UNITED ARAB EMIRATES
MINISTRY OF ENVIRONMENT & WATER

STATE OF ENVIRONMENT REPORT
UNITED ARAB EMIRATES
2015

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Sheikh Zayed bin Sultan Al Nahyan

May Allah forgive him and have mercy on him

"For us in the United Arab Emirates, environmental protection is not just a slogan or words devoid of any substance, rather, it is in fact an integral part of our history, our heritage and our way of life. existence between man and nature".-We have been and are still committed to the principle of co

His Highness Sheikh Khalifa bin Zayed AlNahyan
President of the United Arab Emirates

Protecting the environment and achieving sustainable development in the United Arab Emirates is "
a national duty
with specific institutional frameworks, integrated legislations and advanced mechanisms"

His Highness Sheikh Mohammed bin Rashid Al Maktoum
Vice President and Prime Minister and Ruler of Dubai

Preservation of environment will remain a fundamental principle in our development programs, "
our national projectsand our government policies.
It is the right of future generations to inherit healthy and clean environment".

Acknowledgements:
The Ministry of Environment and Water extends its deep thanks to everyone who contributed to the preparation of State of Environment of the United Arab Emirates.

Executive Summary:

Protection and development of environment is one of the main topics that has been always receiving great attention from His Highness Sheikh Khalifa bin Zayed Al Nahyan, President of the UAE "may Allah protect him" and his brother, His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President - Prime Minister - and Ruler of Dubai, "may Allah preserve him". This has been vividly clear in the various aspects of development programs and plans where the country attempted to achieve a balance between the socio-economic revival and preservation of environment in a unique experience confirms the success of the model of sustainable development. As such, a wide spectrum of achievements has been achieved in the field of environmental protection including the improvement of institutional and legislative frameworks, systems and strategies, and environmental action plans putting the UAE at a prominent place in this field at both regional and international levels.

The state of environment report aims to identify the environmental situation and sheds light on the major challenges in the field of environment. It provides important information about the state of environment in the UAE. This information serves a number of community groups, such as decision-makers working in the field of sustainable development, researchers and students. Moreover, the report helps promoting environmental awareness among various community segments and is considered as an environmental database scalable for growth and development with the upcoming reports. The report consists of seven parts that are thematically classified as follows:

Chapter One: Introduction

The Introduction includes information on the report preparation, principles, aim of the report, indices and methodology.

1- **the Report: Principles of**

a- Transparency: The true picture of the UAE environmental situation has been presented by using the latest available data in cooperation with all ministries and authorities concerned with environment. The principle of transparency is one of the first diagnostic steps towards the development of practical solutions to improve the environmental situation.

b- Participation :The report has been prepared with the participation of a wide range of experts, researchers and those interested in environment who, in turn, represent various sectors, and have been involved in preparing and reviewing the sub-reports and the consolidated report.

c- Recognized global standards: For the purposes of preparing the report, scientificglobal methodology has been applied which includes all areas (Driving forces - Pressures - State - Impacts - Response)(DPSIR).

d- **International Obligations**Tying : UAE obligations to international conventions ratified and aggreements by the country and have an impact on the environment.

2- **Aim of the Report:**

The Report aims to provide a comprehensive assessment of the state of environment which is scientifically supported and documented, and policy-related. It also monitors the interaction between environment and society and helps the concerned authorities to take decisions and develop policies that aim at improving environmental management and advancing the process of sustainable development in the country.

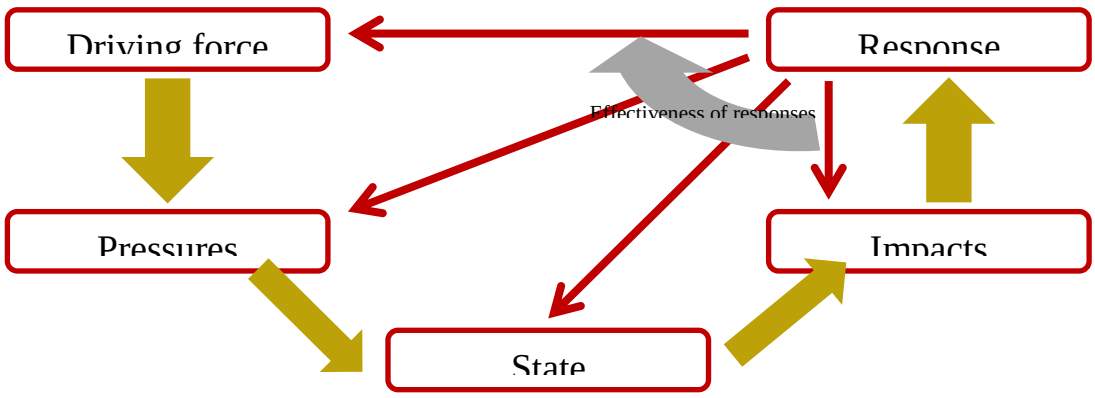
3- **Participants:**

For the purposes of preparing this report and to ensure obtaining the best data, a number of concerned federal agencies has been involved in addition to all local authorities working in the field of environment as well as the statistics centres in the different emirates.

4- **Methodology of Report Preparation:**

The DPSIR model (Drivers- Pressure- State- Impact- Response) has been selected for the purposes of preparing the state of the environment in the United Arab Emirates. The model helps to build future scenarios as part of a series of future vision reports of global environment.t he methodology adopts the narrative style to review the environmental situation.

) Figure) Methodology Used to Prepare SOE Report



5- **Indicators:**

Upon commencing the preparation of the report, many lists of social, economic and environmental indicators have been reviewed, most importantly:Environmental Performance Indices (EPI), Arab League

Sustainable Development Indices, Environmental Footprint, European Environment Agency Indices and other environmental Indices used in countries around the world and are suitable to be used in the UAE. Identification card has been prepared for each indicator, including name, identification, identification code, Method of calculation, type and unit of measurement, in addition to the potential references.

Chapter Two:E-Socio conomic Development:

December 2nd, 1971 witnessed the birth of the United Arab Emirates which came into existence thanks to the clear strategic vision of the late HH Sheikh Zayed bin Sultan Al Nahyan, may he rest in peace. The announcement of the Union of the United Arab Emirates as an independent sovereign country constituting part of the great Arab homeland with the aim of maintaining its independence and sovereignty and stability, and defending against any aggression upon its existence or the existence of its member emirates while protecting the rights and liberties of its people and realizing close co-operation between its Emirates for their common benefit.

The UAE is situated at the heart of the Arabian Gulf and is bordered to the north and north-western with the waters of the Arabian Gulf, in the west with Qatar and Saudi Arabia, in the south with Sultanate of Oman and Saudi Arabia, and in the east with Sea of Oman and Sultanate of Oman. The coastlines overlooking the southern part of the Arabian Gulf extend to 644 Kilometres from the base of Qatar Peninsula in the west to Ra's Musandam in the east hosting the emirates of Abu Dhabi, Dubai, Sharjah, Ajman, Umm Al Quwain and Ras Al Khaimah. The coast of the seventh emirate of Fujairah and the coast of the emirate of Sharjah extend in the Eastern region along the coast of the Sea of Oman with 90 Kilometres length. Thus, the country is located between 22 and 26.5 N latitude, and 51 and 56.51 E longitude. The total area of the UAE is 71023.6 square kilometer.

Topography of the United Arab Emirates:

The topographical nature of most of the UAE territory is desert interspersed with oases. Mountain ranges eastern mountain-form the second part of the desert nature of the UAE, most importantly the northrange which is parallel to the coastline of the Sea of Oman, and reaches its highest peaks in the Mount Jess in Ras Al Khaimah at 1900 meter above sea level. The third section of the UAE topography is the coastal strip with sandy beaches in all emirates except the northern regions in Ras Al Khaimah. The UAE has hundreds of small islands scattered in the Arabian Gulf, more than two hundred of them followed the Emirate of Abu Dhabi alone.

Climate:

UAE has tropical and dry climate, therefore it is subject to some effects coming from the Indian Ocean across the Sea of Oman. The highest temperatures reach up to 47 °C in summer, while the average annual temperature ranges between 35 - 40 °C in summer. The winter is shorter and runs from December to February with temperature drop, especially in the inland areas. As for the wind, the monsoon winds blowing across the UAE is stronger in the spring and late summer months, and are of two types: Northern dry wind which helps mitigate the temperature as far as it is not laden with dust, and mostly very humid

eastern wind. The UAE has low rainfall and is usually accompanied by thunderstorms in December and January of each year. Rainfall is frequent in the emirates of Fujairah and Ras Al Khaimah due to their geographical location and proximity to mountain ranges. During summer, humidity in the UAE ranges particularly on the inhabited coasts and gets lower in the inland areas. %100 -between 60

Demographic Characteristics:

The United Arab Emirates witnessed significant population increase during the past years as a result of the significant growth in the various economic sectors. The following table shows the change in the population of the country during the years (1975- 2010).

Table ( ) Number of Population (1975 – 2010)

Year	Population
1975	557887
1980	1,042,099
1985	1,379,303
1995	2,411,041
2005	4,106,427
*2010	8,264,070

*Estimated

Source: National Bureau of Statistics

Economic Growth:

Before discovery of oil, sources of UAE national income were focused on pearling, fishing, trade and production of some crops. After discovery of oil in 1958, it has become the main source of revenue for UAE and dominated the national economic structure. The country owns about 7.3% of world's oil reserves (97.8 billion barrels) which puts it in sixth place globally, the revenues of the country exports of crude oil represents major financial resource and plays a prominent role in the implementation of economic development projects and their requirements. However, the UAE has succeeded in diversifying the sources of national income by employing achieved oil revenues and gradually reducing the dominance of the oil sector over the national economy. According to statistics available from the National Bureau of Statistics, the share of non-oil productive sectors was 69% of country GDP in 2010.

Generally, the UAE enjoys a strong economy supported by an ideal investment climate with high degree of flexibility, effective economic and favourable investment policies, based on legal and institutional structures comparable to the best international standards, which creates an attractive climate for foreign investment and enhanced the UAE economy.

Energy:

The UAE energy sector has motivated and supported other sectors to advance and shoulder their responsibilities in supporting the economy. However and thanks to the foresight and insightful outlook of its wise leadership, the leadership decided that the traditional source of energy should not be the main driver of the economic process, rather they must focus on renewable energy sources to help in economic growth being an inexhaustible source, and at the same time to minimize the environmental impacts that may arise from burning fuel.

The increased demand on electric power, had to be matched by an increase in the number of power plants and their installed capacities. The installed capacities of power plants have increased by 54 % during 2007 - 2012 as shown in the following table:

Authority	2007	2008	2009	2010	2011	2012
Abu Dhabi Water and Electricity Authority	8,698	9,637	10,110	12,222	13,850	13,842
Dubai Electricity and Water Authority	5,448	6,676	6,997	7,361	8,721	9,646
Sharjah Electricity and Water Authority	2,302	2,382	2,382	2,576	2,576	2,768
Federal Electricity and Water Authority	1,252	1,119	1,080	1,056	985	924
Total	**17,700**	**19,814**	**20,569**	**23,215**	**26,132**	**27,180**
Source: Ministry of Energy, MW unit						

Table ( ) Change in installed capacity for power plants during 2007 - 2012 .

On the other hand, the United Arab Emirates took the lead in the field of green economy in the region. His Highness Sheikh Muhammad bin Rashid Al Maktoum, the Vice-President and Prime Minister of the UAE and Ruler of Dubai, announced the launch of UAE Green Economy Initiative in 2012 under the slogan "A green economy for sustainable development" with the aim of making the UAE one of the global pioneers in green economy, a hub for exporting green products and technologies, and a developmental model to be followed to achieve the objectives of comprehensive development, and at the same time maintain a long-term sustainable environment to achieve UAE 2021 Vision.

Tourism Sector:

Tourism is one of the important sectors whereupon the country depends on for its policy of diversifying the sources of national income and achieving higher rates of economic growth in general. The UAE expressed its keen interest to develop advanced tourist infrastructure represented in various tourist facilities to fulfil the different requirements of tourists and raise the level of services in the sector.

The UAE acquired 55% of the total investments of travel and tourism sector in the Middle East and 19% of the total international visitors arriving to the region in 2012 . Spending of tourists to UAE amounted to 121 Billion dirhams in 2012 representing 42% of total tourist spending in the region according to the World Travel and Tourism Council. The nominal GDP of tourism sector reached 193.6 billion dirhams at annual growth rate of 6%. Total employment in the tourism sector was 384 thousand jobs in 2012 compared to 317 thousand jobs in public 2008 at annual growth rate of up to 5%.

The UAE came in first place globally in the competitiveness of travel and tourism sector within six indicators included in the report of the World Economic Forum in 2013 .

Industry Sector:

Industry is considered one of the most important economic sectors due to its vital role in promoting economic stability and progress through the creation of a permanent and renewable source of national income while developing human resources and providing more job opportunities for citizens. In addition

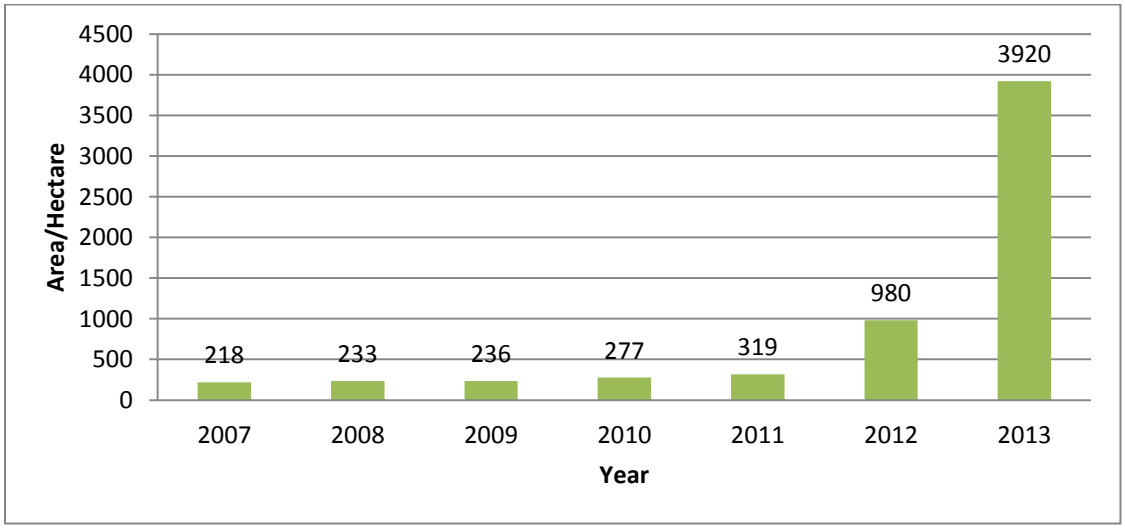
to its role in strengthening the productive base, the industrial sector has witnessed remarkable developments during the past years.

Agriculture Sector.

Agriculture first emerged in the United Arab Emirates as an ancient activity practiced in some areas in the country, such as: Ras Al Khaimah, Fujairah, Al Ain, and some oases, such as: Liwa Oasis. Agriculture in the United Arab Emirates developed rapidly since 1971. Despite the limited natural resources, water scarcity, and difficult environmental conditions, agriculture became an economic activity that relies on the use of the latest technologies. His Highness Sheikh Zayed bin Sultan Al Nahyan, ruler of Abu Dhabi, may God rest his soul said: "Give me agriculture and I will give you civilization". This statement has a significant role in the evolution and development of the agriculture sector in the country.

There were huge efforts made to preserve water resources, with emphasis on promoting the adoption and installation of modern irrigation systems to replace flood irrigation method, which wastes large amounts of water. Figures indicate that modern irrigation systems (sprinkler, drip and fountain irrigation systems) amounted to 91% in 2011, compared to 32% in 1999. The agricultural sector saw a remarkable development. The number of farms increased from 4,000 farms in 1971 to 35,704 operating farms in 2011, with an area of 105257 hectares.

As a result of the UAE efforts, there are now 54 plant organic production farms, three animal production farms, and one manufacturing facility. The organic production area in the UAE increased to 3920 hectares by the end of 2013.



The major challenges facing the agriculture sector in the UAE were: Scarcity of appropriate irrigation water, Soil salinity and available irrigation water, High production costs, Agricultural pests and Post-harvest losses.

Financial and Banking Sector:

The UAE has strong financial and banking sector, including commercial banks, banks licensed for specific activity, specialized banks, investment banks, finance companies, investment institutions, development institutions, financial and monetary brokerage business, exchange companies, insurance companies and representative offices of banks. The sector of commercial banks has more than 50 banking marks including 23 national banks with 768 Branches distributed throughout the country (including exchange offices and customer service units) and 28 foreign commercial banks with more than 80 branches. Among the commercial banks, there are seven banks in the UAE fully operating in accordance with the law of Islamic banks. (UAE Central Bank: Annual Report 2011).

The UAE has two markets (two stock exchanges). According to statistics of the National Bureau of Statistics, the contribution of the financial sector projects in GDP recorded significant increase from 47 billion dirhams in 2005 to 64.6 billion dirhams in 2009 .

Construction and Building Sector:

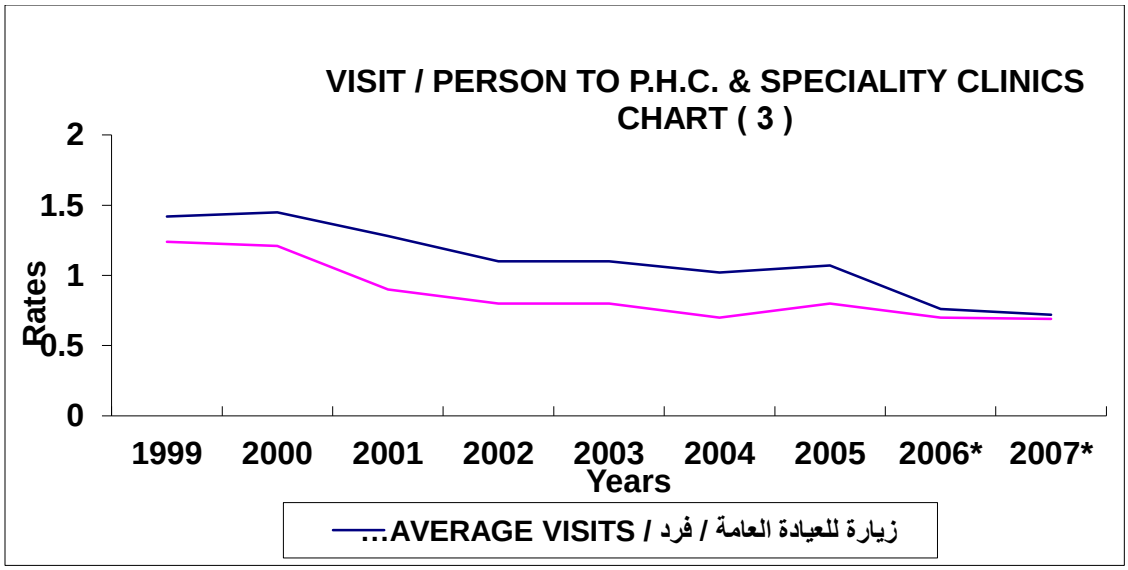
This sector largely contributes to gross national product and absorbs the largest number of workers in the country. According to statistics issued from the National Bureau of Statistics, the contribution of the construction sector to the GDP, at current prices, was increased from 58 billion dirhams in 2005 to 94.7 billion dirhams in 2007, and reached 117.3 billion dirhams in 2009 thanks to government's extensive investment in the infrastructure and construction projects.

Based on the good vision of the government, the Council of Ministers adopted in 2010 standards of green architecture and sustainable construction to be applied all over the country. As a first step, the standards of green architecture have been applied in the government facilities as of the beginning of 2011. The application of the green architecture project is expected to save 10 billion dirhams until 2030 and will also reduce the consumption of water and electricity and improve indoor air quality. The above mentioned standards aim to make buildings compatible with environmental requirements, which include site selection, efficient use of energy and water, quality of materials used in construction, indoor environmental quality and waste management.

Health Sector:

The Ministry of Health ensures that government hospitals, private hospitals, primary health care centres, clinics, and motherhood and childhood provide high-level health services for all citizens, residents and visitors. The UAE provides advanced health services including wide network of modern infrastructure of public and private hospitals, specialized clinics and primary health care centres.

The following figure shows rate of per capita visits to primary health care centres and specialized clinics as follows:



Source: Ministry of Health (Statistics on rates of UAE health services performance (1998 – 2007)

Figure (2-1-5) Rate of per capita visits to primary health care centres and specialized clinics

The figure shows that the rate of visits to primary health care centres and specialized clinics is declining over the years. As a result of high-level services at all stages of the health care system, the average life expectancy in the UAE reaches 78.5 .

Transport Sector:

The current improvement of transport sector is one of the indicative criteria or indicators of the level of urban development. country progress is measured by the progress of means and systems transport where based on the complementary relationship between that sector and all other development sectors, especially if such transport systems are advanced and dependent on technology applications as well as smart and modern systems. Availability of modern and integrated network of various means of transport (land, air and sea) is an important factor in determining the locations and trends of various economic activities knowing that different transport networks govern exchanges between production and consumption centres. Thus, UAE has attached great importance to the transport sector.

Communications Sector:

In an ongoing effort to keep pace with the massive and rapid developments in the UAE communication sector, the country exerted a lot of effort to keep pace with these developments in terms of legislative, organizational and technical structure. The fifth annual report of the Telecommunications Regulatory Authority showed the status of fixed and mobile telecommunications markets.

The report indicated that the number of fixed-line phone subscriptions in the United Arab Emirates reached 2.08 million representing a penetration rate of 25%. As for mobile phones, the sector continued

to grow with more than 16 million users by the end of 2013 representing a penetration rate of 192.9%, making it one of the highest mobile penetration rates in the world. The report also shows an increase in the total number of internet subscriptions by 10.5% to be more than 1.043 million.

Chapter Three: Environmental Management and Policies

Interest in the issue of preserving environment started at an early stage in the United Arab Emirates. Environmental protection efforts in the United Arab Emirates may be divided into four phases.

First Phase: During this phase, the UAE paid attention to the efforts and activities of environmental protection at the federal and local levels.

Second Phase: UAE has been keen to have the efforts of environmental conservation in coincidence with development step by step. In 1975, it formed "**the Supreme Committee of Environment**" to be entrusted with the task of drafting laws, legislations and regulations that achieve safety of environment by coordinating between ministries, agencies, and organizations that have a relationship or activity in the field of environment.

Third Phase: On February 4th, 1993, Federal Law No. (7) of 1993 was issued in regards to the Establishment of the Federal Environmental Agency to replace the Supreme Committee of Environment, which oversaw the environmental issue at the federal level during this phase.

Fourth Phase: "Ministry of Environment and Water" was established in February 2006 marking a new stage in the march of environmental work in the framework of an integrated government strategy. It has been a clear indication of the growing attention to environment and the related issues, particularly the issue of water which constitutes one of the main environmental priorities in the UAE.

Institutional Development:

Ministry of Environment and Water was established to lead the environmental work to be the federal umbrella of environmental action in the United Arab Emirates. In addition to the Ministry of Environment and Water, which is entrusted with environmental action at the federal level, there is a competent authority of environment in each emirate, namely:

- Environment Agency – Abu Dhabi
- Dubai Municipality
- Environment & Protected Areas Authority - Sharjah
- Environment Protection and Development Authority - Ras Al Khaimah
- Ajman Municipality
- Umm Al Quwain Municipality
- Fujairah Municipality

Policies and Legislations in the Field of Environmental Protection

The United Arab Emirates gave clear-cut attention to the achievement of environmental sustainable development, and worked on harnessing all resources to preserve and maintain it for future generations. The country considered the environmental protection a main objective of its development policy and has accordingly made great efforts in difficult environmental conditions to increase green areas, develop water resources, improve marine environment and protect it from pollution, preserve fisheries and livestock, develop strategies to protect biodiversity, and issue necessary legislations for such development policies in the country to ensure sustainable environment for life.

In the field of **legislations**, the UAE has been keen to develop a set of legislations that have had a clear impact in promoting the march of environmental action in the country, including:

Federal Laws: Federal Law No. (24) of 1999 concerning Protection and Development of Environment " and its related five by-laws", Federal Law No. 19 of 1993 on Delimitation of Maritime Zones, Federal Law No. (23) of 1999 concerning the Exploitation, Protection and Development of Living Aquatic Resources, Federal Law No. (11) of 2002 concerning Regulation and Control of International Trade in Endangered Species of Wild Fauna and Flora, Federal Law No. (17) of 2009 on the Protection of New Plant Varieties, Federal Law No. (9) of 2013 on Plant Genetic Resources for Food and Agriculture, Federal Law No. (5) of 2009 on Organic Inputs and Products. It includes the Implementing Regulations of the Federal Law No. (5) of 2009 on Organic Inputs and Products (it specifies the terms of reference for the organic inputs and products in terms of production, manufacturing, processing, trading, importing and exporting), Federal Law No. (8) 2013 concerning the Prevention and Control of Infectious and Epidemic Animal Diseases.

Cabinet Decree: Decree No. (23) of 2001 on the Protection of Ports and Coasts of the country and Its Territorial Sea Against Marine Oil Pollution Incidents, Decree No. (37) of 2001 on the Regulations of the By-laws of Federal Law No. (24) of 1999 regarding the Protection and Development of Environment, Decree No. (29) of 2006 on the Use of Ships and Offshore Units as Floating Warehouses in Transporting or Storing Oil Substance or any of its Derivatives, Decree No. (39) of 2006 on Banning Importation, Exportation and Use of Asbestos Sheets, Decree No. (137) of 2012 on the Guidelines to Regulate the Activities of Facilities Operating in the Cement Industry, Decree No. (26) of 2014 on the National System on Ozone-Depleting Substances.

Ministerial Decrees: A number of ministerial decree are set to prevent pollution or to protect the sources or to achive a commettment.

Environmental Management

The Ministry of Environment and Water is the federal umbrella of environmental action in UAE. The Ministry, in collaboration with its partners from the competent local authorities concerned with

environment, worked on developing environmental action and laid plans, programs and initiatives that will contribute to the sustainability of water security, enhance food security, raise the rates of bio-security and enhance environmental security.

The action plans of the Ministry of Environment and Water emerges from its vision to ensure sustainable environment for life. Thus, it adopted four strategic objectives for 2014 - 2016 tackling integrated management of ecosystems and natural resources, namely: Enhance integrated management for water resources sustainability, Enhance environmental sustainability, Prevention of pests and infectious animal diseases and Enhance food safety and sustainability of domestic production.

Environmental Awareness

Environmental awareness mainly affects the process of environmental improvement knowing that education and awareness campaigns aim at developing the culture of the society regarding environment and promoting environmental behaviour of individuals, which helps to conserve and properly manage natural resource.

The expansion of the concept of environmental awareness over the years motivated various stakeholders of the country to conduct educational campaigns alongside several national campaigns to raise environmental awareness. Also, the country takes part in the various global environmental events.

The bodies concerned with environment organize educational campaigns at the emirate level or in coordination with the concerned federal agency to conduct such campaigns at a federal level encompassing all the emirates. The type and slogans of these campaigns based on the needs of the UAE community in the areas of environmental awareness and education.

Environmental Education:

In recent years, environmental education has become one of the salient elements in curriculum development in many countries of the world, including the United Arab Emirates. Accordingly, efforts have been directed to the need to include environmental content in school curricula and textbooks. Therefore, the Ministry of Education has been keen to incorporate the environmental dimension in school curricula of all stages, by addressing the environmental issues that affect student's environment, in order to open the way for discussion on sustainable solutions.

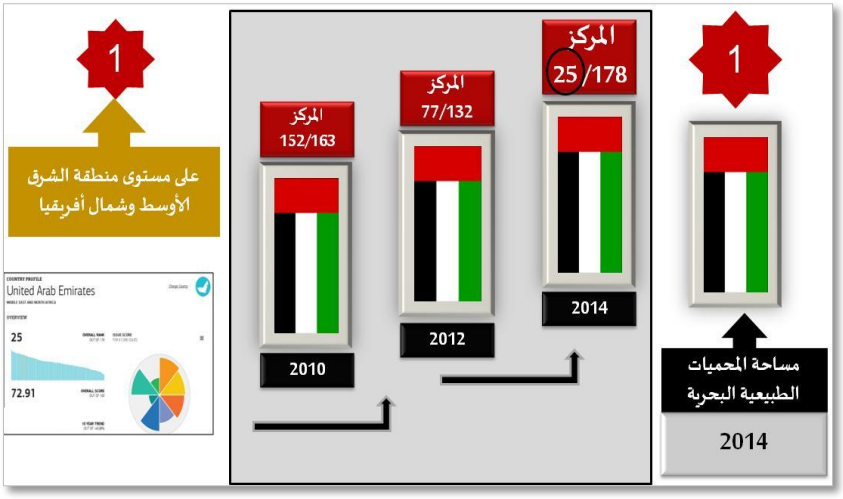
As part of the involvement of global stakeholders in the wheel of promoting environmental knowledge, the Eco-Schools Initiative has been launched. It is a global initiative led by the Emirates Wildlife Society in collaboration with the World Wide Fund for Nature (WWF), aiming to encourage environmental action in schools.

International and Regional Environmental Conventions signed by UAE.

United Arab Emirates join the world in recognizing environmental proplems by signing and ratifying environmental agreements such as: Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer, Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, United Nations Convention to Combat Desertification, Rotterdam Convention on Hazardous Pesticides and Hazardous Chemicals in International Trade, Convention on Biological Diversity, Stockholm Convention on Persistent Organic Pollutants, United Nations Framework Convention on Climate Change and the Kyoto Protocol, Convention on International Trade in Endangered Species of Wild Fauna and Flora - CITES, Convention on Wetlands of International Importance - Ramsar, International Convention for the Protection of New Varieties of Plants, Minamata Convention on Mercury, Convention on the Conservation of Migratory Species of Wild Animals, Kuwait Regional Convention for Cooperation and Protection of Marine Environment from Pollution and its Protocols, International Convention for the Prevention of Pollution from Ships (1973G.) as amended by Protocol MARPOL (1978G.).

Country Ranking on Environmental Performance Index (2010-2014):

The UAE efforts represented in the Ministry of Environment and Water in cooperation with the competent local authorities contributed to advance the UAE ranking on Global Competitiveness Index and the Environmental Performance Index from 152 in 2010 report to 25 in 2014 report. It was ranked first on the Middle East and North Africa.



Environmental Initiatives

The United Arab Emirates made a wide range of achievements in various fields, influenced the various aspects of life and gave it a prominent place among the countries of the world. Like other elements of development carried out by the country, the protection of the environment enjoyed a substantial attention reflected in the large amount of achievements in this area. The UAE Government has adopted many environmental initiatives and projects that have had impact in improving the quality of environment. Examples on these initiatives and project include but not limited to:

1- Abu Dhabi Global Environmental Data Initiative (AGEDI).

2- **The UAE Ecological Footprint Initiative 2006.** The Initiative aims to highlight the ecological footprint of the UAE and seeks to improve it by promoting cooperation between government and private entities. the initiative has contributed to reduce the ecological footprint of UAE as shown in the following table:

Year	2006	2010	2012	2014
Ecological Footprint Index (hectare / person)	11.8	9.5	8.4	7.75

Table ( ) Change in UAE Ecological Footprint Index in 2006, 2010, 2012.

-3 **Abu Dhabi Future Energy Company (Masdar).**

Masdar Company was founded 2006 as a subsidiary of Mubadala Development Company. It aims to achieve commercial benefit in the field of renewable energy and sustainable technologies, and provide the necessary underpinnings in this sector. Masdar City comprises 5 business units with the parent company.

3- **Mohamed bin Zayed Species Conservation Fund.**

Mohamed bin Zayed Species Conservation Fund was established in October 2008 as a charity working on giving grants to individual initiatives to conserve species and identify the pioneers in the fields of conserving species in addition to raising the level of importance of species in the circles of debate.

4- Environmental Performance Card.

In 2009, the Ministry of Environment and Water Initiative initiated the Environmental Performance Card which aims to measure the commitment of industrial. Over years, there has been noticeable increasing number of plants obtaining the card, which promotes the goal of the initiative to encourage industrial establishments to comply with environmental standards, and reduce the negative impact on the environment.

Year	2010	2011	2012	2013
Number of participants obtaining the card	25	37	55	71

5- International Agency for Renewable Energy (IRENA).

6- UAE Strategy for Green Development.

As part of the UAE Government efforts to achieve the vision of the UAE 2021, His Highness Sheikh Mohammed bin Rashid Al Maktoum, UAE Vice President - Prime Minister - and Ruler of Dubai (may Allah protect him) launched in January 2012 "UAE Strategy for Green Development" under the slogan "Green Economy for Sustainable Development".

Environmental Awards

The government has adopted a number of local and international certificates of appreciation for environment so as to demonstrate progress achieved in the environmental field in the country. These awards include: Zayed International Prize for the Environment, Sheikh Mohammed Bin Rashid Prize for Government Excellence, Zayed Future Energy Prize, Emirates Energy Award, Dubai Award for Sustainable Transport, Emirates Appreciation Award for the Environment.

Chapter Four: Air sector:

chapter four speaks about air quality, concentrations of pollutants observed in the monitoring stations in the first section. The second section tackled the various aspects of climate change. The last section handled the ozone and UAE efforts to meet the requirements of Montreal Protocol.

1- Air quality

Maintaining good air quality within the permitted limits is a significant challenge in a moderate population and economic growth. This challenge becomes even more significant in United Arab Emirates due to the significant growth in population and economic growth and the subsequent growth in the number of vehicles and the growth and multicity of industries. The UAE geographic location, rise in temperatures, lack of sources of natural waters, the need for desalination to achieve water balance and the associated electrical energy needed for desalination and fuel burning add more challenges to what has been already stated.

Human activities are the main reason for the increased pressures on air quality such as population and economic growth in the country. The country total population was approximately 4,106,427 million in 2005, and reached about 8,264,070 million in 2010.

1- Ambient air quality monitoring stations in the U.A.E.

Given the importance of the control of concentrations of the ambient air pollutants with the aim of informing the population and providing decision-makers with information on the current situation and enabling them to take appropriate decisions and formulate the policies and plans to reduce the concentration of pollutants and preserving the human health and the environmentUAE has established several stations to monitor the ambient air pollutants. The total numbers of Air Quality Monitoring Stations reached 46 in 2013.

Air pollutant concentrations are measured in the various air quality monitoring stations in the country, including: Sulphur dioxide, Nitrogen dioxide, Ground level ozone, Carbon monoxide, Particulate matter with diameter less than 10 Micron (PM10), Particulate matter with diameter less than 2.5 Micron (PM2.5)

2- Maximum limits for ambient air pollutants in UAE.

Council of Ministers' Decree No. (12) for 2006 concerning air pollution protection system identifies the allowed limits for the ambient air pollutants.

Table (): Maximum limits for the ambient air pollutants by national boundaries and the limits of the Environment Agency, the European Union and the guidelines of the World Health Organization.

Type of pollutant	Average duration of measurement	National Maximum limit	Maximum limit (EPA)	Maximum EU))
		µg/m^3	µg/m^3	µg/m^3
Sulphur dioxide	Hour	350	197	350
	24 Hours	150		125
	Annually	60		-
Carbon monoxide	Hour	30 mg/m^3	40 mg/m^3	-
	8 Hours	10 mg/m^3	10 mg/m^3	10 mg/m^3
Nitrogen dioxide	Hour	400	188	200
	24 Hours	150	-	-
	Annually		99	40
Ozone	Hour	200	-	-
	8 Hours	120	147	120
Particulate (Less than or equal to 10 microns in diameter)	24 Hours	150	150	50

3- Quality of ambient air in the U.A.E.

a- Sulphur dioxide (SO_2)

Burning diesel fuel is considered one of the main sources of increased concentration of sulphur dioxide in the atmosphere in addition to the emissions from some industries. The concentration of SO2 increases in ambient air according to the higher sulphur content in diesel fuel in the case of fuel burning. SO2 concentrations are measured in 36 stations. The concentrations of sulphur dioxide meet the standards with a percentage (94-100) %.

b- Nitrogen dioxide (NO2)

Concentrations of nitrogen dioxide are measured at 25 stations. The nitrogen dioxide concentrations are measured at residential, industrial and common stations. The concentrations of Nitrogen dioxide meet the standards in all stations with a percentage (93-100) %.

c- Carbon monoxide (CO)

Carbon monoxide concentrations are measured in 24 stations. The concentration of carbon monoxide is measured at residential, industrial and common stations. The concentrations of Carbon monoxide meet the standards in all stations.

d- Ground level Ozone (O3)

Ground level Ozone is a secondary pollutant that consists of volatile organic compounds and nitrogen dioxide in sunlight. Ozone concentrations are measured in 31 stations. The concentrations of the ground level ozone are measured at residential, industrial and common stations. The concentrations of ground level Ozone meet the standards in all stations with a percentage (62-93) %.

e- Particulate matter with diameter less than 10 microns (PM10)

The concentrations of particulate matter with diameter less than 10 microns are measured in 32 stations. The concentrations of particulate matter are measured at residential, industrial and common stations. the concentrations of particulate matter with diameter less than 10 microns increase in certain months of the year namely summer months and decrease in other months, due to the influence of monsoons that cause dust-laden storms, particularly given the UAE semi-desert dry climate. The sources of particulate matter with diameter less than 10 microns vary; they may result from human activities or natural sources. In the case of the UAE, natural resources are the main reason for the high concentrations of particulate matter with diameter less than 10 micron. Due to the nature of the UAE climate and geographical location where dust-laden winds blow on the UAE from the neighbouring countries.

f- Particulate matter with diameter less than 2.5 microns (PM2.5)

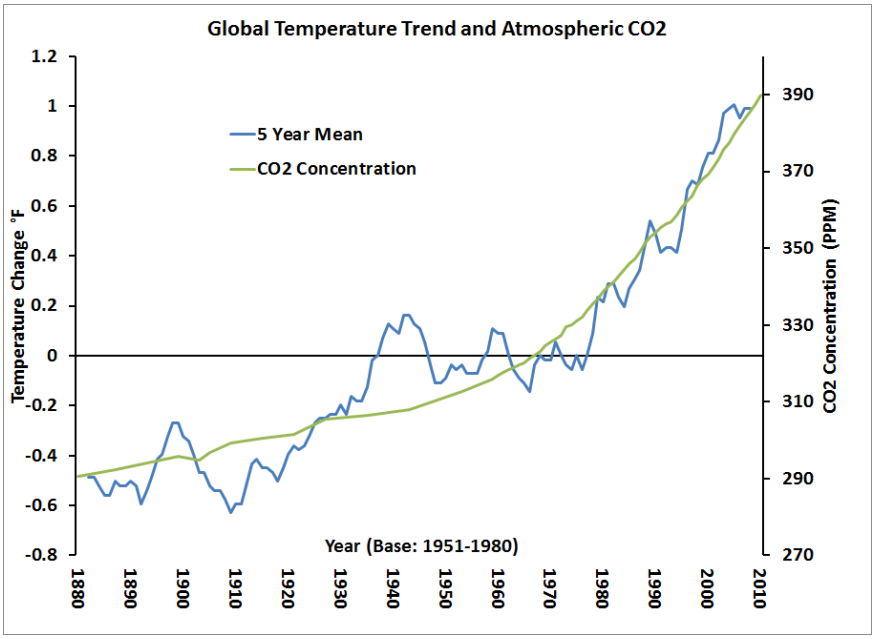
Concentrations of particulate with diameter less than 2.5 micron are measured in 29 stations. The concentrations of particulate matter are measured at residential, industrial and common stations**.**

2- Climate change

The Convention aims to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous changes to the environment due to human activities on the ecosystem. UAE ratified the Framework Convention on Climate Change on December 29, 1995.

The Kyoto Protocol of the framework Convention on climate change came to identify the obligations of the (industrial) countries of annex I that must be taken to reduce their emissions. The UAE has ratified the Kyoto Protocol on January26, 2005.

Scientific studies, prepared by the Intergovernmental Panel on climate change and NASA, have proven the close correlation between increased greenhouse gas concentrations and high temperature. The chart shows the interrelation between temperature and concentrations of carbon dioxide. (NASA)



The impacts of Climate Change are:

The impacts of climate change are expected to include shortage of water quantity and quality in most arid and semi-arid areas, and low agricultural productivity throughout the tropics and subtropics, as well as the increasing incidences of sexually transmitted diseases in the tropics and subtropics, accompanied by damage to ecosystems and biodiversity in these areas, and changes in forests and other ecosystems, in

addition to the impact on the power supply. The sea level rise, associated with the projected increase in temperature, can change the place of tens of millions of people living in low-lying areas.

Changes in Temperature inUAE.

The data analyses of temperature and in the stations of the National Centre of Meteorology and Seismology in UAE airports listed in the release of the environmental statistics group for 2012, refer to a temperature increase at all stations.

Station	Years of Study		Change in Temperature (°C)
Abu Dhabi Airport	1982	2013	2.3
Dubai International Airport	1975	2013	2.7
Sharjah International Airport	1976	2013	1.8
Ras Al Khaimah International Airport	1977	2013	1.5
Fujairah International Airport	1988	2013	0.6
Al Ain International Airport	1994	2013	0.6

2- National Communications:

The United Arab Emirates prepared three national communications reports in fulfilment of its obligations to the Framework Convention on Climate Change. The last of these reports was prepared on 2013.

Sector	Year	Total GHGs emitted in Kilo Ton			
		Co_2	CH_4	N_20	Co_2eq
Energy	1994	60,246	396	5	70,879
	2000	96,240	796	10	116,114
	2005	128,824	1,011	0	153,833
Industry	1994	3,443	1	0	3,455
	2000	6,466	0	0	6,466
	2005	8,623	0	0	9,426
Agriculture	1994	0	48	2	1,777
	2000	0	80	9	4,348
	2005	0	75	8	3,976

Land Use – Land Use Change and Forestary	1994	-4227	0	0	-4227
	2000	-9665	0	0	-9665
	2005	-13223	0	0	-13223
Waste	1994	0	108	0	2,552
	2000	0	120	0	2,622
	2005	0	339	0	7,122
Total	1994	59,462	553	7	74,436
	2000	93,041	997	19	119,885
	2005	124,230	1,425	20	161,134

3- The United Arab Emirates efforts to mitigate climate change:

The United Arab Emirates has engaged in the implementation of 14 projects for the purpose of reducing the emissions of GHGs under the umbrella of Clean Development Mechanism (CDM) projects. The prospective total annual reduction of these projects estimated about one million tons of carbon dioxide equivalent (CO2Eq).

4- Adaptation:

The United Arab Emirates is encountering potential critical effects due to climate change on the natural environmental ecosystems as well as the water surfaces. Moreover, it has an impact on the bio-diversity and the resulted negative effects on agriculture, food security, water resources and health, as well as on the public infrastructure, the human populations and the economic and social framework.

The governments works on many initiatives and projects contributing to the adaptation with the climate change impacts as anticipatory steps as enhancement of the water security and increase of feeding the groundwater, increase the number of dams and barriers that will help in increasing the level of groundwater which enhance the water security in the country.

The MoEW has also undertaken a technology of cultivation without soil in several agricultural projects. This technology helps to control the internal domestic climate (Temperature, humidity and ventilation), roots environment (select of the adequate media and provide it with feeders). It is worth saying that this technology increases the efficiency of water consumption, use of fertilizers, solutions for soil problems and type of soil.

3- Ozone:

Ozone (O3) is a natural atmospheric gas. Each Ozone molecule consists of 3 oxygen particles. It is chemically known as (O_3).

Although the ozone hole was discovered in the 70s of the last century, its impact became the most hazardous in 1985 as the scientists declared that 50% of ozone in the Earth was lost. Several natural and human factors have, over many decades, led to ozone depletion. Among the key factors is the wide use of chlorofluorocarbons (CFCs): organic compounds utilized in many industries and used widely in home, commercial, industrial, central and automobile air conditioning systems, refrigerators, thermal isolation applications, fire extinguishers, insecticides, tools used in hairdressing, deodorants and other beauty products.

Vienna Convention for the Protection of the Ozone Layer

Due to this significant scientific discovery of the ozone depletion, many countries have called for organizing an agreement for the protection of the ozone layer in 1985 in Vienna. Vienna Convention for the Protection of the Ozone Layer aims at: Phase-out of ozone depleting substances, Transfer of environmentally sound technology, Promotion of awareness to all the social levels in regards to the importance of maintaining the ozone layer.

The Montreal Protocol on Substances That Deplete the Ozone Layer:

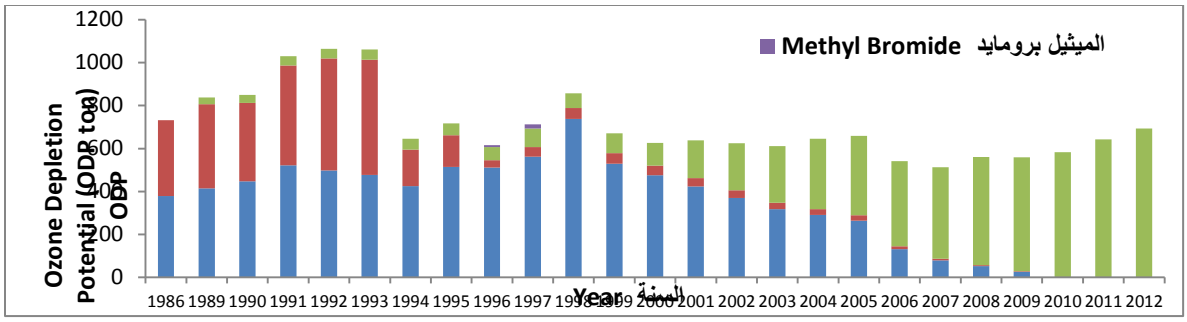
A global convention that aims at protecting the ozone layer through phasing-out numerous substances which are responsible for the ozone depletion. The Protocol was ratified on September 16, 1987. It is considered the technical and financial mechanism for carrying out the goals of the Convention.

For that purpose, the Protocol has undergone four amendments (London, 1990), (Copenhagen, 1992), (Montreal, 1997) and (Beijing, 1999).

UAE Efforts to Protect the Ozone Layer

The UAE was, as always, an important and active party in the efforts exerted by the international community to phase out the ozone depleting substances. UAE acceded to the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances That Deplete the Ozone Layer in 1989. In addition, it adopted the four amendments of the Montreal Protocol. It has been since then exerting enormous efforts to meet its obligations under the Convention and the Protocol. Eliminating the consumption of numerous CFCs, Halons and methyl bromide in 2010, UAE has then met the requirements of the Protocol. For HCFCs, UAE shall have completely eliminated their consumption by 2040.

Table ( ) shows the UAE consumption of the ozone depleting substances according to their groups for years 1995/2011 (ozone depletion potential ton).



Chapter Five: Water Resources

The United Arab Emirates relies on three main sources of water: groundwater, desalinated water, and treated wastewater. Surface water resources account for a little percentage that does not exceed 1% annually of the available water resources. The deficit between the amount of the (incoming) feeding and the (outgoing) consumption of water from the aquifer has caused a number of consequences, namely: the reduction in the level groundwater, the increase in the water salinity of a large number of wells, groundwater intrusion with seawater, and the total drought of certain wells.

Water sources:

Water sources may be divided into traditional sources, such as surface water and groundwater, and non-traditional sources, such as desalinated water and treated wastewater. Groundwater and desalinated seawater are the major water sources in the country.

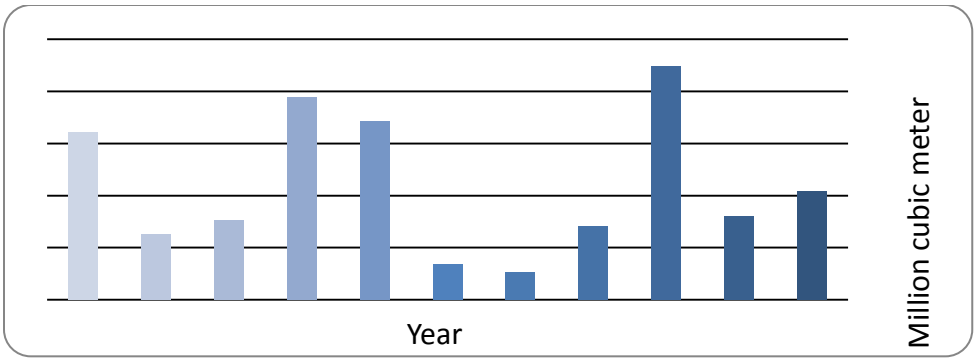
Water Sources 2013 Estimates		
Source	**Quantity (million cubic meter)**	**Percentage**
Groundwater	1850	%44
Treated wastewater	584	%14
Desalinated water	1750	%42
Surface water	16	Less than 1%
Total	4200	%100

Source: Ministry of Environment and Water, Water Resources Management, internal reports

a- Dams and rainwater harvesting:

The United Arab Emirates has paid great attention to dams and rainwater harvesting projects. Dams contribute to protection from floods and flows risk, and improve the quality and quantity of the water situation in the aquifer by increasing the feeding rates of groundwater. In addition, dams preserve the soil from erosion in agricultural areas. Alluvial materials deposited in the dam lake may be used to improve the properties of the soil for agriculture purposes. In 2013, the number of dams and levees amounted to 130, with a total storage capacity of about 120 million cubic meters of water.

Water accumulated behind dams in the UAE during the period from 2003 to 2013.

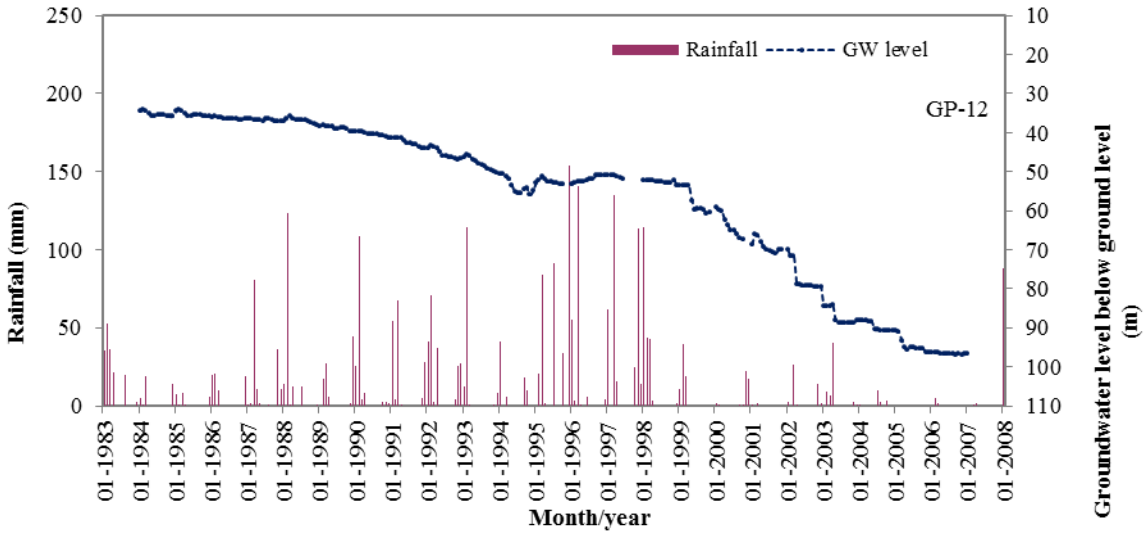


b- Aflaj, springs and fountains:

Falaj is a traditional engineering system for water transportation and irrigation. It has a special heritage significance and is used in traditional farming areas in UAE. Aflaj is a man-dug water canal in the ground or on its surface. The source of this groundwater carrier system is a spring. Water flows from this spring or well into the Falaj. Aflaj are usually available in mountains or plain areas at the feet of mountains, where groundwater level is high. Aflaj are utilized in so many important ways, namely farm irrigation.

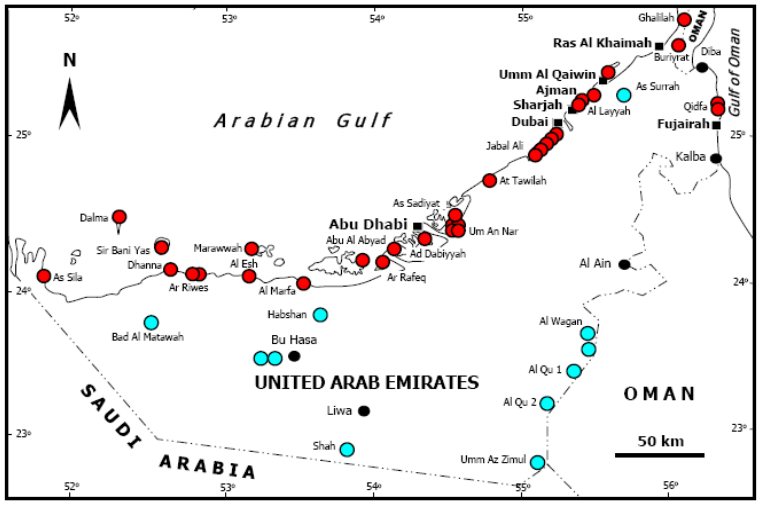
c- Groundwater:

Groundwater is the water located beneath the surface of the earth and can be extracted by wells. It is the main natural resource and the most used water resource in the UAE. It accounts for 44% of the total used water resources. Most of the groundwater is used in the agricultural sector. Over-pumping in excess of annual feeding rates caused great disproportion in the water balance of the ground reservoir, because the rate of rainwater that feeds and renews groundwater reservoir is no more than 10% of the withdrawn amount. Groundwater levels dropped by 10 meters per decade until the mid-nineties, and by 70 meters since then. the following Figure indicate the low groundwater level inHamraniyeh area.



d- Desalinatedseawater:

The United Arab Emirates depends on seawater as the main source for the production of fresh water. It has created several desalination plants to provide the water requirements of various municipal sectors. The production capacity of desalination plants in the UAE has increased because of the increased water demand caused by the economic development and population growth. The increase since 2000 to 2010 is estimated by about three-fold and counting. There are about 33 major water desalination plants in the UAE



Locations of major desalination plants in the UAE.

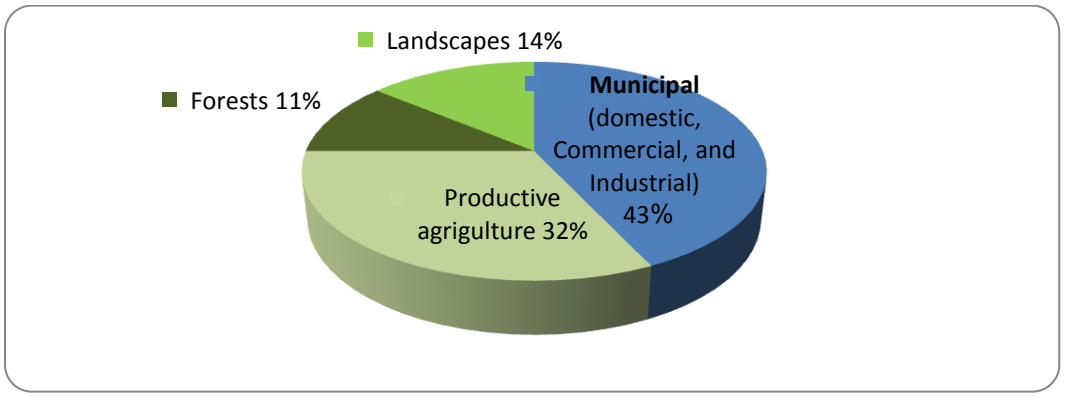
Source: Water Resources Preservation Strategy 2010

.Treated wastewater -e

During recent years, the UAE has adopted the approach of reusing treated wastewater in landscaping, such as irrigation of gardens, green spaces and reforestation trees, especially in the areas surrounding complexes. This aims to relieve pressure on other water resources. There are 79 medium and large wastewater treatment plants in the UAE. The treated wastewater produced in 2012 is estimated about 584 million cubic meters (615 million cubic meters in 2013). Thus, it accounts for 14% of the total water resources used in the UAE. This water is used mostly (64%) in green areas irrigation and landscaping.

Water Demand:

The demand for water in the UAE is influenced by high population growth, high standard of living, and the expansion of economic and agricultural activities. The current total demand for water in the UAE is estimated at 4.2 billion cubic meters per year. It must be noted that the rate of water consumption per .(capita is high in the UAE (364 litres/capita/day

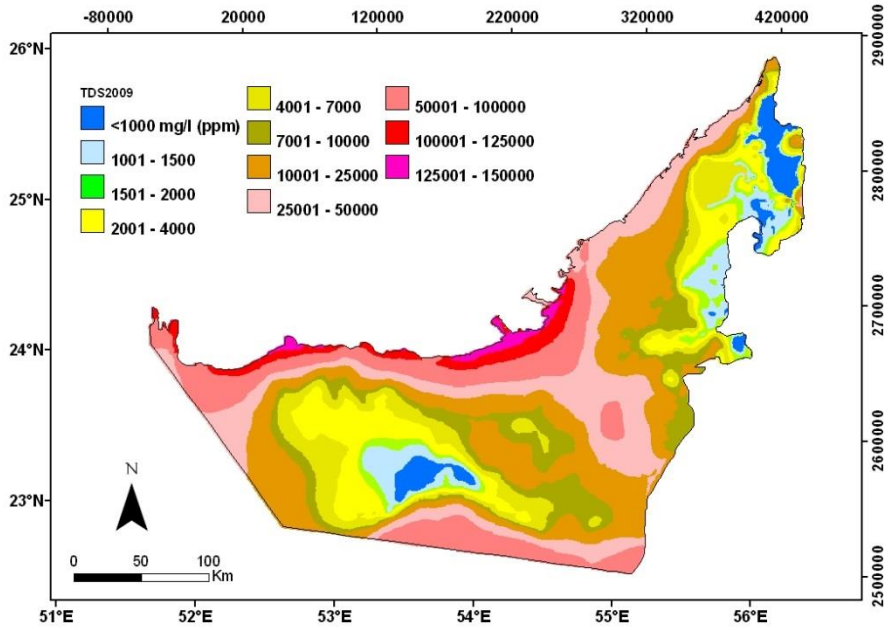


Water demand by water consuming sectors in the United Arab Emirates.

:Source Water, Water Resources Ministry of Environment andManagement estimates.

Water quality:

Groundwater salinity map shows the quality of groundwater in the UAE.



Desalinated water is the main source of drinking water in the United Arab Emirates. Seawater desalination plants produce about 98% of the water consumed in the municipal sector, which includes drinking and household, industrial, commercial, and some agricultural uses.

Integrated managementfor water resources:

In the UAE, the water issue has always been a high priority, due to the natural factors leading to scarce water resources.

In 2010, the Ministry has developed the National Strategy for Preservation of Water Resources, which has been approved by the Council of Ministers. This strategy adopts policies for water use rationalization and conservation in all sectors. Within an integrated approach to manage demand for water resources, and increase rates of natural feeding of groundwater resources through the establishment and management of dams and levees to raise the feeding rates of groundwater resources.

Chapter Six: Land Resources

Chapter Six tackles land resources focusing on biodiversity, desertification and Coastal marine environment.

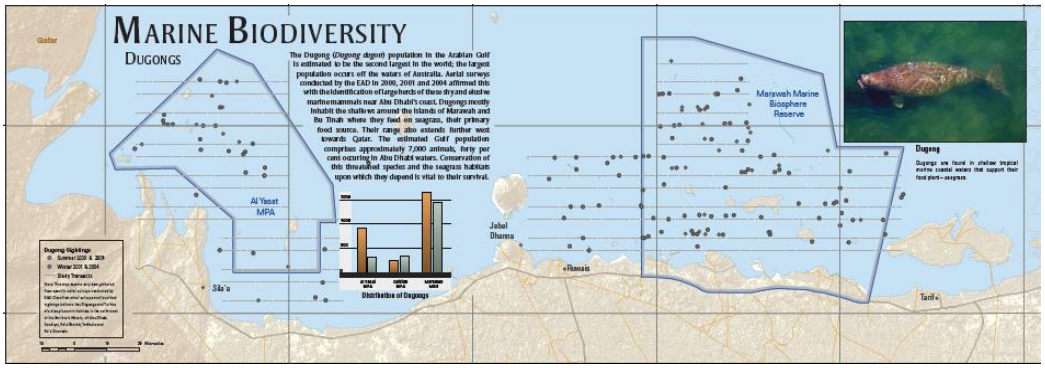
1- Biodiversity

Biodiversity holds great significance to the United Arab Emirates. Desert environment supports various sparse seasonal plants, while several native plants, which have adapted to the country's harsh climatic conditions, are an important grazing source and are used as feed for animals. Seasonal plants are also of great value to the stabilization of sand dunes, and have many medical uses. As for mountain environment, fungi has adapted to those systems and their freshwater habitats, such as ponds, valleys, and springs. Given its rugged nature, it is considered an ideal wildlife refuge for some species that are exposed to pressures, like the Arabian leopard and the endemic Arabian Tahr. Further, the marine environment historically played major role in the prosperity of transportation and housing, while pearling, in the recent past, was the cornerstone of economy in the society. In addition, marine and coastal environment is the habitat for many marine species and important fish hatchery. It also contributes to the protection of beaches from coastal erosion, and plays a role in climate change mitigation.

Climate change, along with its associated impacts, is one of the major threats facing the UAE, which are classified among the categories of countries highest rate of vulnerability to the potential impacts of climate change in the world. The impact of climate change on the coastal area is considered notable, as these areas often have high population density. The coastal area in the UAE host about 85% of the total population and more than 90% of the country's infrastructure. It also embraces various fragile sub-ecosystems and many leading cultural sites (EAD, 2008).

Invasive species are also deemed as key factor with negative effects on biodiversity. In UAE, many species entered the region by mistake with the increase in commercial activity, and through illicit trade in wild species. Some plants that bear the high temperature and salinity have been admitted to the country to be used in the cultivation of forests and landscaping within cities, while other species have been admitted as personal possessions, but ran away from their owners and began to compete with native species for food. These are expected to have serious consequences on wildlife, in particular, and the environment in general.

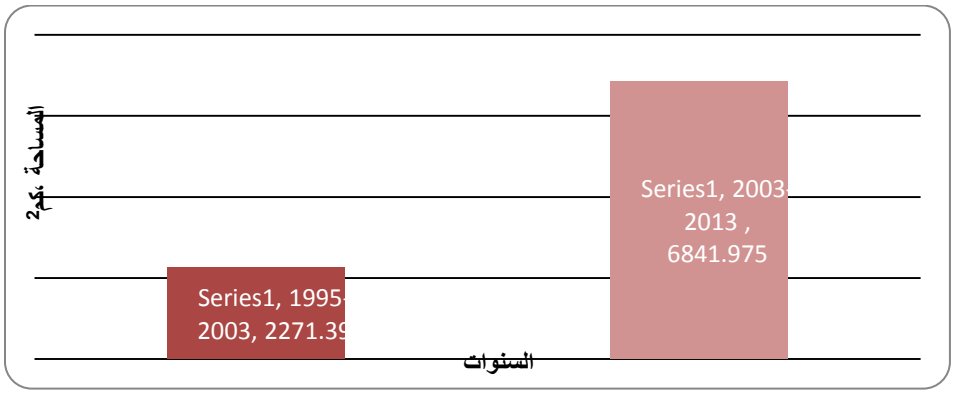
There are many migratory species and wild animals that use certain areas of the country to spread from, like sea turtles, dugong (dugong dugon), birds of prey, and sharks. These species, just like other wild animals, are exposed to various risks that threaten their existence.



dugongs locations in Abu Dhabi (Environment Agency of Abu Dhabi)

Nature Reserves

By 2010, declared natural reserves in UAE totalled to 19, and were increased to 22 in 2013. Reserves that have been listed as wetlands of international importance within the framework of Ramsar Convention increased from (2) reserves in 2010 to (5) reserves in 2013.



Declared natural reserves in UAE (1995-2013-sq.km)

Marine Reserves:

In 2014, the United Arab Emirates was ranked first in the marine reserves index, compared to 33rd in 2012. This, indeed, reflects the UAE efforts in the preservation of ecosystems

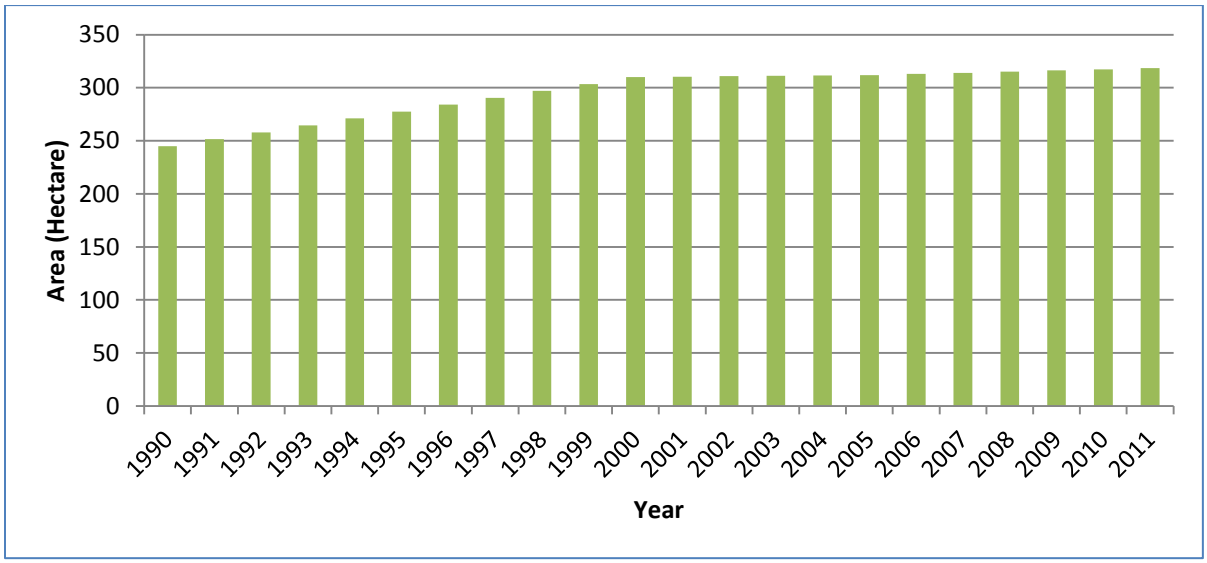
UAE marine reserves and their areas.

Emirate	Reserve name	Reserve type	Area (sq.km)	Date of declaration
Abu Dhabi	Marwah	Marine (marine biosphere reserve)	4255	2007
	Al Yasat	Marine	2046	2005 (declaration) 2009 (renovation)

Dubai	Ras Al Khor Wildlife Sanctuary	Marine (Ramsar)	6.2	1998
	Jebel Ali Wildlife Sanctuary	Marine	28.76	1998
Sharjah	Sir Bu Naeir Island	Marine (Ramsar)	49.6	2000
	Mangroves and Alhafeya in Khor Kalba	Marine (Ramsar)	14.9	2012
Ajman	Al Zoura reserve	Marine	1.4	2004
Fujairah	Bird island	Marine	1.36	1995
	Badeyya	marine	0.57	1995
	Aqqa	Marine	0.71	1995
	Dadna	Marine	0.08	1995

Forests

Competent authorities in UAE made great efforts to increase forest area, considering their significant contribution to the protection of soil and sand dune fixation and minimization of climate change impacts. As such, it has increased forest area from 245 thousand hectares in 1990 to approximately 318.36 thousand hectares in 2011.



Growth in forest area during the period 1990-2011 (Source: World Bank report)

2- Land Degradation and Desertification

Human factors, represented in population increase and the change in social order pattern and consumption systems, play a major role in increasing phenomenon of land degradation and desertification by increasing pressure on natural resources, water resources, and urban encroachment on arable land, the intensification of the use of pesticides and fertilizers, logging, and overgrazing, as they all contribute to the deterioration of soil properties.

On the other hand, climatic conditions prevailing in the country, such as high temperatures, evaporation, relative humidity, and low average rainfall, play a major role in the degradation of land, and contribute greatly to the emergence of fragile ecosystems characterized by vulnerable vegetation and predominant erodible soil. They have also adversely affected groundwater reserves.

The human and climatic factors discussed above have caused soil erosion. Wind leads to soil erosion, which results in dust and dust storms depending on wind intensity. Its impact is deeper in areas with deteriorating vegetation, and perhaps erosion caused by wind, sand encroachment and formation of sand dunes is considered the most influential factors causing land degradation in UAE. Indeed, this process has significant impact on the movement of soil components and their mobility from one place to another, which leads to sand encroachment and dunes formation. These dunes or quicksand may encroach to arable lands, civil facilities, and public roads and sometimes cause damage to them.

Erosion is also caused by water due to surface water runoff or as a result of the raindrops impact on soil. Effect increases as a result of heavy rains and runoff, and as water erodes and deposits soft soil components in other locations. Canyons and valleys are formed and increase in size with time. Loss of soft clay particles and alluvion results in the prevalence of loose sand in the surface layer of soil which leads to formation of superficial loose sand layer exposed to erosion by wind.

Climatic changes and frequent drought periods have led to a decline and degradation in natural pastures, resulting in increased numbers of grazing animals per area unit, which in turn led to the disappearance of favourite grazing plants and the spread of least palatable plants. With continued grazing, pastures have been invaded by plants that are out of local vegetation groups and which often include annual plants. Due to intensive grazing, grazing lands have become semi-naked and suffer degraded vegetation and soil.

Vegetation cover

Vegetation density in the United Arab Emirates is concentrated in three main areas: The East Coast, Ras Al Khaimah and Al Ain region and the oases and forests in the Liwa- Aeradh- Bu Hasa Empty Quarter.

3- Marine and Coastal Environment.

The coastal and marine environment in the United Arab Emirates has a traditional importance for its people. In spite of its presence in an arid climate belt, the UAE has rich coastal and marine resources. Its waters house a complex and unique mixture of fish and marine organisms. It is also abundant with diverse and productive environmental habitats, which are relatively considered essential to the life of these

species. The coastal and marine environment essentially supports the country's economy. The UAE people have relied for generations on the marine and coastal environment as one of the main sources of income. The UAE territorial waters are part of the Arabian Gulf and Sea of Oman, and thus environmental problems and issues related to these waters are common with other Gulf countries to varying degrees.

In this field, the Ministry of Environment and Water took the initiative to preserve and sustain marine and coastal environmental resources. This in line with the UAE Vision 2021.

Characteristics of the UAE marine and coastal environment:

The United Arab Emirates has a regional sea area of 27,624 sq. km, and a coast that extends about 734 kilometres. It includes the coasts of the Arabian Gulf and the Sea of Oman, which are natural coasts. Its marine and coastal environment, including habitats and water organisms, are among the most important renewable natural resources of the UAE. This environment includes various types of sand, mud and rock beaches, coastal marshes, mangrove forests, sea grass areas, and coral reefs. The UAE water is home to diverse and unique marine species.

Pressures on marine and coastal environment:

UAE marine and coastal environment experiences several pressures caused by many years of development, expansion and over-exploitation of natural coastal and marine resources The following are the most important pressures and factors threatening the sustainability of marine ecosystems: Urbanization and coastal development, Pollution from onshore and offshore activities, Over-exploitation of living aquatic wealth, Climate Change and Invasive species.

Efforts in protection of marine and coastal environment:

1. Legislations and regulations:

Marine and coastal environment in the UAE have received considerable attention given the valuable resources and wealth it is rich with, which, over the centuries, have been considered the main artery to achieve food security and community welfare.

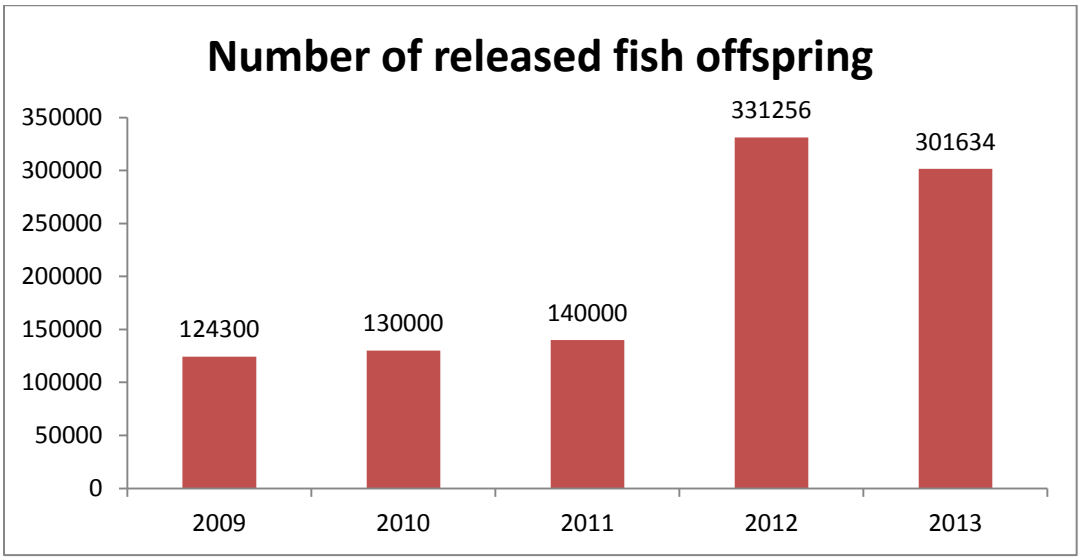
2. International and regional agreements

The United Arab Emirates has been very keen on participating in all regional and international efforts aimed at the protection of the marine environment. In 1978, the United Arab Emirates participated in the establishment of the Regional Organization for the Protection of the Marine Environment.

3. Fish stock enhancement

The Marine Environment Research Department was opened in 1984 and was entrusted with numerous tasks that aimed at achieving the objectives of fisheries development. The Department was established in Emirate of Umm Al Quwain, with an area of 333,000 square meters. Over the past years, fish stocks in the UAE waters were supported by the farming and production of a number of local, economically significant fish, that were released into the UAE coast, particularly in protected areas and areas rich with

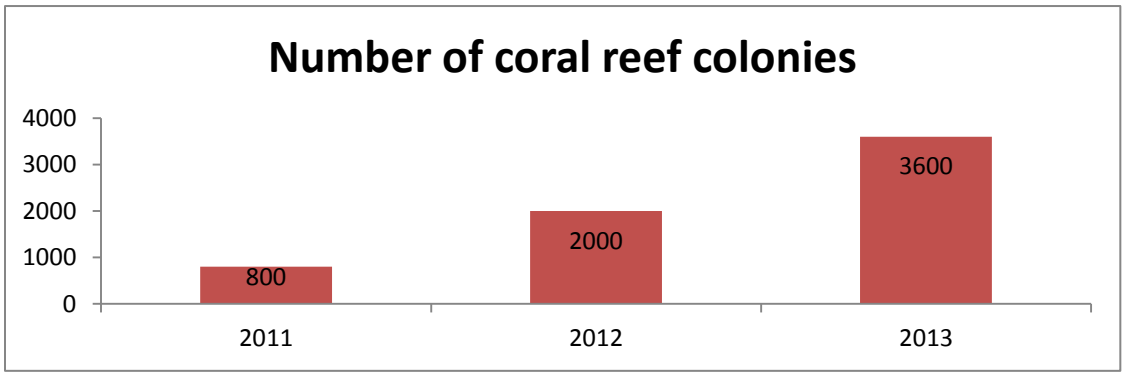
mangroves and creeks during the period from 1984 to 2013. Fish species included Grouper, Sea Bass, Sea Bream, Rabbit Fish, Spangled Emperor, Mullet, Finned Black Sea Bream, and Grayish Grunt.



Fish offspring released during 2009-2013

4. Coral Reefs and Mangroves:

The Ministry of Environment and Water has cultivated coral reefs, which are considered one of the most important activities that improve the protection of habitats and fragile environments.



Change in the number of coral reef colonies during 2011-2013

Mangrove trees are cultivated, nurtured and maintained due to their great benefits and their role in protecting the marine environment and its live resources. The Government has paid great attention to mangrove trees, since they are among the ecosystems that must be developed and maintained.

Mangrove forests according to their density at UAE level

Emirate	Areas per density (square kilometre)			Total area (square kilometre)
	Low (10%)	Medium (10-75%)	High (more than 75%)	
Abu Dhabi	30.62	52.91	24.81	108.34
Dubai	0.12	0.13	0.38	0.63
Sharjah	0.16	0.3	1.85	2.04
Ras Al-Khaymah	0.78	1.52	2.50	4.80
Umm Al Quwain.	11.76	0.42	6.59	18.77
Ajman	1.58	-	-	1.58
Total	**55.57**	**35.79**	**36.13**	**136.16**

5. Monitoring and controlling coastal waters.

6. Observing phytoplankton and red tide phenomenon using satellite imagery:

The Ministry of Environment and Water developed a national plan for managing and monitoring the red tide phenomenon in the UAE. The programs of the plan are implemented by forming a working group to follow up on the red tide phenomenon. Experts are brought in from various countries around the world. The plan has been adopted by the Ministerial Council for Services. It includes a program of monitoring and controlling phytoplankton causing the red tide. The program is updated according to the requirements. A laboratory was prepared, and samples are collected periodically from stations on the UAE coasts in order to identify the spread and types of phytoplankton in the UAE territorial waters during different times and seasons of the year.