the necessary policies package is available, the private sector can be included as an essential partner in preserving the environment and natural resources.

- **Climate change**. Climate change represents an obvious risk to water resources in Egypt. This impact covers two sections: the first section is related to coastal areas that are vulnerable to sea level rise and economic and social damages at the coastal areas. The

second section is the River Nile water flow on which the scientific research differs as to whether it is preferable to increase or decrease the flow percentage. In both cases, an intervention is necessary to get adapted to any of the two cases, if occurred.

- **Deterioration of watercourses and drainages.** Watercourses and drainages require renewal and a greater attention as they have been greatly violated whether through opening illegal irrigation channels or disposing of wastewater and industrial wastes into them that resulted in pollution of water and shortage of water at the ends of watercourses that generally affects the efficiency of the use of water resources.

- **Overuse of groundwater.** Overuse of groundwater represents a threat to water security due to the pressure placed on non-renewable water resources without restoring them, taking into consideration that groundwater has a great importance as a strategic reserve.

- **Lack of trained technicians in the area of waste recycling.** This leads to poor efficiency of the recycling system, resulting in failure to achieve the ultimate benefits from available natural resources.

- **Poor incentive policies for encouraging green production.** Poor inventive policies in the private sector for adopting eco-friendly green production methods that are efficient to manage natural resources in addition to rationalization of energy consumption resulted in the private sector's refraining from adopting such production patterns and Egypt's setback in this area compared with developed countries.

- **Open-air burning of different kinds of wastes (municipal or agricultural).** Open-air burning of wastes, whether municipal or agricultural, is one of the main reasons for air-polluting emissions that result in negative environmental and health impacts. This challenge is due to the deficiency in waste collection, recycling, and disposal systems in addition to the low level of society's awareness of the risks of such practices.

The second group of challenges has relative low impact and is relatively controlled. It includes the following:

- **Poor participation of the private sector in the collection and recycling of solid wastes.** With the lack of encouraging and participation mechanisms, this has resulted in increasing the financial burden on the State for managing solid waste systems whether through collection or recycling, leading to aggravating the problem of solid wastes accumulation in different districts and cities and the attempt to dispose of such wastes in unsafe manners that will negatively affect the environment and citizens' health.

- **Increasing the cost required for introducing and using modern technologies for desalination and treatment of water.** This represents a challenge to the achievement of the utmost benefit from non-traditional water resources, which should be relied upon to elevate the pressure on fresh water resources and to face the increasing demand.

- **Overhunting practices.** The failure to implement the law on the prevention of infringements of natural reserves and coastal environments and the increasing

overhunting has led to a negative impact on biodiversity and natural habitats and fish wealth in Egypt, particularly in the recent period, which was marked by security chaos.

- **Increasing the cost of collecting and transporting solid wastes.** This affects the efficiency of collecting solid wastes, especially municipal wastes, where the efficiency of collection reaches less than **60%** of the total generated wastes, which necessitates searching for variation of financing sources to ensure the sustainability of waste management systems.

- **Fragmentation of the work of institutions in the water sector.** The roles and powers of the agencies governing the water resources sector in Egypt are overlapping and not clear. This includes the Ministry of Water Resources and Irrigation and the Ministry of Housing, Utilities and Urban Development, which results in deficiency of water resources management due to inconsistencies along with the lack of coordination between them.

- **Lack of necessary funding for the pollutants and emissions monitoring stations.** Also, lack of funding for the implementation of the plans to reduce the rates of air-pollution has led to the increase of their financial burden on the State, threatening their sustainability and resulting in a decline of the progress of these programs and an increase in air pollutants along with the negative impacts on the environment and public health. In addition, the lack of financing resources for expanding the establishment of pollutant monitoring stations decreases the ability of measuring and following up pollution levels in order to support taking the necessary reformative decisions and procedures, in addition to increasing the efficiency of personnel of monitoring stations to ensure the production of correct and accurate reports.

- **Lack of funding for monitoring biological diversity and reserves management.** This has led to the deficiency of the efforts of biological diversity and Egypt's setback in this area compared with other countries.

- **Lack of incentive policies encouraging individuals to use natural gas-operating vehicles.** Traditional transportation means depending on petroleum materials are one of the elements of air pollution and greenhouse gases emissions that contribute to global warming. The failure of the State to adopt policies that encourage citizens and institutions to use natural gas as an alternative, which has a less damaging impact on environment. The use of eco-friendly vehicles such as bicycles constitutes a challenge that results in increasing the use of traditional transportation means including the abovementioned harmful effects.

- **Poor information system in the areas of wastes.** The lack of comprehensiveness and accuracy of data related to waste management systems has a negative impact on the efficiency of systems' management and taking the proper procedures and decisions.

- **Lack of integration of civil society into the efforts of protecting biological diversity.** The failure to expand the scope of beneficiaries from the efforts of protecting

biological diversity and those interested in them to include civil society results in increased protection pressure on the State that affects the efficiency of such efforts.

- **Failure to include the price of water cost in the different products.** This is one of the factors that encouraged not to achieve the utmost efficiency in the use of water resources and resulted in poor expansions in infrastructure to ensure the sustainability of water systems.

- **Deterioration of the current water transmission pipelines.** This results in loss of treated fresh water, leading to the increase of the demands for water resources more than actual needs due to the amount of lost water during transmission.

- **Lack of an independent budget for managing solid wastes**. According to the priorities of governmental expenditure, this lack has led to the deficiency of the operation of this sector.

- **Irregular increases in the rates of coastal areas development.** The Red Sea in particular witnesses an irregular increase in development rates and many activities including diving, boats fees, spread of moorages and marinas, drilling, mining, petroleum excavations, and other activities that directly affect biological diversity in the Red Sea, natural resources, and environmental systems such as coral reefs and mangrove forests.

- **Poor coastal areas protection procedures.** These areas are subject to environmental threats such as a disappearing beaches phenomenon that may result in losing lands and expected sea level rise because of climate change, which may have disastrous consequences on the country's economy.

- **Poor mechanisms for monitoring and measuring the rate of emissions of ozone-depleting materials.** This results in poor efficiency of managing the plans to decrease these materials and taking the required reformative decisions and procedures. It should be noted that the efforts made for decreasing the rates of ozone-depleting materials are among the main international obligations.

The **third set of challenges** includes lower priority challenges. However, this does not mean that they are less important and they must be faced.

- **Adopt non-sustainable industrial production modes polluting the environment.** The failure to consider the environmental dimensions during planning and managing industrial facilities results in a non-sustainable industrial system contributing to the pollution of natural resources and decreasing the efficiency of their use. This includes generating hazardous wastes that are not treated, non-rationalization of water resources usage, and the use of non-renewable energy resources that cause air pollution.

- **Increased number of informal waste dumps.** This reduces the State's ability to efficiently manage the waste systems, including the calculation and collection of the generated amounts of waste and dealing with the wastes through recycling or final disposal.

- **Poor support for the scientific research system to achieve environmental sustainability.** There is no clear policy and effective mechanisms for directing scientific research to the areas of preserving natural resources and protecting the environment in order to support achieving sustainable development in Egypt.

- **Lack of a community motivation to facilitate the operation of the waste management systems.** Whether facilitating the recycling process through isolation from source or by following more sustainable consumption methods for reducing the rates of generated wastes.

- **Inability to keep trained personnel in biological diversity and reserves areas.** Economic incentives provided for trained personnel in the area of preserving biological diversity do not encourage personnel to continue work and develop the sector, in addition to the lack of qualifying and training programs provided for them.

- **Poor community participation in preserving the environment and inadequate environmental awareness.** This results in poor utilization of natural resources and deterioration of that environment's condition and their impact on economy and social and environmental conditions.

- **Multiple agencies responsible for the implementation of plans**. Several agencies are responsible for implementing plans to reduce the rates of air-pollution and poor coordination ability results in the lack of integration of the projects and lack of ability to evaluate their results within a unified framework reflecting the progress of implementation.

Environment Programs to 2030

Based on these challenges, and in addition to the policies, programs, and projects of environment included in the 2016-2018 government program, the following are the key programs and projects of the strategy during 2016-2030.

Programs for Implementation Mechanisms

Strengthen the institutional and legislative structure of the water resources management system:

- **Program Description:** The program intends to reform the institutional and legislative defects in the water resources management system by re-identifying the roles of the sector's governing agencies and enhancing their administrative efficiency in addition to drafting the necessary legislation. This program is expected to be complete by 2020. This is a low-cost program.

- **Key Elements:**

  - Clearly identify the institutional and organizational roles of the Ministry of Water Resources and Irrigation and the Ministry of Housing to avoid overlap of authorities and powers.

  - Implement a program for providing water from non-traditional resources, renewing the ecological water systems, activating the management role of providing water from non-traditional resources to alleviate the growing pressure on traditional water resources.

  - Draft legislation and laws supporting the optimal use of water resources.

  - Develop a legislative framework and new criteria for wastewater treatment and water treatment.

  - Include penalties for water pollution in relevant laws, introduce laws and criteria requiring the installation of water saving equipment and methods in facilities and enact legislation and mechanisms for implementing the law to reduce the overuse of underground reservoirs.

  - Implement an institutional capacity building program to enhance the administrative and technical aspects of personnel in the agencies entrusted with water resources management.

Expand the establishment and development of required infrastructure for achieving a sustainable water system:

- **Program Description**: This program intends to develop the existing infrastructure and expand in major projects for the future infrastructure to increase the use of non-traditional water resources and reduce water loss in the current systems. This program is targeted to complete by 2025. This is a high-cost program.

- **Key Elements:**

  - Implement a program for developing, maintaining, and expanding the establishment of waterways and drainages.

  - Expand the establishment of infrastructure to make the best use of rain and torrential water.

  - Implement a program for establishing new wastewater treatment and seawater desalination plants to increase the capacity and alleviate the pressure on traditional water resources.

  - Develop the existing water treatment plants and water transmission networks to reduce water loss and enhance the efficient use of water resources.

- Set policies encouraging the private sector to invest in water resources management, whether with regard to treatment, recycling, or infrastructure reforms along with designing the legislative framework to organize its participation.

- Provide the required funding to prevent drainage, of all forms, in the watercourses, particularly the River Nile.

Implement financial policy reforms and use of economic instruments to move toward more sustainable consumption patterns of water and natural resources:

- **Program Description**: This program intends to bridge the gap in water demand through developing policies that support the practices of water conservation and reviewing virtual water policies of the international trade. This program is intended to commence in 2020 and complete by 2025. This is an average-cost program.

- **Key Elements:**

  - Implement a program for water rationalization in various sectors, particularly industry and agriculture, with reliance on modern technology in irrigation and crops that require less water.

  - Adopt policies that support cost recovery of water transmission and treatment for various sectors.

  - Develop motivating policies, such as tax reduction, for the private sector to encourage water rationalization and reuse.

  - Facilitate access to modern and innovative water-saving equipment and technologies through decreasing customs tariffs.

  - Develop commercial policies that increase water resources through international trade (virtual water).

Increase awareness of the need to preserve the environment and natural resources, motivating required alternatives and technologies for water rationalization, and protecting natural resources.

- **Program Description**: This program intends to consolidate community efforts for environmental resources rationalization and conservation through awareness programs and training services or integrating environmental concepts in education, while focusing on the role of women in these programs. Implementation of this program is targeted to complete by 2020. This is an average-cost program.

- **Key Elements:**

  - Implement geographical awareness programs about the importance of water conservation according to the demands and nature of each community.

- Provide guidelines and training services on the means of water conservation used for agriculture in rural communities.

- Integrate the concepts of comprehensive and sustainable management of solid wastes into the educational system.

- Implement awareness programs on the need to shift to more sustainable consumption and production patterns, including rational consumption of energy and natural resources and protecting the environment from pollution.

- Implement awareness programs on the development of industrial sector awareness, particularly small and medium enterprises, of the importance of environment protection and resources rationalization.

- Develop awareness and educational programs on biodiversity through social awareness programs intending to spread the social and economic values of biodiversity and including the elements of biodiversity protection in the educational curriculum.

Enhance the efficiency of solid waste management systems and support its sustainability:

- **Program Description**: The program intends to establish an institutional, legislative, and executive system for the management of solid wastes of all forms. This system would be characterized by integrity, efficiency, and financial sustainability. Implementation of this program is targeted to complete by 2020. This is a high-cost program.

- **Key Elements:**

  - Develop an integrated system at the institutional and legislative level for the management of the wastes sector by identifying the sector governing entities and issuing the required laws for setting forth their roles and powers as well as allocating financial resources required for operations.

  - Develop the administrative and technical capability of solid waste management organizations.

  - Implement a plan that intends to achieve financial sustainability for solid waste management by developing the policies that create encouraging the environment to increase the private sector's involvement in solid waste management to alleviate funding pressure on the State.

  - Develop a mechanism for integrating the informal sector into the solid waste management system and legalizing its conditions to take advantage of its capabilities and enabling the State to regulate its activities.

  - Develop operational and commercial models that are in line with management service providers.

- Develop and put in place environmental and health criteria for solid waste management to ensure the consistency of sector activities with international safety standards.

- Develop a mechanism for controlling and monitoring the performance of local bodies with regard to solid waste management to ensure the efficiency of collection and recycling or disposal systems.

Develop the necessary policies to reduce air pollution, combat climate change, and protect the environment:

- **Program Description**: This program intends to adopt and develop necessary strategies and policies to reduce air pollution and greenhouse gas emissions through three major sectors: energy, industry, and transportation. Implementation of this program is intended to complete by 2018. This is a high-cost program.

- **Key Elements:**

  - Implement a program for diversifying sources of funding for air pollution reduction plans by promoting international partnerships programs in this area to alleviate the funding pressure on the State and involve all beneficiaries in these programs.

  - Develop economic incentives for encouraging the industry sector to reconcile its environmental conditions regarding the reduction of air pollution and greenhouse gas emissions.

  - Develop economic policies for supporting the efforts aimed at energy conservation in all sectors.

  - Develop motivating policies for the production and consumption of new and renewable energy sources, particularly wind and solar power.

  - Develop polices intending to increase the use of mass and eco-friendly means of transportation (such as electric trains).

Develop the infrastructure to enhance the efforts aimed at reducing air pollution and combating climate change:

- **Program Description**: This program intends to enhance the measurement and management of the effectiveness of the efforts aiming at reducing air pollution and greenhouse gas emissions, in addition to strengthening the coordination ability to supervise multiple reduction plans. Implementation of this program is intended to complete by 2020. This is an average-cost program.

- **Key Elements:**

  - Expand the provision of infrastructure to monitor and measure the rates of air pollution, including monitoring stations and technological equipment that increase the State's ability to monitor pollution levels and take the appropriate procedures.

  - Establish a climate change database to serve as the core of establishing a research and studies center, in addition to introducing a new department in the competent ministries of climate change for emissions inventory.

  - Increase the powers of the Ministry of Environment to lead the supervision and coordination among the different agencies implementing the reduction plans in order to avoid the existing contradictions resulting from the lack of coordination among implementing agencies.

Enhance the efficiency of the administrative structure and infrastructure required for developing the efforts of biodiversity protection:

- **Program Description**: This program intends to strengthen the efforts of maintaining ecosystems and biodiversity by developing the infrastructure and its administrative framework. This program is intended to commence in 2020 and complete by 2025. This is a high-cost program.

- **Key Elements:**

  - Increase the numbers and efficiency of reform and rehabilitation programs for environmentally disadvantaged areas.

  - Improve the communication network and develop information systems for the management of natural reserves and various environments to enhance the efficiency of monitoring the environment's current situation.

  - Implement training programs for developing government employees (in the competent bodies for environment protection) and civil agencies (local communities in the environment protection areas) in the areas of biodiversity preservation and protection.

  - Introduce and develop financially sustainable management frameworks to maximize the economic aspects for the management of natural reserves.

  - Provide the stakeholders entrusted with implementing the law on prohibiting illegal hunting practices with new methods of security control and training the required human cadres to enhance the efficiency of prohibiting illegal hunting practices, which threaten the balance of ecosystems.

Increase the involvement of private and non-governmental sectors in the efforts of preserving and protecting biodiversity:

- **Program Description**: This program intends to alleviate the financial and administrative costs incurred for implementing the programs of biodiversity preservation by involving the private sector and strengthening social partnership frameworks. Implementation of this program is intended to commence in 2025 and complete by 2027. This is an average-cost program.

- **Key Elements:**

  - Establish integrated frameworks for partnerships with local and civil societies in the efforts of protecting the environment and biodiversity.

  - Develop mechanisms to encourage voluntary activities and involvement of civil society organizations in environment protection and biodiversity preservation.

  - Develop policies to encourage the private sector to invest in biodiversity, natural reserves, and environmental tourism, while raising the value added of environmental products.

  - Create job opportunities for local societies in the environmental protection areas through:

    - Developing qualifying and training programs to work in the area of environmental products and preserving biodiversity.

    - Developing economic policies to increase the competitiveness of environmental and local products such as medicinal and aromatic plants and local crafts.

Enhance the efficiency of protecting coastal and marine areas:

- **Program Description**: This program intends to enhance the State's ability to protect coastal areas from the challenges resulting from various activities, whether naval, such as fishing and oil exploration or industrial, such as urban, industrial, agricultural, and touristic development. Implementation of this program in intended to commence in 2020 and complete by 2025. This is an average-cost program.

- **Key Elements:**

  - Develop a program for enhancing Egypt's capability to attract sustainable and environmental tourism and implement a comprehensive marketing plan to ensure the attraction of this type of tourism and, accordingly promote its contribution to the GDP.

  - Develop more strict management and monitoring systems with regard to marine environment violation in order to ensure that these activities are consistent with international environmental standards.

- Develop the required policies and legislation to motivate the private sector to comply with efficient and sustainable practices for the marine ecosystem, while applying the "Polluter pays" principle by the individuals and economic sectors.

- Promote sustainable practices for fisheries to support ecosystems and marine biodiversity.

- Implement programs for developing the technical capabilities (research and studies, advanced information systems) and administrative capabilities of personnel carrying out coastal and marine environment management.

- Develop sustainable economic policies for encouraging civil society organizations that are working in the field of coastal and marine environment preservation, and creating partnership frameworks to develop these initiatives.

- Implement a program intended to adapt with the risks of climate changes on coastal areas, particularly high-density areas located along the coastline of the Mediterranean Sea, through developing scientific research to issue accurate studies on the expected risks and the best scientific methods to deal with them, in consideration of sustainability.

Monitoring the implementation of international conventions on environment:

- **Program Description:** This program intends to enhance the State's ability to comply with its international conventions on environment by enhancing the efficiency of its administrative frameworks and activating their integration into the executive strategies of the State in the competent ministries. Implementation of this program is intended to complete by 2018. This is an average-cost program.

- **Key Elements:**

  - Develop a mechanism for integrating the international conventions into the national strategies and legislation of various ministries to enable the State to comply with these conventions.

  - Develop a mechanism for enhancing the efficiency of managing and monitoring financial resources allocated to the program aiming at compliance with international conventions on environment.

  - Activate the role of national committee supervising the implementation of each convention to ensure the compliance of the State to such convention.

  - Develop a mechanism to link the program outputs aiming at achieving international obligations and conventions clauses on environment to ensure the progress of projects in the right direction and take appropriate corrective procedures, when necessary.

- Develop a comprehensive, periodically updated, database, including the number of signed conventions, number of conventions in force, submitted national reports, implemented programs within the context of the convention and their progress, to monitor the State's compliance with its international conventions on the environment.

Programs Relating to Certain Topics

Develop a system for disposal of hazardous waste and raising management efficiency:

- **Program Description:** This program intends to reduce the production of hazardous wastes and treat them appropriately in order to avoid their harmful environmental and health impacts. Implementation of this program is intended to commence in 2020 and complete by 2030. This is an average-cost program.

- **Key Elements:**

  - Develop economic policies to encourage the private sector to reconcile its environmental conditions with regard to hazardous wastes.

  - Impose harsher penalties on the agencies generating hazardous wastes if they are not treated and disposed of safely and appropriately.

  - Expand the establishment of infrastructure for methods of hazardous waste disposal.

  - Develop a list of the most hazardous chemicals on health and the environment, including the appropriate methods for disposal.

Establish a higher council for sustainable development:

- **Program Description**: This program intends to establish a higher council for sustainable development, reporting to the Cabinet, aiming at ensuring the implementation and monitoring of the State's environmental policies and achieving sustainable management of the State's natural resources. Implementation of this program is intended to complete by 2018. This is a low-cost program.

- **Key Elements:**

  - The higher council for sustainable development will undertake the following tasks:

    - Continuous coordination among all governmental authorities to ensure the integration of sustainable development criteria into the strategies of various ministries in order to raise the efficiency of natural resources utilization and protection of the environment.

    - Develop various economic policies aiming at achieving good and sustainable management of natural resources and supervise achievement by the different implementation authorities.

- Develop market policies and mechanisms that promote the shift to more sustainable production and consumption patterns, while enhancing the control systems on the environmental impacts of economic activities.
- Develop efficient, transparent, and accountable monitoring and environmental performance assessment systems for the various ministries.

It is targeted that the period starting from 2020 to 2025 will witness the implementation of urban development policies that consider all sustainable development principles and promote the alternatives and technologies required for consumption rationalization and natural resources protection.