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**PACE LAW SCHOOL**  
P A C E U N I V E R S I T Y

**PROMOTING SUSTAINABLE DEVELOPMENT THROUGH ENVIRONMENTAL LAW:  
PROSPECTS FOR SAUDI ARABIA**

**FAISAL K. ALTURKI**

**A Thesis Submitted in  
Partial Fulfillment of the  
Requirements for the Degree of  
Doctorate in Juridical Science**

**At**

**Pace University School of Law  
May 2015**

**(Submitted, April 2, 2015)**

**Revised, June 2015**

## **Abstract**

The Kingdom of Saudi Arabia enjoys a rich cultural and natural heritage and has an advanced state of socio- economic development. It also suffers from a wide range of growing environmental problems such as securing its potable water supply, coping with solid and liquid waste, ensuring clean air or protecting the marine environment. It is the objective of sustainable development to ensure that further development in the Kingdom does not damage the public health of the people or the natural environment. The policies underlying sustainable development have developed internationally over the past four decades and are well explained in Agenda 21 (1992) restated in the Sustainable Development Goals (2014). One of the three pillars of sustainable development is protection of the environment. Islam provides a foundation for the Kingdom's duty to protect the environment. The Kingdom of Saudi Arabia has enacted an ambitious body of environment law to support this pillar, but these laws are not yet effectively implemented. Its environment management systems are not protecting the environment, and measures are needed to strengthen environmental regulation. To do so, the Kingdom needs to provide education and training about environmental protection, to improve the administration of its environmental management, and to adopt and implement modern procedures that ensure compliance with – and enforcement – of the Kingdom's environmental laws. Principally, the Kingdom needs to use an environmental management system ("EMS") and to require wide use of the ISO 14000 standards and audits. And to employ the methodologies of the International Network on Environmental Compliance and Enforcement ("INECE"), it should also establish a committee on performance which would oversee compliance with and enforcement of environmental law. The Kingdom should be guided by the UN Sustainable Development Goals,

and above all by its religious values, to establish an effective environmental law compliance and enforcement regime.

## **Acknowledgements**

I cannot express adequately thanks to the members of my thesis committee for their insights, support and encouragement. I offer my sincere appreciation for the learning opportunities provided by all my professors at Pace Law School.

First and foremost, my adviser has been the *sine qua non* of my success. I would like to express my most deep and sincere gratitude to my advisor, Professor Nicholas A Robinson, for his continuous support of my SJD study and research and for his excellent guidance, patience, motivation, enthusiasm, and profound knowledge. His guidance helped me throughout the research and writing of this thesis. I simply could not imagine a better advisor and mentor for my SJD study. He has been supportive since the days I began studying at Pace Law School. I remember he used to say something like “you’re in a marathon so you should continue with the same speed” to encourage me to stay in the library and be optimistic. Ever since, he has supported me not only by providing a research assistantship over almost three years but also academically and emotionally during the most difficult times when writing this thesis, as he offered the moral support and the freedom I needed to complete this project.

I humbly take this opportunity to express my gratitude to many people who have helped me reach the completion of my studies. In a special way, I would thank every person who either directly or indirectly contributed to the success of this project. Principally, I salute all those who provided direct support, read, offered their views and comments, those who proofread, edited and assisted me with deeper insights in writing this thesis.

In my gratitude, I would not wish to ignore the presence of librarians, who accorded me all manners of assistance in the research and in preparing references for this project. Being new area of academic research, it was an on-going challenge to gather all the necessary resources; with their advice and support, I was able to wander around in pursuit of relevant and useful resources. The librarians of Pace Law School showed me how to identify rich sources to beef-up my contents, both hard copies and online. Also, without the presence of my classmates and peers, this thesis would not have been completed. Last but not least, I beg forgiveness for my impositions on all those who in one way or an other assisted me in completing this thesis; I really appreciate your contributions and support. Thank you all for the joy and knowledge, which resulted from this project.

Most importantly, none of this would have been possible without the love and patience of my family. I must thank my mother, father, brother and sisters, to whom this dissertation is dedicated. They have been a constant source of love, concern, support and strength all these years. I would like to express my heartfelt gratitude to my family. Special gratitude goes to my beloved grandmother who showed concern and in particular always asks God to help and guide me in this world and the hereafter. It is for you my dearest that this thesis has become a success. In spite of the long and difficult journey, I can truly say that I have achieved all these due to integrated efforts of my dear family.

March 30, 2015

Faisal K. Alturki



## **Note on References Cited**

In this thesis I have employed the Modern Language Association (“MLA”) style of citation<sup>1</sup> as the most appropriate style for providing thorough references to the authors and other sources of information on which this project relies. Principally, MLA is efficient, effective, and gives the readers opportunity to undertake their own substantial research on any of the themes presented in this thesis. MLA is a style of citations that brings coherence and consistency in writing.

MLA adopts various citation styles. One of the best-known styles involves the following arrangement (author, name and page number). Another involves footnotes, with the entire reference/works cited appearing in the footnote, with the page number in the end. In my thesis, I adopted the second style, since it allows the reader easier access to the source of information. For instance, using the footnote gives a simple citation of the source and the page number where the information was retrieved. However, the styles for footnotes vary according to the website where the information is retrieved. Sources that do not have clear dates and years of publications are noted as (No date) or (Nd), while those that lack clear page numbers are left without inserting pages. The second scenario arises where sources are drawn from the Internet or websites that lack paging system for the information. Despite this gap, the information can always be checked from these websites.

Overall, I adopted two formats in placing references in the thesis.

- In the first case, I inserted all references below their corresponding chapters and arranged them alphabetically.

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<sup>1</sup> Modern Language Association, <https://www.mla.org>

- In the next mode, I combined all references at the end of the thesis and titled it the Bibliography. The Bibliography includes all references used in all chapters.

## **Sources**

Sources used in this thesis came from the Internet, books, journals, and institutional websites. The number of sources drawn from books and academic journals were fewer than those derived from the institutional websites. The main reason for this balance is that environmental law in Saudi Arabia is a new field of study, and there are very few books as yet written on the topic. As environmental issues emerge, most information available becomes online and thus appears most often on website sources. In this context, I relied on websites such as those of the Saudi Royal Ministry of Petroleum and Ministry of Energy, among other authoritative websites. In relation to the institutional websites, most sources were indicated as websites source. The sources drawn from books were indicated as print at the end of every source arrangement, while those purely drawn from the Internet were indicated as Internet sources. This is the clear distinction and categorization of sources that I used in the thesis. Finally, the information derived from the Internet and particularly from websites of the government of the Kingdom of Saudi Arabia matched most topics directly related to those examined in this thesis. As scholarship on environmental law in Saudi Arabia grows, future scholars will find more books on this new topic.

Sources are cited for each chapter at the end of each chapter, a bibliography of all references appears at the end of the thesis. Footnotes are used to identify specific authorities within a source.



## Citations

- The citations in this work are specific to the details from which the information was retrieved. Here I relied on page numbers and the authors' particulars in citing critical information found in the sources.
- Citations always follow quotations marks, just to give readers easy access to the information. The quotation marks also denote the major points in the content. These two reasons justify why quotation marks were preferred in this work.
- For sources that were used more than once, I inserted the word, "Ibid." (abbreviation of ibidem, meaning "the same" in Latin), just to signify the multiple use of a single source. On the other hand, I did not include the page numbers or dates where they were missing from the initial document where the information was retrieved. This gap should not be a major issue since the links following the source in the end of each chapter provides the complete citation.
- Finally, some citations have similar author names, yet omit the word "Ibid." This is so because the same author can publish numerous books on the same topic but in different years.
- All footnotes are numbered consecutively in each chapter, and are not numbered through the thesis.

## Websites

- Most sources were retrieved from several websites. The websites for the Saudi Royal Ministry of Petroleum, among others, are among the commonly cited websites. To

corroborate the information sourced from websites, I relied as far as possible upon books, journals, and articles to elaborate and support my argument.

## **Links**

- The links provide specific details about where to locate the referenced information. These links also lead to many of the books that I commonly used for reference.

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*We are part of this world and face its problems and challenges. We all share this responsibility and will actively contribute to putting solutions for many urgent international issues, including the issues of environment and promotion of sustainable development and will continue to work with international organizations and institutions and international partners.*<sup>2</sup>

Custodian of the Two Holy Mosques  
King Salman bin Abdulaziz Al Saud  
King of the Kingdom of Saudi Arabia

## CHAPTER 1

### 1. Introduction

This thesis provides the framework for understanding how the government of Saudi Arabia and its people can advance the above noted vision of King Salman, regarding stewardship of the environment through the promotion of sustainable development practices.

In September of 2014, the United Nations General Assembly adopted the Sustainable Development Goals (“SDGs”). Representatives of the Kingdom of Saudi Arabia participated in the negotiations that led to the SDGs. Each country will determine its own path to attain the SDGs. How every nation will implement sustainable development depends on the laws and resources of each country and on specific environmental conditions, as every nation experiences differently the impacts of rising sea level and other changes to the earth. Each nation should institute innovative and effective policies and practices to cope with environmental change. The Kingdom of Saudi Arabia has important opportunities to create its own path toward sustainable social economic and ecological conditions for its people.

Every nation has to figure out what to do to build its own sustainable future. The Kingdom of Saudi Arabia will determine its own way to do so, but it will be seeking innovation

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<sup>2</sup> Outline on Tuesday King Salman AlSaudi domestic and foreign policy agenda in a televised speech ALRABIYA NEWS, Middle East. Staff writer, Tuesday, 10 March 2015. <http://english.alarabiya.net/en/News/middle-east/2015/03/10/Saudi-King-says-he-is-committed-to-defending-Palestinian-cause.html>.

and sharing ideas with others as it finds its own path. This thesis discusses the path that the Kingdom of Saudi Arabia should take. This thesis seeks to help the Kingdom to build its capacity to create one of the world's finest environmental management systems. The Kingdom has shown innovative leadership in other sectors of social and economic life. Until recently it has not felt the urgent need to create environmental management systems because the impact of human life on the environment in Saudi Arabia were not so evidently severe. The problems are now becoming more visible and need to be addressed and, therefore, a strong environmental management system using international best practices is needed, together with support from a sound environmental enforcement system.

This thesis explores ways to implement environmental laws in the Kingdom of Saudi Arabia, and how these laws serve pillars of environmental sustainability. Every country establishes particular rules aimed at enhancing harmony and order. The environmental rules formulated in the Kingdom of Saudi Arabia contribute significantly to its development and sustainability. Environmental laws provide the basis for the conservation of both natural and human habitats. Protection of lands, the inner atmosphere and the oceans is also provided by these laws.

Environmental laws are of utmost importance to the Kingdom of Saudi Arabia in promoting development and sustainability. For this reason, this thesis clearly analyses the various rules that have been enacted, both at national and internal levels, and the aim of which involves protection of both natural and manmade habitats. In this regard, special consideration is geared towards the Kingdom's legal duties to environmental conservation under international agreements and how these treaties and the soft-law policies of the SDGs and Agenda 21 (the U.N. action plan adopted in 1992) promote environmental conservation efforts in Saudi Arabia.

The conclusion of this thesis is that various rules have enhanced conservation and sustainability of the ecosystem and can do more if fully implemented and enforced. Thus the foundation of this thesis rests on understanding that environmental laws and regulations are a key pillar to enhancing environmental sustainability within the Kingdom of Saudi Arabia. Accordingly, the research focuses on these regulations and their mode of application in the context of several substantive environmental themes. It examines various impacts, and calls for their application in overcoming environmental challenges in the Kingdom of Saudi Arabia.

The history and heritage of the Kingdom of Saudi Arabia are equally important and should be understood when examining the application of these environmental rules in the country. For example, because the country is entirely dedicated to the precepts of the Islamic faith, the research examines how religious laws should further laws for environmental protection and conservation. In a nutshell, this thesis addresses for the first time how environmental laws serve as a pillar for sustainable development in the Kingdom of Saudi Arabia.

This topic is of much importance to the Kingdom of Saudi Arabia due to the unfolding environmental developments in the country. In brief, the Kingdom of Saudi Arabia lies within a desert, and its chief economic activity is the extraction of oil and natural gas. The development of natural resources must deal with impact on the land and the aquatic environment, thus promoting the formulation of policies for sustainable land and ocean use. This is just one illustration out of many, which underscores the importance of the theme of this thesis.

Considering the geographical location of the Kingdom of Saudi Arabia, unless formal laws are formulated and enforced, environmental degradation will risk compromising the country's future. Advancing the concept of sustainable development through policy formulation and environmental laws is in the best interest of the country as far as oil and gas exploitation is



concerned. The most important aspect of this topic relates to the future sustainability of these resources. For example, overexploitation of natural resources eventually will dry up oil and gas reserves and deplete water aquifers, thus rendering the country without enough resources for its future generations. This problem can only be resolved by implementing firm regulatory measures that protect both human and environmental interests. These concepts are articulated in this thesis because they are essential for the country's economic sustainability.

Discussing this topic is very important to the country's on-going development process, since development can proceed only with insight into past and present policies on sustainable development. In this regard, it is important to consider the baseline provided by Agenda 21 and its key stipulations and how various other policies emanating from the 1992 Rio Conference on Environment and Development have contributed to shaping sustainable development in the Kingdom of Saudi Arabia. The most important part of this discussion entails aligning the best environmental policy and management practices with social, political and economic backgrounds respectively.

Therefore, this thesis identifies measures that can eliminate various bad practices while promoting sustainable development in all spheres. Sustainable development is an integrated process involving a variety of conservation measures. The seas represent the most important natural endowments enjoyed by the Kingdom of Saudi Arabia, but this location also puts it at special peril because of the harms caused by the pollution from the extraction of oil and gas. Therefore, the thesis examines guidelines for establishing policy frameworks to govern petroleum mining, and thus to help minimize the pollution that threatens aquatic life. Implementing sustainable development rules is essential to Saudi Arabia because it gives basic

formulation and processes for protecting aquatic life as well as for maintaining cleaner land and atmospheric environments.

The discussion surrounding sustainability identifies various measures to ensure a cleaner, safer and long lasting energy industry, and also in other sectors such as food production.

Ultimately, diligent pursuit of enlightened environmental policies and sustainable development should lead to the establishment of practices essential for human survival. Energy production is one such aspect. The concept of sustainable development cuts across every dimension of life, most notably through the use of increasingly clean energy and consequent ability to enjoy clean air. These are but a few sustainability benefits that this thesis examines.

This is a snapshot of what the thesis entails. The following is a summary of the aims of each chapter. In the chapters that follow, this thesis sets forth research, analysis and explanation of a wide variety issues. Chapter One examines how the history of sustainable development in the Kingdom of Saudi Arabia is crucial for understanding contemporary perspectives on the nation's developmental process. This chapter covers various historical aspects of sustainable development in the Kingdom of Saudi Arabia. In addition, this topic explains the consequences of the unique historical and geographical contexts of the country, and it enumerates various policies that have so far sustained its livelihood. For instance, having a thorough knowledge of the country's natural resources is important to developing well informed and suitably nuanced policies and guidelines that enhance their sustainability. This is just one issue featured under the study of sustainable development. The current state of sustainable development operates in the environment and culture of the production of energy resources; reflecting past progress offers a sound basis for proposing what the country still needs.

After setting forth the history of sustainable development in the Kingdom of Saudi Arabia, this thesis focuses on the state of the environment today. In the subsequent sub-chapters, the research focuses on several key environmental conditions in Saudi Arabia. Principally, the need for enhancing sustainable development is related to modes of environmental conservation adopted in a country. This is the most important premise of the discussion that the research will offer. Therefore, the history of sustainable development involves tracing social, economic and political trajectories. Environmental conservation and regulation are one such aspect that is entailed under sustainable development in a country. For example, natural resources are directly extracted from the environment, and these resources either directly or indirectly contribute to human sustainability. In addition, man-made resources are integrated in the environment with the view of supplementing the finite natural resources that have traditionally driven development in the region.

The Kingdom of Saudi Arabia, like most countries, subscribes to the environmental protection and sustainable development agenda, and so this agenda should be mirrored in all perspectives and understood by tracing its history. This thesis sets forth critical recommendations for sustainable development practices in the Kingdom of Saudi Arabia. The conclusion focuses on measures that will test the country's state, stake, willingness and capacity to implement the relevant developmental agenda required for a sustained future. The conclusion also gives detailed illustrations and a statement of the environmental situation in the Kingdom of Saudi Arabia.

Chapter Two offers a detailed description of the resources and environmental situation in the Kingdom of Saudi Arabia and aims to achieve the following objectives. The first aim is to contribute an unprecedented taxonomy of the basic structure of the environmental laws of the

Kingdom of Saudi Arabia by providing, among other things, a comprehensive environmental history and geography of the country. It also aims to give detailed information on the state of the country's economy and development compared as relevant to other national economies, and to further compare how different regulations play fundamental roles in how nations perform on this economic index and rating. Finally, this chapter aims to give a detailed account of the most important ecological and environmental issues affecting the Saudi Arabia. This element comes with a series of sub-chapters including studies of fresh water and its provision throughout the country and of hazardous wastes and the countless efforts to manage them.

The main aim of Chapter Three is to provide a detailed description of sustainable development policies applicable to the Kingdom of Saudi Arabia. Other important objectives to include illustrating the concept of sustainable development in relation to care of the earth as a critical natural resource and illustrating the mandate of institutions charged with the care of the earth and how those bodies have contributed to sustainable land use systems in the Kingdom. These are some critical aims of Chapter Three.

Chapter Four offers a detailed account of topics in Agenda 21 of particular relevance to the Kingdom. In line with Agenda 21, this chapter aims to synthesize various strands including poverty and sustainable development. In addition, this chapter highlights other social issues such as production and consumption patterns as highlighted by Agenda 21. In a nutshell, this chapter provides a new understanding of critical social factors entailed in Agenda 21, and how these factors have contributed to social transformation in the Kingdom of Saudi Arabia's social development plan.

Chapter Five recognizes the central roles of the Islamic religion in providing proper norms of conduct relative to the environment. Therefore, this chapter is geared towards explaining Islamic principles and attitudes towards environmental sustainability.

Chapter Six identifies and states the existing environmental laws of the Kingdom of Saudi Arabia. This chapter seeks to give a complete understanding regarding the knowledge of legal systems of the country, various rules of governance, national environmental laws, and how these laws contribute to sanitation and environmental sustainability. These laws provide the foundation for developing the Kingdom's environmental management system, as proposed in chapters 8 and 10.

Chapter Seven enumerates various environmental challenges facing the Kingdom of Saudi Arabia. In order to achieve this objective, this chapter surveys the natural resources and conditions of the country, including fresh water sources, oil and gas reserves, and climatic conditions, and it details how these resources are impacted by the environmental conservation measures and other regulations. The aims of chapter eight are to describe, contextualize and analyze various key environmental regulations in the Kingdom of Saudi Arabia. It also enumerates the implementation and enforcement of regulations in the Kingdom of Saudi Arabia, and how these aspects contribute to (or detract from) environmental sustainability. Chapter Eight explains existing environmental regulations and their enforcement, and it shows how these laws affect the Kingdom of Saudi Arabia.

Chapter Eight discusses strengthening Saudi Arabia's systems for environmental regulation. It explains how better monitoring and data collection is required to know what problems need better enforcement of environmental law to ensure more regular compliance.

Principally, it argues that the channels for public participation are weaker than the environment demands. It calls for establishing a new environmental management system (“EMS”).

Finally, Chapter Nine renders insights into the up-coming sustainable development plans of the Kingdom of Saudi Arabia, and how these plans are expected to transform the country’s future. It calls for greater use of international best management practices in all aspects of the Kingdom’s environment-related activities, in order to ensure its sustainable development.

## CHAPTER 2

### 2. The environment of Saudi Arabia

The environment is a remarkable non-specific term that encompasses both human and nonhuman factors. It is imperative to note that every living and non-living creature in a particular environment is part of a dynamic relationship, which shapes their shared environment.

Therefore, the core test that every environment lives or dies by is called sustainability. Regarding this term, it is worth appreciating the value of the environment for all life forms and how environmental degradation may threaten the existence of living organisms, humans included.

With regard to this topic, we shall examine various environmental constructs in Saudi Arabia and how legal measures are put into place to ensure sustainable utilization of the environment. A variety of factors either directly or indirectly impacts the vitality of an environment. This chapter provides overview of the environmental sustainability deliberation about certain rules and regulations that have contributed to the conservation of Saudi Arabia's environment. In addition, key issues involving biotic and abiotic factors within the Saudi Arabian environment will be examined in order to explain how such different legal frameworks have shaped environmental sustainability within the country.

Saudi Arabia is situated on the Arabian Peninsula and shares a sea and gulf with several neighbors.<sup>3</sup> The geographical location of this country poses environmental risks, as it is surrounded by water. However, Saudi Arabia traces its history over many centuries to the ancient civilization of the Arabian Peninsula.<sup>4</sup> This region remains central to the flourishing international trade, particularly in the trade of bulk items economical for trading only by sea. The Kingdom holds a unique religious significance, which is Islamic. The Kingdom has important natural

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<sup>3</sup> Wynbrandt, James. *A Brief History of Saudi Arabia*. New York, NY: Facts On File, 2010. Print. 24

<sup>4</sup> Wynbrandt, James. *Ibid.* 46

resources and serves as home to significant plants and animals. The subsequent chapter will give a detailed description of the Kingdom of Saudi Arabia.

## **2.1 The history and geography**

Before being able to understand the basic structure of environmental law and practice in Saudi Arabia, it is necessary to know how the country identifies itself in the world. The Kingdom of Saudi Arabia is an Arab Islamic State and a member of the United Nations.<sup>5</sup> It has a total area of 2,149,690 km,<sup>6</sup> and according to the 2010 census has an estimated population of 29.1 million people of whom 20 million are citizens and 9 million are non-citizens.<sup>7</sup> Arabic is the official language of the Kingdom.

The cultural identities of Saudi Arabian citizens are both Muslim and Arab,<sup>8</sup> which connects them to millions of people in other countries. Saudi Arabian culture mainly revolves around the religion of Islam. Islam's two holy sites, Mecca and Medina, are located on the west side of the country. The culture of Saudi Arabia is rich because it has been shaped by its Islamic customs as well as by its ancient Bedouin civilization.<sup>9</sup>

In September 23, 1932, the modern Kingdom of Saudi Arabia was unified by King Abdulaziz bin Abdulrahman Al-Saud. The country was named the Kingdom of Saudi Arabia, an Islamic state with Arabic as its national language and the Holy Qur'an is its constitution.<sup>10</sup> The

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<sup>5</sup> Kechichian, Joseph A. *Succession in Saudi Arabia*. New York, N.Y: Palgrave, 2001. 209

<sup>6</sup> Ministry of Foreign Affairs. About Saudi Arabia. Last Updated in 2013. 1

<sup>7</sup> The central department of statistics and information, Saudi Arabia. Nd.

<sup>8</sup> Article 10, Royal Order No.(A/90)27 Sha'ban 1412H. Basic Law of governance. Umm alQura Gazette No. 3397, 2 Ramadan 1412H, 1-5<sup>th</sup> March 1992, print.

<sup>9</sup> Muhammad bin Saud. Royal embassy of Saudi Arabia, Saudi Arabian, History of Civilization. 1744. Internet source. Nd. 1

<sup>10</sup> Kechichian, Joseph A. Ibid. 209.



discovery of oil on March 3, 1938 in Dhahran brought about a dramatic transformation of the country;<sup>11</sup> it provides great economic wealth to enable modernization.

Law reform has been an on-going process. King Abdul Aziz decreed new legislation in 1924 with a view towards unifying Saudi Arabia's legal system. The administrative arrangement was improved in 1932 and 1958, through various measure including a decree saying the source of law in Saudi Arabia is the Hanbali School of Islamic jurisprudence<sup>12</sup> and that the Kingdom and its subjects are bound by *Shari'a* ("Islamic Law").<sup>13</sup>

The Kingdom is committed to supporting international peace as part of its foreign policy, which calls for greater justice in the treatment among countries, with respect to political, economic, social, and other dimensions.<sup>14</sup> In 1960 the Kingdom of Saudi Arabia and other states created the Organization of the Petroleum Exporting Countries ("OPEC").<sup>15</sup> Saudi Arabia joined the UN as an original member in 1945 and also became a founding member of the Gulf Cooperation Council in 1981. Because of the location and the common interests of the Kingdom and the other Arabian Gulf States, these six states have agreed to coordinate joint policies of security and defence during times of major crisis. The leaders of the six Gulf States agreed in 1981 to found Cooperation Council for the Arab States of the Gulf – GCC.<sup>16</sup> In 1984 The Kingdom joined the United Nations Convention on the Law of the Sea "UNCLOS"<sup>17</sup> and has established its exclusive economic zone ("EEZ"). In 2005 Saudi Arabia joined the World Trade

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<sup>11</sup> Ramady, M A. *The Saudi Arabian Economy*. New York: Springer, 2010. Internet resource. 218

<sup>12</sup> Weigl, Constanze. *Reproductive Health Behavior and Decision-Making of Muslim Women: An Ethnographic Study in a Low-Income Community in Urban North India*. Berlin: Lit, 2010. Print. 196

<sup>13</sup> Ahmed Al-Suwaidi. Developments of the legal systems of the Gulf Arab States. 1993. Arab L.Q. 289. Sharia definition: Islamic canonical law based on the teachings of the Koran and the traditions of the Prophet (Hadith and Sunna), prescribing both religious and secular duties and sometimes retributive penalties for law breaking. It has generally been supplemented by legislation adapted to the conditions of the day, though the manner in which it should be applied in modern states is a subject of dispute between Islamic fundamentalists and modernists.

<sup>14</sup> Ministry of Foreign Affairs, Kingdom of Saudi Arabia. Ibid.

<sup>15</sup> OPEC . Brief History.2015. Internet source.

<sup>16</sup> Clements, Frank. *Arab Regional Organizations*. New Brunswick, N.J. (U.S.A.: Transaction Publishers, 1992. Print. 320

<sup>17</sup> *United Nations Convention on the Law of the Sea*. New York: Nova Science Publishers, 2009. Print. 121.

Organization.<sup>18</sup> It is also party to many international environmental agreements. In 1981, the Kingdom of Saudi Arabia joined the International Union for Conservation of Nature (“IUCN”), and has played an important role in establishing IUCN’s presences in the WAME Region during this time.<sup>19</sup>

Saudis have extensively transformed their country and style of living within the last twenty years, growing from a group of traditional villages into a country with modern cities enjoying an advanced level of development. However, the people still keep and cherish their traditions and values, such as respect for the family and religion as the center of daily life. That said, the Saudi people have taken their principles and customs and even their style of dress and adapted them to the modern world.<sup>20</sup> For example, women today can work outside the home and exercise independence. Modernization has brought some environmental pollution to Saudi Arabia, similar to the experience of most economically developed nations.

Saudi Arabia lies at the crossroads of three continents: Europe, Asia, and Africa. The Kingdom is located in the southwest corner of Asia. It extends from the Red Sea on its west side to the Arabian Gulf, the United Arab Emirates, Qatar, and the island state of Bahrain on its east. From Yemen and the Sultanate of Oman border to its south and the borders of Jordan, Iraq, and Kuwait to its north, Saudi Arabia has 2,640 kilometres of coastline—nearly 1,800 kilometres along the Gulf of Aqaba and the Red Sea and the remainder along the Arabian Gulf.<sup>21</sup>

Saudi Arabia’s geography contains a variety of landscapes, including forests, grasslands, mountains, seacoasts, and deserts. The climates vary greatly. Temperatures vary in different regions. In the desert, some cities in the desert can reach over 115 degrees Fahrenheit during the

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<sup>18</sup> Bowen, Wayne H. *The History of Saudi Arabia*. Westport, Conn: Greenwood Press, 2008. Print.

<sup>19</sup> Anstey, Simon. The International Union for Conservation of Nature IUCN; Kingdom of Saudi Arabia to expand collaboration with IUCN. November 18 2005, news story.

<sup>20</sup> Information Office of the Royal Embassy of Saudi Arabia. About Saudi Arabia; culture and art. Nd.

<sup>21</sup> *The Link*. New York: Americans for Middle East Understanding, 1968. Print. 115.

summer, while in the winter temperatures in central parts of the country can drop below freezing.<sup>22</sup> Most of the regions of Saudi Arabia are in or near desert, which puts them at constant risk of further desertification.<sup>23</sup> Saudi Arabia in general has a desert-based climate and is also one of the driest countries in the world.<sup>24</sup> It receives very little rain, averaging at about only four inches annually.<sup>25</sup> Lack of water in the Kingdom means that it has no perennial rivers or permanent water bodies, prompting the development of wide seawater desalination services.

The Kingdom founded the Ministry of Agriculture in 1953, and since that time the ministry has distributed, free of charge, more than two million hectares of domestic uncultivated land to farmers and agricultural companies.<sup>26</sup> The Kingdom established the Saudi Agricultural Bank in 1964 to finance development in the agricultural sector. One of the ways the agricultural sector is financed is through the bank's extension of long-term and interest-free loans to the farmers and to the agricultural companies throughout the country.<sup>27</sup> The establishment of the Ministry of Agriculture and the Agricultural Bank has led to the development of an agricultural sector to the point that the Kingdom is now a self-sufficient producer of many types of food. There has been a growth in the production of all basic foods and Saudi Arabia is completely self-sufficient in several food items, such as meat, milk and eggs. Indeed, the Kingdom exports wheat, dates, dairy products, eggs, fish, poultry, fruits, vegetables and flowers to markets around

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<sup>22</sup> Taher, Nahed, and Bandar Hajjar. *Energy and Environment in Saudi Arabia: Concerns & Opportunities*. Cham: Imprint: Springer, 2014. Internet resource. 13

<sup>23</sup> Kulovesi, Kati. *The Wto Dispute Settlement System: Challenges of the Environment, Legitimacy and Fragmentation*. Alphen aan den Rijn: Wolters Kluwer Law & Business, 2011. Print. 73. "Desertification does not mean that deserts are steadily advancing or taking over neighboring land. As defined by the UN Convention, desertification is a process of "land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities". Patches of degraded land may develop hundreds of kilometers from the nearest desert. But these patches can expand and join together, creating desert-like conditions. Desertification contributes to other environmental crises, such as the loss of biodiversity and global warming." Earth Summit 5. Rio de Janeiro 1992.

<sup>24</sup> *Mergent International Manual*. New York: Mergent, 2001. Print. 9211.

<sup>25</sup> Muhammad bin Saud. Ibid.

<sup>26</sup> Peretz, Don. *The Middle East Today*. Westport, Conn: Praeger, 1994. Print. 474.

<sup>27</sup> The ministry of finance, Kingdom of Saudi Arabia.Nd.

the world. This situation reflects the accomplishment of the government's particularly ambitious goal in light of the fact that because the majority of Saudi Arabia is desert, the potential for crop cultivation is severely limited.

A world-class fresh water infrastructure is key to the successful development of an agriculture sector in Saudi Arabia. The Kingdom has built more than 200 dams to contain the rainwater that does fall. These dams have an estimated storage capacity of 689 million cubic meters. The network of dams has been built to trap and utilize precious seasonal floods, such as those that occurred in Jeddah<sup>28</sup> in 2011. In 2009 and 2011, Jeddah experienced extreme flooding that resulted in loss of life and in property damage. The rains caused a major infrastructure failure, and government responded by undertaking one of the most significant infrastructure improvement programs in Jeddah. Not surprisingly, the desert Kingdom takes the husbandry of water resources very seriously.

## **2.2 Economy and development**

The economy and society of the Kingdom have been transformed considerably from supporting a basic agricultural society to becoming a global commercial and industrial trading centre with a modern infrastructure. In present day Saudi Arabia, all industrial facilities must be sited within industrial cities and located in major urban centres. A major issue is the failure of industrial facilities to follow environmental laws. In addition to oil and gas, the principle natural resources of the Kingdom are: gold, uranium, bauxite, coal, iron, phosphate, tungsten, zinc, silver, and copper.<sup>29</sup> Famously, the Kingdom's economy is based largely on the extraction, production and shipment of oil and gas. The economy is subject to quite comprehensive

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<sup>28</sup> Jiménez, Cisneros B. E, and Takashi Asano. *Water Reuse: An International Survey of Current Practice, Issues and Needs*. London: IWA Pub, 2008. Print. 578

<sup>29</sup> DeRouen, Karl R, and Paul Bellamy. *International Security and the United States: An Encyclopedia*. Westport, Conn: Praeger Security International, 2008. Print. 667

government controls on most economic activities by the Ministry of Finance and Saudi Arabian Monetary Agency.<sup>30</sup> Saudi Arabia possesses 18% of the world's petroleum reserves and consistently ranks as the largest exporter of petroleum. The petroleum sector accounts for roughly 75% of budget revenues, 90% of export earnings, and 45% of gross domestic product notwithstanding the growth of other sectors.<sup>31</sup>

Saudi Arabia possesses vast reserves of natural gas. The Kingdom is expanding its use of gas because it is a relatively environmentally friendly energy source for urban and industrial use. Until the 1970s most of the gas produced in the Saudi Arabia was a by-product of crude oil production. However, since then the Kingdom has collected natural gas and pipes it around the country.<sup>32</sup>

The Kingdom's economy remains greatly dependent on oil. The number of hydrocarbon field discoveries has reached more than 60 fields, many located in the Eastern Province.<sup>33</sup> The remaining is located south of the capital city, Riyadh, in the central parts of the Kingdom, and in the coastal plains and under the waters of the Red Sea in the western parts of Saudi Arabia.<sup>34</sup> The majority of these are oil fields, while some are oil and gas, gas only or condensates fields.

The Ministry of Petroleum and Mineral Resources emphasizes that mining activities require appropriate environmental management in all fields particular to mineral exploration, processing, extraction and production. Therefore, economic and environmental issues must be considered when taking a decision related to any mining project, taking into account that mineral

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<sup>30</sup> AlHaj, Ali M. S. *Saudi Arabian Monetary Agency: A Review of Its Accomplishments, 1372 Ah-1411 Ah, 1952 G-1991 G*. Riyadh: publisher not identified, 1991. Print. 7.

<sup>31</sup> Annual Statistical Bulletin. Organization of the petroleum exporting countries. 2014. Internet source.

<sup>32</sup> Jeffreys, Andrew. *The Report*. London: Oxford Business Group, 2011. Print. 166.

<sup>33</sup> Jeffreys, Andrew. *Ibid*. 167

<sup>34</sup> Hatim Al-Bisher, Selina Stead, Tim Gray. *Saudi Maritime Policy: Integrated Governance*. 2011. Print. 55

deposits are non-renewable.<sup>35</sup> Most production is developed by government controlled Aramco, which has its own environmental management system.<sup>36</sup>

Saudi Arabia has been a member of the World Trade Organization since December 2005, reflecting the Kingdom's role as part of the international economy and attracting foreign investment.<sup>37</sup> The accession of the Kingdom to the WTO has a number of different economic effects. Accession of the Kingdom to the WTO has produced several useful reforms in the Kingdom's laws, for example, establishing regulations with respect to the protection of patents and other forms intellectual property. The Kingdom amended 42 rules, among which were rules that affected some policies of the Kingdom to conform to general fundamentals and principles of World Trade Organization agreements, giving the Kingdom a great opportunity to work with other states sharing common objectives, using its authority and financial strength to draft and influence policies.

Education is another key sector that has undergone dramatic transformation. When the modern Kingdom was established in 1932, education was available to very few people, and primarily only to those who lived in the cities and really just to those wealthy families who could afford to pay for it.<sup>38</sup> Education is a requirement for every Muslim. Today, the Saudi public education system includes 24 universities<sup>39</sup> and "47,000 schools."<sup>40</sup> The system is open to all residents. The education system offers students free education and books. Moreover, in the universities, students are also provided by the government with remuneration in the form of a monthly stipend. Environmental educational programs are just being introduced. In the Kingdom

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<sup>35</sup> Ministry of Petroleum and Mineral Resources.

<sup>36</sup> Chris E. Stapp, Mohamed S. Katkhouda, and Philip E. Reed. Environmental Protection Department Saudi Aramco Environmental System, 2011. Print. 2.

<sup>37</sup> Economy Watch. Saudi Arabia Economy. October 19, 2011. Website source.

<sup>38</sup> *The Middle East, Abstracts and Index*. Pittsburgh, Penn: Library Information and Research Service, 1978. Print. 934.

<sup>39</sup> Ministry of Higher Education Portal. Nd. MOHE Website. K.S.A.

<sup>40</sup> Ministry of Education Portal. Nd. MOE website. K.S.A.

of Saudi Arabia, however, there are few universities at which environmental law is yet being taught. However, there is a Centre of Excellence in Environmental Studies (“CEES”) at King Abdulaziz University that focuses on scientific research in air pollution, water, and solid waste treatment. The Centre welcomes all those interested in environmental studies including scientists, researchers and graduate students who wish to use its human resources and other facilities.<sup>41</sup>

### **2.3 Ecological and environmental issues**

Several environmental issues in the Kingdom hold over-arching significance either because they are pervasive or because they are essential for the country’s continued habitability. Six can be described as follows.

#### **2.3.1 Saudi Coastal Areas**

Saudi Arabia is situated between two major international water bodies, both of which are covered by the Regional Organization for the Protection of the Marine Environment (“ROPME”). These are the sea areas of the Arabian Gulf and the Persian Sea or Red Sea and the Gulf of Aden. ROPME coordinates the management of the use of these seas<sup>42</sup>. These coastal and marine ecosystems hold great potential for economic development because they support highly productive coastal habitats, such as the extensive intertidal mudflats, sea grass, algae beds, mangroves and coral reefs. Marine and coastal ecosystems are experiencing various pressures

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<sup>41</sup> Viana, Mar. *Urban Air Quality in Europe*. Berlin: Springer, 2013. Internet resource. 338. CEES looks forward to being among the leading research centres in environmental studies locally and internationally through the integration of its administrators and researchers as well as the cooperating researchers from KAU and from other bodies that have similar research interests.

<sup>42</sup> Regional Organization for the Protection of the Marine Environment. The eight coastal States of the Region (Bahrain, I.R. Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates) ropme.org, 4 May 2, 2014.

due to human activities, resulting in environmental and coastal degradation.<sup>43</sup> One of the major pressures that needs immediate attention is landfilling, which has occurred along the coasts. These increasingly prevalent activities have escalated the destruction of marine habitats and regions that have ecological significance to the aquatic life. Other consequences include: coastal erosion and the general loss of coast stretching over many countries that have stretched coastal lines.<sup>44</sup>

Pollution is also a major issue because of over fishing and uncontrolled coastal development. Land based sources of pollution resulting from human activities in coastal areas and further inland is a threat to the productivity, biodiversity, and health of the coastal and marine ecosystems.<sup>45</sup> Most of the pollution of the Red Sea, oceans and gulf include municipal, industrial and agricultural wastes and spilled oil, as well as atmospheric deposition which emanates from such land based activities as prospecting for oil and minerals and which affects the most productive areas of the marine environment. Saudi Arabia has recognized pollution from land sources such as sewage disposal as a major threat to the marine and coastal environment.

The ROPME has been playing an essential role to harmonize the extensive efforts of the member states towards protection of the marine environment and follows up on the plans of each member states.<sup>46</sup> The protocol on the Control of Marine Trans-boundary Movements and Disposal of Hazardous Wastes and Other Wastes (1998) is an example. In conformity with the provisions of the Protocol concerning Regional Cooperation in Combating Pollution by Oil and other Harmful Substances in Cases of Emergency, the Marine Emergency Mutual Aid Centre

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<sup>43</sup>Sabah Al-Jeneid, Nader Hammad Moussa, Maha Mahmood Alsabbagh, Heba Elhusseini, Maria Snoussi, Ali Amasha, and Mohamed Tawfic Ahmed. Environment Outlook for the Arab Region, Chapter 4, Coastal and Marine Environments, League of Arab States, UNEP, CEDARE.96.

<sup>44</sup> State of the Environment and Policy Retrospective. *Costal and marine areas*. 1972-2002. print. 203

<sup>45</sup>Sabah Al-Jeneid, Nader Hammad Moussa, Maha Mahmood Alsabbagh, Heba Elhusseini, Maria Snoussi, Ali Amasha, and Mohamed Tawfic Ahmed. Ibid:100.

<sup>46</sup> Regional Organization for the Protection of the Marine Environment. 2011-2012. Internet source.



(“MEMAC”) was established in Bahrain and started functioning in 1983.<sup>47</sup> In response to the pressures of pollutants, ROPME introduced satellite-receiving stations to detect coastal activities and monitor pollutants’ impacts on marine environment in 2003.<sup>48</sup> The Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden was specifically formulated to protect the region from the impact of land-based activities, the three states: Saudi Arabia, Jordan and Yemen the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (“PERSGA”).<sup>49</sup> In cooperation with many concerned regional and international organizations, it has been playing an active role in promoting regional cooperation and has supported regional activities concerning wastewater management, fisheries stock assessment, environmental inspection, hydrographical capabilities, monitoring/management of invasive species, control of persistent organic compounds, human health in coastal areas, preparedness/contingency planning for pollution incidents, and preparedness for risks from tectonic movements in the region.<sup>50</sup>

The Kingdom has not yet established and integrated coastal zone management system for sustainable development of coastal areas, including exclusive economic zones. Plans have been developed but not yet implemented to work between nations, to protect the marine resources shared by the neighbouring countries.<sup>51</sup> This lack of established environmental management and enforcement in the coastal zone is particularly important because the Arabian Gulf has the largest number and concentration of oil tankers in the world, and incidences of ocean dumping and ballast water discharges are not yet addressed.

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<sup>47</sup> Marine Emergency Mutual Aid Centre, (MEMAC). Regional Organization for the Protection of Marine Environment. (ROPME). 2014. Website source.

<sup>48</sup> Gelil, Dr.Ibrahim Abdel. League of Arab States: Camre. The Sustainable Development Initiative in the Arab Region, Third Progress Report, 2011.

<sup>49</sup> State of the Environment and Policy Retrospective. Ibid.204

<sup>50</sup> Dr.Ibrahim Abdel Gelil. League of Arab States. Ibid.

<sup>51</sup> Van Lavieren, Hanneke and Rebecca Klaus. An effective regional Marine Protected Area network for the ROPME Sea Area: Unrealistic vision or realistic possibility? Marine Pollution Bulletin. 2012. Print. 2.

### 2.3.2 Fresh Water

Saudi Arabia provides its residents with water for human, agriculture and industrial use.

Water scarcity presents significant security challenges with respect to all aspects of the water sector. Seventy percent of the nation's fresh water comes from the desalination of seawater.<sup>52</sup>

This source is energy intensive and becoming increasingly difficult as the raw intake from the Red Sea and the Arabian Gulf is ever more polluted. Because of this, the price of water is greater than for gasoline.<sup>53</sup>

Due to its location, Saudi Arabia is one of the most water stressed areas in the world.<sup>54</sup> The main driving stressors in the region are the burgeoning population, accelerated development and inefficient competition for water among the urban, industrial and agricultural sectors (consuming more than 88% of the groundwater supply), ineffective water management policies and practices, erratic precipitation, and leaking infrastructure.<sup>55</sup> Unaccounted for water in Riyadh alone comprises 31 percent of the total supply, mostly lost through leaks and spills, and evaporation that drains 1.1 million m<sup>3</sup> of water every day. According to one reliable estimate, an expenditure of \$400 million on basic network repairs can save an amount equivalent to \$2.1 billion over twenty years because the country would lose less and consequently reduce the demand for new desalination plants.<sup>56</sup>

Recognizing that reduction of water waste is cost effective, the Saudi Arabian capital, Riyadh has mandated within its structure the reduction of water leakage attributed to extensive

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<sup>52</sup> Royal embassy of Saudi Arabia. About Saudi Arabia; Water resources. 2013. Internet source DC.

<sup>53</sup> Findfacts Premium. Saudi Arabia: Petrol is cheaper than bottled water. 2011. Internet source.

<sup>54</sup> Abdrubalrasoul Msoa Al-Omran, Dr. Anwar and AbdElRahman Aly. Status and New Developments on the use of Brackish Water for Agricultural Production in the Near East, Saudi Arabia Country Report. 2012, United Nations Food Agriculture Organization (FAO). 4.

<sup>55</sup> UNEP. Arab Regional Strategy for Sustainable Consumption and Production. 2009. Print

<sup>56</sup> Al-Musallam. Urban Water Sector Restructuring in Saudi Arabia'. Presentation to the Global Water International Conference, Barcelona, Spain, 2006, Print. 14. Evidence Paper 2: A World of Opportunities, This paper presents key data and supporting information that underpin the section 'A World of Opportunities' in the UKWRIP report: 'HetchO – Tapping the Potential: A Fresh Vision for the UK Water Technology Sector' 2014.

distribution networks by up to 40 percent. ABB's market-leading range of Flow Master flow meters have been identified on three distinct occasions as important for integration into the proposed large scale project aimed at modernizing Riyadh's vast but old water distribution network.<sup>57</sup> Investments such as these should pay off many fold.

The policy requiring self-sufficiency with regard to food security in Saudi Arabia has come at a tremendous price because groundwater was depleted at an alarming rate for irrigation of crops due particularly to the great subsidies to farmers growing wheat. Wisely, in January 2008, the government abandoned this strategy and decided to import wheat in order to protect the scarce groundwater resources.<sup>58</sup> Urbanization demands ever more water, and in Saudi Arabia the only two ways that can come are from groundwater and desalination. Across the country, the quality and quantity of groundwater is decreasing. The desalination plants are old and coming to the end of their useful life, but the demand for water in the urban areas is rapidly increasing due to population growth and industrial processes that demand more water.

Water is heavily subsidized in Saudi Arabia and these subsidies lead to undervaluation of this precious resource. The cost of production is estimated to be SR6 (\$1.60) per cubic meter but customers pay a little more than SR0.15 (\$0.04) per cubic meter.<sup>59</sup> In the long term, this system is unsustainable. Individual use of the public water supply is 265 litres per day per person. This is high by international standards and, for example, twice that of the European average.<sup>60</sup> Improved distribution within the network and greater conservation within households are a

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<sup>57</sup> ABB. Power and productivity for a better world. 2010. Internet source. ABB Flow Master flow meters are helping the Saudi Arabian capital, Riyadh, to cut leakage in its water distribution network by around 40 percent. The flow meters were repeatedly selected for their outstanding accuracy and performance.

<sup>58</sup> Lester R. Brown. Full Planet, Empty Plates: The New Geopolitics of Food Scarcity. Peak Water and Food Scarcity. 2012. Print.

<sup>59</sup> The KICP Annual Strategic Study, Promoting Wastewater Reclamation and Reuse in the Kingdom of Saudi Arabia: Technology Trends, Innovation Needs, and Business Opportunities. King Abdullah University Science and Technology. 2010-2011. Print. 3-6

<sup>60</sup> Abed Khazendar, and Al-Riyadh. Water will cost more than oil. Saudi Gazette. 2013. Internet source.

priority currently being addressed by the Ministry of Water and Electricity. Water quality has also become a major issue of concern in Saudi Arabia. Water pollution of shallow aquifers due to sewage pathogens, industrial waste and agricultural effluents represents a serious threat to human health and further aggravates water scarcity by reducing clean water availability. The lack of sewage treatment plants has been a source of pollution along the coastal cities like Jeddah and has created large sewage lakes in the desert in Riyadh Province.<sup>61</sup>

The current water scarcity crisis will be intensified by a further decrease in water availability due to reduced rainfall, which is projected to decrease by 20 percent over the next 50 years. Meanwhile, water demand will also increase as a result of rising temperatures, leading to an increase in evaporation from irrigated agriculture and natural ecosystems.<sup>62</sup> A decrease in rainfall and an increase in temperatures are projected to contribute to increased evaporation and decreased groundwater recharge.<sup>63</sup> The Kingdom needs to protect water resources, including groundwater and the environmental systems of wetlands, from pollution, including supporting the efforts to develop alternative water resources and developing new sources of technology for water desalination, rainwater harvesting, and recycling and reuse of water.

There is an urgent need to put integrated water management high on the political agenda in order to enable responsible decision makers to act effectively in the interest of sustainability as well as commit needed financial and human resources.<sup>64</sup> At a minimum, the Ministry of Water and Electricity<sup>65</sup> and the National Water National Company and Saline Water Conversion

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<sup>61</sup> Case Study Solid Waste Treatment, Jeddah, Saudi Arabia. IROTEC Global Solutions.2.

<sup>62</sup> Dr.Ibrahim Abdel Gelil. League of Arab States: Camre. The Sustainable Development Initiative in the Arab Region, Third Progress Report, 2011.Print.21

<sup>63</sup> Dr.Ibrahim Abdel Gelil. Ibid. 22

<sup>64</sup> UNEP. Policy Solutions: The Way Towards Sustainable Water Management. Chapter Eight 2012. Print.

<sup>65</sup> *The Report: Emerging Saudi Arabia 2007*. London: Oxford Business Group, 2007. Print.125.

Corporation must work more closely together to meet the water demands with a sustainable supply of clean water.<sup>66</sup>

### **2.3.3 Hazardous wastes**

It is estimated that the Kingdom generates approximately one million tons of hazardous wastes per year.<sup>67</sup> This section will address 1) the history of hazardous waste management in Saudi Arabia, 2) the management of hazardous waste in general, 3) compliance issues of hazardous waste, 4) prevention of the generation of hazardous wastes, 5) rehabilitation of contaminated sites, 6) enforcement of regulations. Saudi Arabia signed the Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal<sup>68</sup> on March 22, 1989 and confirmed and ratified it in May 1992. The overarching objective of the Basel Convention is to control the trans-boundary movements of waste for both their responsible disposal and recovery.<sup>69</sup> Oversight for hazardous waste management in the Kingdom of Saudi Arabia falls the Presidency of Meteorology and Environment Authority, which is designated as the responsible authority for the protection of the environment and the development of environmental protection standards.<sup>70</sup>

With the exception of the Royal Commission of Jubail and Yanbu and the efforts of the Aramco Corporation, hazardous waste management in the Kingdom is painfully limited.<sup>71</sup> Licensed contractors operate medical waste treatment facilities in major cities. Industrial wastewaters are treated by Marafiq, an organization run by the Kingdom in the Royal

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<sup>66</sup> Cordesman, Anthony H. *Saudi Arabia Enters the Twenty-First Century: The Political, Foreign Policy, Economic, and Energy Dimensions*. Westport, Conn: Praeger, 2003. Print. 305

<sup>67</sup> Kingdom of Saudi Arabia. Environmental technologies export market plan, Waste management and recycling. 2013. 2

<sup>68</sup> UNEP, Basel Convention. The overarching goal of the Basel Convention is to protect human health and the environment against the adverse effects of hazardous wastes. 1989. Internet source.

<sup>69</sup> Country Profile. Johannesburg Summit Saudi Arabia. 2002. UN website. 4.

<sup>70</sup> Jeffreys, Andrew. *The Report*. London: Oxford Business Group, 2011. Print. 298.

<sup>71</sup> Royal Commission for Jubail and Yanbu (RCJY). Saudi Aramco Environmental Stewardship, Environmental Technology; RC Environmental Program, Volume II.2014. Internet source. 12.

Commission of Industrial Cities using the latest technologies, while other types of wastewater comingle with municipal wastewaters.<sup>72</sup>

Effective control of the generation, storage, treatment, recycling and reuse, transport, recovery and disposal of hazardous wastes is not being ensured throughout the Kingdom. Comprehensive management of hazardous wastes and medical waste management is extremely important for ensuring proper health as well as for environmental protection, natural resource management and sustainable development.

The Kingdom of Saudi Arabia is at early stages of developing meaningful practices for hazardous waste management. Although regulations have been in place for several years and were improved in 2012, the level of awareness and compliance with these regulations remains inadequate to the task.<sup>73</sup> In the Royal Commission of Jubail and Yanbu, and the facilities operated by Aramco, environmental regulations including hazardous waste management and disposal find a higher degree of compliance.<sup>74</sup> Those facilities operated by MODON (the licensing authority in Saudi Arabia dealing with all aspects of industry) are not yet in compliance. For example, their hazardous wastes are disposed of as solid wastes or are improperly disposed of by licensed haulers. Only two treatment facilities for hazardous waste storage and disposal (hereinafter referred to as “TSDF”) are operating in the Kingdom, at the Royal Commission industrial cities in Jubail and Yanbu. Other licensed facilities mainly store their liquid hazardous wastes in lined ponds and dispose of hazardous solid wastes in double lined landfills. Such facilities are not managing hazardous wastes according to the most current and efficient practices. Additional TSDF facilities are necessary in all the large cities such as Jeddah, Riyadh and Dammam/Al Khobar for managing the hazardous wastes they generate.

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<sup>72</sup> Marafiq’s website . Power and Water Utility Company for Jubail and Yanbu. Website source. Nd.

<sup>73</sup> Environmental Standards Prevention of Major Accidents, (PME), 2012. Website.

<sup>74</sup> Royal Commission for Jubail and Yanbu (RCJY). Ibid. Volume II.

Prevention of the generation of hazardous wastes and the rehabilitation of contaminated sites are the key elements, and both require knowledge, experts, facilities, financial resources and technical and scientific capacities.<sup>75</sup> These activities are taking place in the Kingdom at a slow pace. The cleanup of the Jeddah Sewage Lake and remediation of Nazem Lake in Riyadh by the National Water Company are two sample projects in the Kingdom.<sup>76</sup>

The Kingdom needs a comprehensive campaign to manage hazardous waste. It should enforce existing environmental regulations more actively by sponsoring public awareness campaigns, hiring and training more environmental inspectors, and through the imposition of heavy fines and penalties for violations that result in the illegal disposal of hazardous waste. In addition, PME must promote the prevention and minimization of hazardous waste and strengthen institutional capacities in hazardous waste management.

New plants with potential impact on the environment have been obliged to conduct studies on Environmental Impact Assessment (“EIA”) in adherence with Agenda 21 requirements.<sup>77</sup> These EIA’s are studies required to be conducted, filed (along with any necessary mitigation plans) and approved in order to obtain environmental licenses to operate business. Properly trained staff and proactive inspectors must approve these EIAs. However, the requirement of preparing EIAs is often ignored. Ironically, many of the EIAs are conducted after the project is underway or even in operation. Such practices defeat the purpose of the EIA, an instrument which if employed diligently has been highly effective at reducing or mitigating environmental destruction around the world.

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<sup>75</sup> United Nations Department of Economic and Social Affairs. Sustainable Development Knowledge Platform, UN, chemicals and waste, waste (Hazardous). Source taken from UN Website. Nd.

<sup>76</sup> Clean-up of Sewage Lakes: Case Studies in Jeddah and Riyadh, presentation to national water company, 2011. Nd.

<sup>77</sup> Economic aspects of sustainable development in Saudi Arabia. Sustainable Development UN (Agenda 21), Economic Aspects of Sustainable Development in Saudi Arabia, Waste and Hazardous Materials. Retrieved from the website on Sustainable Development. Nd.

#### 2.3.4 Atmosphere Protection

Saudi Arabia is focusing on industrialization and manufacturing as a source of employment for the Saudi citizens enabling the nation to move away from its near total dependence on oil for its employment and wealth. With the establishment of more factories, an increase in industrial pollution will also occur. Without effective monitoring and enforcement, air pollution will almost inevitably increase causing great harm to the natural environment and human health throughout the region.

In Saudi Arabia, there are two major sources of air pollution: natural - such as dust and sandstorms - and anthropogenic activities such as thermal power stations, oil refineries, industrial facilities and vehicle emissions.<sup>78</sup> Sand and dust storms and severe weather conditions tend to aggravate the air quality problems in most of the Kingdom's cities. Air pollution problems are aggravated by rapid economic development, the high rate of urbanization, the lack of proper urban planning and a lag in adopting pollution control strategies for industry. Population growth, economic development, and accelerated rates of urbanization lead to higher demand for transportation, and therefore are the main drivers for deteriorating air quality in Saudi Arabia. Public transportation is inadequate, and most people drive their own vehicles daily. Moreover, many of the existing major industrial facilities are old and lack the technology for pollution controls to reduce such noxious pollutants as sulphur dioxide, nitrogen oxides or particulate matter.<sup>79</sup> Levels of air quality in Saudi Arabia differ widely, due to the variation of pollution sources and climate conditions. But the overall prospect for air quality is bleak if the Kingdom does not get more serious about regulating pollution at its sources.

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<sup>78</sup> Kjellén, Bo, Irving M. Mintzer, J A. Leonard, and Michael Chadwick. *Negotiating Climate Change: The Inside Story of the Rio Convention*. Cambridge: Cambridge Univ. Press, 1994. Print. 72

<sup>79</sup> Air quality and atmospheric pollution in the Arabia Region, Gas Emissions. Economic and Social Commission for Western Asia and League of Arab States. Nd.14.



Currently, Saudi Arabia's current policies for reducing or mitigating air pollution remain inadequate to the challenges. To improve air quality will require the adoption of policies and regulations such as establishing air monitoring networks, setting air quality and vehicle emission standards, increasing public awareness, industrial pollution abatement, and promoting sustainable transport.<sup>80</sup> The scope of the problem remains understudies, as there are too few ambient air quality monitoring stations such a large country. For example, Saudi Aramco has only seven air quality stations. There are seven fixed monitoring stations and two mobile stations in the Royal Commission of Jubail ("RCJ").<sup>81</sup> King Abdulaziz City for Science and Technology ("KACST") operated five air quality stations between 1999 and 2004 in Riyadh. Currently there are none.<sup>82</sup> There are likewise few stations in Jeddah and Eastern province.

The dearth of monitoring stations symbolizes the fact that there is not yet a system of national environmental programs. The Presidency of Meteorology and Environment ("PME") which is the responsible agency, is not able to monitor or improve the air quality. It does, however, have plans to set up additional stations and centres of excellence. To date, most of the publicly available information and existing control activities reflect efforts by Saudi Aramco. The Committee for Coordination on Chlorofluorocarbons ("CFCs") monitors the company's activities related to the consumption, handling, and keeping of CFCs, and it formulates strategies in accordance with the appropriate provisions of the Montreal Protocol.<sup>83</sup> For example, Saudi Aramco's program for the conservation of cooling materials sets mandatory requirements for the handling and re-processing of CFCs. Implementation was recently initiated for a technical

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<sup>80</sup> Mohamed El Raey. Air quality and atmospheric pollution in the Arabia Region, Gas Emissions. Economic and Social Commission for Western Asia and League of Arab Stated Air quality and atmospheric pollution in the Arab region. University of Alexandria. Nd. Print.2.

<sup>81</sup> Tahir Husain . Air pollution monitoring, assessment, control technologies for Saudi Arabia- An integrated approach. Environmental Engineering Memorial University of Newfoundland, Canada. 2012. Print. 27.

<sup>82</sup> Tahir Husain . Ibid. 27

<sup>83</sup> Johannesburg Summit. Saudi Arabia, country profile, UN. Chapters 20 TO 22: Environmentally Sound Management of Hazardous, Solid and Radioactive Wastes. 2002. Print.39

program for monitoring consumption of chillers in Aramco. The Committee has completed consumption projections, and plans to limit and eventually ban the use of solvents containing CFCs, and to find alternatives to such ozone-depleting materials.<sup>84</sup>

### **2.3.5 Toxic Chemicals**

Chemicals are essential to modern society, especially in terms of agriculture and pest control, but they can also pose serious threats to human health and the environment. As Saudi Arabia becomes more industrialized, there has been a dramatic growth in the manufacture and use of chemicals resulting in the release of ever more toxic pollutants into the environment. Misuse of pesticides is the largest chemical risk in Saudi Arabia other than accidental releases. Many of the pesticides banned in developed nations remain in use in Saudi Arabia.<sup>85</sup> Under Agenda 21 of the United Nations Conference on Environment and Development (“UNCED,” 1992), Saudi Arabia committed to achieve environmentally sound management of chemicals.<sup>86</sup> In Saudi Arabia, the enforcement authority for toxic chemical control is given to PME.<sup>87</sup> Unfortunately, this agency lacks trained inspectors who can monitor and enforce the regulations so compliance is weak.

Saudi Aramco and Saudi Electric Company have commenced a new program that articulates the gradual limiting and phasing-out of the use of polychlorinated biphenyls (“PCBs”) from all electric transformers and capacitor oils because of the high toxicity of these compounds. In addition to removal of these chemicals, they instigated a phase-out of old equipment that emits

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<sup>84</sup> Johannesburg Summit. Ibid. 18

<sup>85</sup> Abrol, D P, and Uma Shankar. *Integrated Pest Management: Principles and Practice*. Cambridge, MA: CABI, 2012. Print. 5

<sup>86</sup> 5th Session of the United Nations Commission on Sustainable Development, Agenda 21- Saudi Arabia. Institution Aspects of Sustainable Development in Saudi Arabia Decision-Making: Strategies, Policies and Plans, “Conducted a field of study of toxic chemicals and hazardous waste in the Kingdom. Updated in April.1997. Internet source. The purpose of the study was to draw up policies and future executive plans for management of hazardous toxic materials in the Kingdom.

<sup>87</sup> *Proceedings of the Expert Group Meeting on Harmonization of Environmental Standards in the Water Sector of Escwa Member States: Beirut, 28 September - 1 October 1999*. New York: United Nations, 1999. Print. 94.

more than 50 parts per million of PCBs. The Company policies and regulations prohibit procurement and installation of equipment containing these compounds.<sup>88</sup>

The Chemical Emergency Response Team, a governmental task force was formed to respond to emergencies such as chemical spills or leakage.<sup>89</sup> This team is responsible for frequent training in emergency situations as well as regular training of company staff. The Committee for Hazardous Materials was also formed to manage toxic chemicals and hazardous materials. This Committee gives opinions on plans for the appropriate use and disposal of all hazardous materials. It participates in the preparation and execution of such plans. Two of the major problems with managing toxic chemicals are one, lack of sufficient scientific information for the assessment of risks entailed by the use of a great number of chemicals, and two, lack of resources for assessment of chemicals for which data are at hand. There is also a general lack of awareness regarding toxic chemicals and safe use in the work place. The rights of the community and of workers to be informed about these chemical risks are not realized.<sup>90</sup> There is also a lack of material safety datasheets (“MSDS”) in the Arabic language. MSDSs are widely considered essential for safe use and handling of chemicals.<sup>91</sup> All these factors contribute to a situation of widespread and unnecessary pollution of the environment and harm to human health by chemicals.

Chemical hazards can be controlled through pollution prevention, monitoring emission inventories, product labelling, use limitations, and establishing meaningful procedures for safe handling and exposure. Chemicals can be used in a cost-effective manner and with a high degree

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<sup>88</sup> National Implementation of Agenda 21. Kingdom of Saudi Arabia, country profile, Implementation of Agenda 21, Chapter19 Environmentally Sound Management of Toxic Chemicals, Including Prevention of Illegal International Traffic in Toxic and Dangerous Products. United Nations Department of Economic and Social Affairs.1997.

<sup>89</sup> Johannesburg Summit. Ibid. 20

<sup>90</sup> UNEP. Environmentally sound management of toxic chemicals including prevention of illegal international traffic in toxic and dangerous products. Speeches 2004. Introduction 19.8

<sup>91</sup> OSHA. Material Safety Data Sheets, United States Department of Labor, Occupational Safety and Health Administration. Washington, DC 2010. Print.

of safety; however, there must be Hazard Communications Programs at each facility to ensure it.<sup>92</sup> Also using non-chemical technologies or chemicals that are not as toxic can reduce risks. However, there is a lack of research and dissemination of useful information in the area of chemical safety. With a large foreign workforce in Saudi Arabia's industrial facilities, information should be provided on chemical hazards in the languages of those who use the materials. In addition, a chemical-hazard labelling system using easily understandable symbols should be implemented in all work places. Saudi Arabia also needs emergency-response centres, including poison-control centres for public education. Following all of these suggestions should result in a safer environment for all.

### **2.3.6 Solid Waste and Sewage**

Saudi Arabia is one of the fast growing nations in the Middle East with an estimated population of over 29 million. This country attributes its growth to the intense industrialization process that it is currently undertaking. However, as industrialization leads to fast population growth, it triggers a series of potentially problematic situations, including an upsurge in urban population. The increased number of cities within Saudi Arabia is blamed for jeopardizing the level of environmental control, and thus subjecting more people to the dangerous effects of poor solid waste management and of other high levels of pollution. The three cities of Riyadh, Jeddah and Dammam have the largest solid waste disposal needs, estimated at 6 million tons of waste per annum, while the average waste generation is estimated to range between 1.5 to 1.8 kg per person and per day.<sup>93</sup> Meeting the high levels of waste disposal within the cities poses a hard task for the municipalities. In addition, the growing menace associated with waste disposal in Saudi

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<sup>92</sup> UNEP. Ibid: 19.44

<sup>93</sup> Shabbaj, Ibrahim I. *Solid Waste Management in the City of Jeddah (kingdom of Saudi Arabia)*. Manchester: University of Manchester, 1986. Print. 56.

Arabia is accelerated by the fact that the waste management system lacks jurisdiction over the entire activity. The efforts of recycle or recover energy is currently gaining attention in Saudi Arabia<sup>94</sup> though it has not been optimized in meeting the country's demands for waste management. Furthermore, the poor waste management system is worsened by the fact that waste is collected from individual or community containers and always disposed of in landfills or dumpsites; most of these landfills are unlined. In most developed countries, there is a nearly perfect system for recycling, reuse and energy recovery, but in Saudi Arabia such a system remains at the inception stages.

Poor waste management processes have not gained much attention because the sorting and recycling processes are driven only by small and informal sectors. This fragmentation limits the prospects for an easy overhaul in waste management. The range of recycling rate is estimated to be between only 10 and 25%, because of the informal sectors carrying out what waste management exists.<sup>95</sup> Other than the existence of the informal sectors in waste recycling, the process is always manual, and labour intensive, thus slowing down efforts to accurately collect waste. For example, the waste management companies lack a portfolio of separating containers for recycling products. Composting is another method that is gaining a competitive edge in waste management within Saudi Arabia, and it is estimated to amount to up to 40%. Indeed, the municipal waste has a high organic content, which generates an incentive for composting. Other than these techniques, there are concerted efforts to deploy waste-to-energy technologies in the Kingdom of Saudi Arabia. However, all formal waste management activities are coordinated and financed by the government and have not yet really taken off.

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<sup>94</sup> Shabbaj, Ibrahim I. Ibid. 58

<sup>95</sup> Goldman, Benjamin A. *Hazardous Waste Management: Reducing the Risk*. Washington DC: Island Pr, 1986. Print. 152.

Based on the high demand for waste management in Saudi Arabia, the government is undertaking massive investment to help create a sustainable solution to this problem. For example, the government invested over SR 29 billion in the municipal services.<sup>96</sup> These concerted efforts by the Saudi government are aimed at improving recycling and waste disposal activities in its congested cities. Despite these efforts by the government, the general public must be at the forefront in campaigns aimed at encouraging recycling and sorting of solid wastes in the cities. Society must be engaged to tackle this widespread and pernicious problem.

Other than the government efforts, there are some critical interventions that must be injected to ensure improved water management practices within the country. Such efforts include the management of construction and demolition debris. It is evident that roadside reserves and isolated areas are prone to dumping of large quantities of debris thus encouraging unlawful dumping and resulting directly in poor wastewater management.<sup>97</sup> In order to improve waste management scenarios and generate good business opportunities, it is imperative to undertake modern waste management techniques including material recovery strategies, waste-to-energy systems and recycling infrastructures.

The mode of collecting sewage in Saudi Arabia varies, but is largely done through trucks, which account for 40% of the sewage wastewater collected in the entire country. The remaining portion is collected from septic tanks, from which the septic wastewater is taken to the treatment plant that refines it for normal domestic use.<sup>98</sup> Currently, a total amount of 2.5 million cubic metres of wastewater is treated per day, thus representing only 9% of high standard treated reuse water. On the other hand, 1.6 million cubic metres of wastewater are reused for irrigation

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<sup>96</sup> Brebbia, C A, G Passerini, and H Itoh. *Waste Management and the Environment* Vii. Southampton: WIT Press, 2014. Internet resource. 284.

<sup>97</sup> Goldman, Benjamin A. Ibid. 154

<sup>98</sup> Habeeb, Kais S. *Solid Waste Management During the Haj Pilgrimage, Mecca, Saudi Arabia.* , 1987. Print. 87.

purposes while the rest are simply discharged into the desert. Numbers indicate that there is plenty of space for increased efficiency and reduced pollution.

One problem in the wastewater management system is that a large portion of septic wastewater is taken to the wastewater lagoon where it is dispersed without treatment. One such area includes the Jeddah wastewater lagoon where up to 10 million cubic metres get dumped.<sup>99</sup> Other areas include Riyadh where wastewater is discharged directly into the Riyadh River. In addition, a small effluent from Jeddah is discharged into the Red Sea, thus interfering with aquatic life. The effects of pollution are severe as in Salman Bay, which has seriously accumulated sediment and is highly polluted. Other significant effects of pollution include rising groundwater levels in Riyadh, Jeddah and Dammam that can result in destruction of property and threats to human health.

In conclusion, Saudi Arabia lacks a proper wastewater collection system with adequate wastewater treatment plants and re-use systems. Happily, a new program based on privatization is in the works, and its proponents intend eventually to extend proper wastewater management systems throughout the country. This plan will cover all spheres that have been identified as direct victims of the poor wastewater management system. Such areas include lagoons, among other centres. Developing strong policies and a comprehensive wastewater management system is important for a lasting and sustainable solution to Saudi Arabia's waste management problems.<sup>100</sup> And now there is reason for hope that they will be implemented – if they receive necessary and proper levels of support.

From the descriptions set forth in to this chapter, it is evident that attention must be given to various issues as they evolve about Saudi Arabia. Therefore, the study of the geography and

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<sup>99</sup> Habeeb, Kais S. Ibid., 89

<sup>100</sup> *Environmental Performance Reviews*. Paris, France: OECD, 2002. Internet resource. 142.

history of Saudi Arabia is critical to the understanding of the country's demographic composition as well as the social organization of the people. As we have seen, the Kingdom's geographic circumstances dictate much many of its needs and constrain how it may respond. The geography, therefore, constrains how the Kingdom's efforts at conservation can be aligned to pursue the global agenda on environmental protection.<sup>101</sup>

Beyond surveying the history and geography of Saudi Arabia, this chapter emphasises the importance of Saudi Arabia's economic and social development, as essential to the continued improvement of the general livelihood. The Kingdom's support for economic development means that it ought generally to be receptive to any conservation measure introduced by the government because such measures tend to promote development (at least in the long run). Likewise, social progress should encourages long-term stability.<sup>102</sup> Finally, this chapter demonstrated how urgent are ecological and environmental issues for the continued health and prosperity of the Kingdom, and it highlighted some specific opportunities for improving policies and practices. Most notably, the close proximity of Saudi Arabia to the Red Sea exposes the Kingdom to myriad environmental challenges and particularly waste disposal hazards. So this chapter offered a number of suggestions for meeting these challenges. The next chapter gives a detailed description about various sustainable development policies applied in the Kingdom of Saudi Arabia that anchor various policies that are being implemented by the Saudi Arabian government. Sustainable development policies are essential to ensure that the planet Earth remains hospitable to human existence. Accordingly, the next chapter will survey various concepts of sustainability that are necessary to the world and to countries such as Saudi Arabia.

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<sup>101</sup> *Environmental Performance Reviews*. Ibid. 144

<sup>102</sup> Daven, James I. and Robert N. Klein. *Progress in Waste Management Research*. New York: Nova Science Publishers, 2008. Print. 49





## Works Cited for Chapter 2

- 5th Session of the United Nations Commission on Sustainable Development, Agenda 21- Saudi Arabia. Institution Aspects of Sustainable Development in Saudi Arabia Decision-Making: Strategies, Policies and Plans, "Conducted a field of study of toxic chemicals and hazardous waste in the Kingdom. Updated in April.1997. Internet source.  
<http://www.un.org/esa/agenda21/natlinfo/countr/saudi/inst.htm>
- ABB. Power and productivity for a better world. 2010. Internet source. ABB Flow Master flow meters are helping the Saudi Arabian capital, Riyadh, to cut leakage in its water distribution network by around 40 percent. The flow meters were repeatedly selected for their outstanding accuracy and performance.  
<http://www.abb.us/cawp/seitp202/f3a1801b3f54e7f4c12576ce00430977.aspx>
- AbdrubalrasouLMsoa Al-Omran, Dr.Anwar and AbdEIRahman Aly. Status and New Developments on the use of Brackish Water for Agricultural Production in the Near East, Saudi Arabia Country Report. 2012, United Nations Food Agriculture Organization (ENE). 4.
- Abed Khazendar, and Al-Riyadh. Water will cost more than oil. Saudi Gazette. 2013. Internet source.  
<http://www.saudigazette.com.sa/index.cfm?method=home.regcon&contentid=20130808176281>
- Abrol, D P, and Uma Shankar. *Integrated Pest Management: Principles and Practice*. Cambridge, MA: CABI, 2012. Print. <http://www.worldcat.org/title/integrated-pest-management-principles-and-practice/oclc/713191656>
- Ahmed Al-Suwaidi. Developments of the legal systems of the Gulf Arab States. 1993.,8 Arab L.Q. 289.
- Air quality and atmospheric pollution in the Arabia Region, Gas Emissions. Economic and Social Commission for Western Asia and League of Arab Stated.  
Nd.[http://www.un.org/esa/sustdev/csd/csd14/escwaRIM\\_bp1.pdf](http://www.un.org/esa/sustdev/csd/csd14/escwaRIM_bp1.pdf)
- AlHaj, Ali M. S. *Saudi Arabian Monetary Agency: A Review of Its Accomplishments, 1372 Ah-1411 Ah, 1952 G-1991 G*. Riyadh: publisher not identified, 1991.Print.  
<http://www.worldcat.org/title/saudi-arabian-monetary-agency-a-review-of-its-accomplishments-1372-ah-1411-ah-1952-g-1991-g/oclc/34281552>
- Al-Musallam. Urban Water Sector Restructuring in Saudi Arabia'. Presentation to the Global Water International Conference, Barcelona, Spain, 2006, Print.  
[www.ukwrip.org/sites/default/files/.../Evidence\\_paper\\_-\\_2.docx](http://www.ukwrip.org/sites/default/files/.../Evidence_paper_-_2.docx)
- Annual Statistical Bulletin. Organization of the petroleum exporting countries. 2014. Internet source. [http://www.opec.org/opec\\_web/en/about\\_us/169.htm](http://www.opec.org/opec_web/en/about_us/169.htm)
- Article 10, Royal Order No.(A/90)27 Sha'ban 1412H. Basic Law of governance. Umm alQura Gazette No. 3397, 2 Ramadan 1412H, 1-5<sup>th</sup> March 1992, print.
- Bowen, Wayne H. *The History of Saudi Arabia*. Westport, Conn: Greenwood Press, 2008. Print.  
<http://www.worldcat.org/title/history-of-saudi-arabia/oclc/166388162>

- Brackish Water for Agricultural Production in the Near East, Saudi Arabia Country Report. 2012, United Nations Food Agriculture Organization (ENE). [http://www.webcache.googleusercontent.com/search?q=cache:-x3HR\\_y4F7cJ:neareast.fao.org/Download.ashx%3FFile%3DFCKupload/BrackishWater/Pilot-Country-Reports/KSA\\_Country\\_Report\\_Brackish\\_Water.pdf+&cd=2&hl=en&ct=clnk&gl=us](http://www.webcache.googleusercontent.com/search?q=cache:-x3HR_y4F7cJ:neareast.fao.org/Download.ashx%3FFile%3DFCKupload/BrackishWater/Pilot-Country-Reports/KSA_Country_Report_Brackish_Water.pdf+&cd=2&hl=en&ct=clnk&gl=us)
- Case Study Solid Waste Treatment, Jeddah, Saudi Arabia. IROTEC Global Solutions. PP.2. [http://virotec.com/download/email/web\\_files/industrial-wastewater-remediation-viroflow/Case%20Study%20Jeddah%20Solid%20Waste.pdf](http://virotec.com/download/email/web_files/industrial-wastewater-remediation-viroflow/Case%20Study%20Jeddah%20Solid%20Waste.pdf)
- Chris E. Stapp, Mohamed S. Katkhouda, and Philip E. Reed. Environmental Protection Department, Saudi Aramco Environmental Management System. 2011. Print. <http://www.saudiaramco.com/content/dam/Publications/Envirnews/Envirnews%20Winter%202011/SAEnvironmental.pdf>
- Clean-up of Sewage Lakes: Case Studies in Jeddah and Riyadh, presentation to national water company, 2011. <http://www.nwc.com.sa/English/MediaCenter/Resources/Documents/Clean%20Up%20of%20Sewage%20Lakes.pptx>
- Clements, Frank. *Arab Regional Organizations*. New Brunswick, N.J. (U.S.A.: Transaction Publishers, 1992. Print. <http://www.worldcat.org/title/arab-regional-organizations/oclc/25410577>
- Cordesman, Anthony H. *Saudi Arabia Enters the Twenty-First Century: The Political, Foreign Policy, Economic, and Energy Dimensions*. Westport, Conn: Praeger, 2003. Print. <http://www.worldcat.org/title/saudi-arabia-enters-the-twenty-first-century-the-political-foreign-policy-economic-and-energy-dimensions/oclc/51330553>
- Country Profile. Johannesburg Summit Saudi Arabia. UN. 2002. UN. <http://www.un.org/esa/agenda21/natinfo/wssd/saudiarabia.pdf>
- Daven, James I. and Robert N. Klein. *Progress in Waste Management Research*. New York: Nova Science Publishers, 2008. Print. <http://www.worldcat.org/title/progress-in-waste-management-research/oclc/182621495>
- DeRouen, Karl R. and Paul Bellamy. *International Security and the United States: An Encyclopedia*. Westport, Conn: Praeger Security International, 2008. Print. <http://www.worldcat.org/title/international-security-and-the-united-states-an-encyclopedia/oclc/173640795>
- Dr.Ibrahim Abdel Gelil. League of Arab States: Camre. The Sustainable Development Initiative in the Arab Region, Third Progress Report, 2011 print. <http://css.escwa.org.lb/sdpd/1545/3rd.pdf>
- Economic aspects of sustainable development in Saudi Arabia. Sustainable Development UN (Agenda 21), Economic Aspects of Sustainable Development in Saudi Arabia, Waste and Hazardous Materials. Retrieved from the website on Sustainable Development. Nd. [www.un.org/esa/agenda21/natinfo/countr/saudi/eco.htm](http://www.un.org/esa/agenda21/natinfo/countr/saudi/eco.htm)
- Economy Watch. Saudi Arabia Economy. October 19, 2011. Internet source. [http://www.economywatch.com/world\\_economy/saudi\\_arabia](http://www.economywatch.com/world_economy/saudi_arabia)

- Environmental Performance Reviews*. Paris, France: OECD, 2002. Internet resource.  
<http://www.worldcat.org/title/environmental-performance-reviews-united-kingdom/oclc/190823644>
- Environmental Standards Prevention of Major Accidents, (PME), 2012  
[http://www.pme.gov.sa/en/En\\_EnvStand5.pdf](http://www.pme.gov.sa/en/En_EnvStand5.pdf)
- Finfacts Premium. Saudi Arabia: Petrol is cheaper than bottled water. 2011. <http://www.finfacts-premium.com/free/global/saudi-arabia-petrol-cheaper-bottled-water>
- Goldman, Benjamin A. *Hazardous Waste Management: Reducing the Risk*. Washington DC: Island Pr., 1986. Print. 152. <http://www.worldcat.org/title/hazardous-waste-management-reducing-the-risk/oclc/715821369>
- Habeeb, Kais S. *Solid Waste Management During the Haj Pilgrimage, Mecca, Saudi Arabia*. , 1987. Print. <http://www.worldcat.org/title/solid-waste-management-during-the-haj-pilgrimage-mecca-saudi-arabia/oclc/25702392>
- Hanneke Van Lavieren, and Rebecca Klaus. An effective regional Marine Protected Area network for the ROPME Sea Area: Unrealistic vision or realistic possibility? *Marine Pollution Bulletin*. 2012. Print. 2. <http://inweh.unu.edu/wp-content/uploads/2013/05/VanLavierenandKlaus2012.pdf>
- Hatim Al-Bisher, Selina Stead, Tim Gray . Saudi Maritime Policy: Integrated Governance. 2011. Print.  
[https://books.google.co.ke/books?id=fMKoAgAAQBAJ&pg=PA55&dq=Saudi+Arabia%E2%80%99s+hydrocarbon+resource+fields+in+capital+city+Riyadh&hl=en&sa=X&ei=JTexVOK4F9KN7AbWvICoCA&redir\\_esc=y#v=onepage&q=Saudi%20Arabia%E2%80%99s%20hydrocarbon%20resource%20fields%20in%20capital%20city%20Riyadh&f=false](https://books.google.co.ke/books?id=fMKoAgAAQBAJ&pg=PA55&dq=Saudi+Arabia%E2%80%99s+hydrocarbon+resource+fields+in+capital+city+Riyadh&hl=en&sa=X&ei=JTexVOK4F9KN7AbWvICoCA&redir_esc=y#v=onepage&q=Saudi%20Arabia%E2%80%99s%20hydrocarbon%20resource%20fields%20in%20capital%20city%20Riyadh&f=false)
- Information Office of the Royal Embassy of Saudi Arabia. About Saudi Arabia: Culture and Art. Copyright 2013, press. [http://www.saudiembassy.net/about/country-information/culture\\_art](http://www.saudiembassy.net/about/country-information/culture_art)
- Jeffreys, Andrew. *The Report*. London: Oxford Business Group, 2011. Print.  
<http://www.worldcat.org/title/report-saudi-arabia-2010/oclc/808412613>
- Jiménez, Cisneros B. E, and Takashi Asano. *Water Reuse: An International Survey of Current Practice, Issues and Needs*. London: IWA Pub, 2008. Print.  
<http://www.worldcat.org/title/water-reuse-an-international-survey-of-current-practice-issues-and-needs/oclc/148633254>
- Johannesburg Summit. Saudi Arabia, country profile, UN. Chapters 20 TO 22: Environmentally Sound Management of Hazardous, Solid and Radioactive Wastes. 2002. Print.39  
<http://www.un.org/esa/agenda21/natinfo/wssd/saudiarabia.pdf>.
- Kechichian, Joseph A. *Succession in Saudi Arabia*. New York, N.Y: Palgrave, 2001. Internet resource. <http://www.worldcat.org/title/succession-in-saudi-arabia/oclc/179157120>
- Kingdom of Saudi Arabia. Environmental technologies export market plan, Waste management and recycling. 2013. 2

- [http://export.gov/%5C/static/Saudi%20EnvTech%20export%20plan%202013\\_Latest\\_eg\\_main\\_067305.pdf](http://export.gov/%5C/static/Saudi%20EnvTech%20export%20plan%202013_Latest_eg_main_067305.pdf)
- Kjellén, Bo, Irving M. Mintzer, J A. Leonard, and Michael Chadwick. *Negotiating Climate Change: The Inside Story of the Rio Convention*. Cambridge: Cambridge Univ. Press, 1994. Print. <http://www.worldcat.org/title/negotiating-climate-change-the-inside-story-of-the-rio-convention/oclc/185332953>
- Kulovesi, Kati. *The WTO Dispute Settlement System: Challenges of the Environment, Legitimacy and Fragmentation*. Alphen aan den Rijn: Wolters Kluwer Law & Business, 2011. Print. <http://www.worldcat.org/title/wto-dispute-settlement-system-challenges-of-the-environment-legitimacy-and-fragmentation/oclc/753324106>
- Lester R. Brown. Full Planet, Empty Plates: The New Geopolitics of Food Scarcity. 2012. Chapter 6. Peak Water and Food Scarcity. <http://www.earth-policy.org/books/fpep/fpepch6>
- Marafiq's website . Power and Water Utility Company for Jubail and Yanbu. Website source. Nd. <http://www.marafiq.com.sa/en/default.aspx>
- Marine Emergency Mutual Aid Centre, (MEMAC). Regional Organization for the Protection of Marine Environment. (ROPME). 2014. Print. <http://www.memac-rsa.org>
- Marine regions.org [http, nd. www.marineregions.org/gazetteer.php?p=details&id=8356](http://www.marineregions.org/gazetteer.php?p=details&id=8356)  
[https://treaties.un.org/Pages/ViewDetailsIII.aspx?&src=TREATY&mtdsg\\_no=XXI~6&chapter=21&Temp=mtdsg3&lang=en#EndDec](https://treaties.un.org/Pages/ViewDetailsIII.aspx?&src=TREATY&mtdsg_no=XXI~6&chapter=21&Temp=mtdsg3&lang=en#EndDec)
- Mergent International Manual*. New York: Mergent, 2001. Print.  
<http://www.worldcat.org/title/mergent-international-manual/oclc/48969159>.
- Ministry of education Portal. Nd. Moe website., K.S.A,  
<http://www.moe.gov.sa/Pages/Default.aspx>
- Ministry of Foreign Affairs. About Saudi Arabia. Last Updated in 2013.  
<http://www.mofa.gov.sa/SITES/MOFAEN/ABOUTKINGDOM/Pages/KingdomGeography46466.aspx>
- Ministry of Higher Education Portal. Nd. Mohe Website. K.S.A,  
<http://www.mohe.gov.sa/en/Pages/default.aspx>
- Ministry of Petroleum and Mineral Resources, KSA,  
[http://www.mopm.gov.sa/mopm/detail.do?content=environment\\_mining](http://www.mopm.gov.sa/mopm/detail.do?content=environment_mining)
- Mohamed El Raey. Air quality and atmospheric pollution in the Arabia Region, Gas Emissions. Economic and Social Commission for Western Asia and League of Arab Stated Air quality and atmospheric pollution in the Arab region. University of Alexandria. Nd. Print.2. [http://www.un.org/esa/sustdev/csd/csd14/escwaRIM\\_bp1.pdf](http://www.un.org/esa/sustdev/csd/csd14/escwaRIM_bp1.pdf).
- Muhammad bin Saud. Royal Embassy of Saudi Arabia, Saudi Arabian, History of Civilization. 1744, internet source. <http://www.saudiembassy.net/about/country-information/history.aspx>
- National Implementation of Agenda 21. Kingdom of Saudi Arabia, country profile, Implementation of Agenda 21, Chapter19 Environmentally Sound Management of Toxic

- Chemicals, Including Prevention of Illegal International Traffic in Toxic and Dangerous Products. 1997, United Nations Department of Economic and Social Affairs. <http://www.un.org/esa/earthsummit/saudi-cp.htm>
- OPEC. Brief History. 1960. [http://www.opec.org/opec\\_web/en/about\\_us/24.htm](http://www.opec.org/opec_web/en/about_us/24.htm)
- OSHA. Material Safety Data Sheets, United States Department of Labor, Occupational Safety and Health Administration. Washington, DC 20210. Print. <https://www.osha.gov/oilspills/msds.html>
- Peretz, Don. *The Middle East Today*. Westport, Conn: Praeger, 1994. Print. <http://www.worldcat.org/title/middle-east-today/oclc/28634082>
- Proceedings of the Expert Group Meeting on Harmonization of Environmental Standards in the Water Sector of ESCWA Member States: Beirut, 28 September - 1 October 1999*. New York: United Nations, 1999. Print. <http://www.worldcat.org/title/proceedings-of-the-expert-group-meeting-on-harmonization-of-environmental-standards-in-the-water-sector-of-escwa-member-states-beirut-28-september-1-october-1999/oclc/231864579>
- Ramady, M A. *The Saudi Arabian Economy*. New York: Springer, 2010. Internet resource. <http://www.worldcat.org/title/saudi-arabian-economy/oclc/676700248>
- Regional Organization for the Protection of the Marine Environment. The eight coastal States of the Region (Bahrain, I.R. Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates) ropme.org, 4 May 2, 2014.
- Regional Organization for the Protection of the Marine Environment. 2011-2012. Internet source. <http://ropme.org/home.clx>
- Royal Commission for Jubail and Yanbu (RCJY). Saudi Aramco Environmental Stewardship, Environmental Technology; RC Environmental Program, Volume II.2014. Internet source. <http://www.rcjy.gov.sa/en-US/AboutUs/Environment/Pages/default.aspx>
- Royal Embassy of Saudi Arabia. About Saudi Arabia: Water resources. Copyright © 2013. Internet source DC. [http://www.saudiembassy.net/about/country-information/agriculture\\_water/Water\\_Resources.aspx](http://www.saudiembassy.net/about/country-information/agriculture_water/Water_Resources.aspx)
- Sabah Al-Jeneid, Nader Hammad Moussa, Maha Mahmood Alsabbagh, Heba Elhusseini, Maria Snoussi, Ali Amasha, and Mohamed Tawfic Ahmed. Environment Outlook for the Arab Region, Chapter 4, Coastal and Marine Environments, League of Arab States, UNEP, CEDARE. [http://eoar.cedare.int/report/EOAR\\_Chapter%204%20\(EN\).pdf](http://eoar.cedare.int/report/EOAR_Chapter%204%20(EN).pdf)
- Shabbaj, Ibrahim I. *Solid Waste Management in the City of Jeddah (kingdom of Saudi Arabia)*. Manchester: University of Manchester, 1986. Print. <http://www.worldcat.org/title/solid-waste-management-in-the-city-of-jeddah-kingdom-of-saudi-arabia/oclc/642485995>
- Simon Anstey. The International Union for Conservation of Nature IUCN; Kingdom of Saudi Arabia to expand collaboration with IUCN. November 18 2005. News story. [https://www.iucn.org/news\\_homepage/news\\_by\\_date/previous\\_years\\_news/?67/Kingdom-of-Saudi-Arabia-to-expand-collaboration-with-IUCN](https://www.iucn.org/news_homepage/news_by_date/previous_years_news/?67/Kingdom-of-Saudi-Arabia-to-expand-collaboration-with-IUCN)
- State of the Environment and Policy Retrospective. Coastal and marine areas. 1972-2002.print. [http://www.grida.no/geo/geo3/english/pdfs/chapter2-6\\_marine.pdf](http://www.grida.no/geo/geo3/english/pdfs/chapter2-6_marine.pdf)

- Taher, Nahed, and Bandar Hajjar. *Energy and Environment in Saudi Arabia: Concerns & Opportunities*. Cham: Imprint: Springer, 2014. Internet resource.  
<http://www.worldcat.org/title/energy-and-environment-in-saudi-arabia-concerns-opportunities/oclc/867051941>
- Tahir Husain. Air pollution monitoring, assessment, control technologies for Saudi Arabia- An integrated approach. Environmental Engineering Memorial University of Newfoundland, Canada. 2012. Print. 27. <http://kacstetc.com/2012/en/images/speakers/pdf/122.pdf>
- The central department of statistics and information, Saudi Arabia. Nd. <http://www.cdsi.gov.sa>
- The KICP Annual Strategic Study, Promoting Wastewater Reclamation and Reuse in the Kingdom of Saudi Arabia: Technology Trends, Innovation Needs, and Business Opportunities. King Abdullah University Science and Technology. 2010-2011, print. P. 3-6
- The Link*. New York: Americans for Middle East Understanding, 1968. Print.  
<http://www.worldcat.org/title/link/oclc/2244248>
- The Middle East, Abstracts and Index*. Pittsburgh, PA: Library Information and Research Service, 1978. Print. 934. <http://www.worldcat.org/title/middle-east-abstracts-and-index/oclc/243460930>
- The Ministry of Agriculture, KSA & the Saudi network (nd) <http://www.the-saudi.net/saudi-arabia/agriculture.htm>
- The Ministry of Finance, Kingdom of Saudi Arabia  
<http://www.mof.gov.sa/English/Pages/Home.aspx>
- The Report: Emerging Saudi Arabia 2007*. London: Oxford Business Group, 2007. Print.  
<http://www.worldcat.org/title/report-emerging-saudi-arabia-2007/oclc/782130590>
- UNEP, Basel Convention. The overarching goal of the Basel Convention is to protect human health and the environment against the adverse effects of hazardous wastes. 1989. Internet Source. <http://www.basel.int/TheConvention/Overview/tabid/1271/Default.aspx>
- UNEP. Arab Regional Strategy for Sustainable Consumption and Production. 2009, print. <http://www.unep.fr/scp/marrakech/publications/pdf/Final%20Draft%20Arab%20Strategy%20on%20SCP%20-%202006-10-09.pdf>
- UNEP. Environmentally sound management of toxic chemicals including prevention of illegal international traffic in toxic and dangerous products. Speeches 2004. Introduction 19.8 <http://www.unep.org/Documents.multilingual/Default.asp?>
- UNEP. Policy Solutions: The Way Towards Sustainable Water Management. Chapter Eight 2012, Print. [http://www.unep.org/dewa/portals/67/pdf/vulnerability/Chapter8\\_Hi.pdf](http://www.unep.org/dewa/portals/67/pdf/vulnerability/Chapter8_Hi.pdf)
- United Nations Convention on the Law of the Sea*. New York: Nova Science Publishers, 2009. Print. <http://www.worldcat.org/title/united-nations-convention-on-the-law-of-the-sea/oclc/243605775>
- United Nations Department of Economic and Social Affairs. Sustainable Development Knowledge Platform, UN, chemicals and waste, waste (Hazardous). Source taken from UN Website <http://sustainabledevelopment.un.org/index.php?menu=214>

- Viana, Mar. *Urban Air Quality in Europe*. Berlin: Springer, 2013. Internet resource.  
<http://www.worldcat.org/title/urban-air-quality-in-europe/oclc/852159944>
- Weigl, Constanze. *Reproductive Health Behavior and Decision-Making of Muslim Women: An Ethnographic Study in a Low-Income Community in Urban North India*. Berlin: Lit, 2010. Print. <http://www.worldcat.org/title/reproductive-health-behavior-and-decision-making-of-muslim-women-an-ethnographic-study-in-a-low-income-community-in-urban-north-india/oclc/656776490>
- Wynbrandt, James. *A Brief History of Saudi Arabia*. (Nd). Website source.



## CHAPTER 3

### 3. Evolving Concepts of Sustainable Development

The concept of sustainable development refers to meeting the current needs or demands of the population without necessarily compromising future necessities.<sup>103</sup> Therefore, this concept calls for policy formulation intended to meet diverse needs of the people without diminishing their capacity to meet future demands. Therefore policies pursuing sustainable developments typically address social, political and economic demands, and crafts measures to meet each in ways that allow the overall sustainability to a given people.<sup>104</sup> To achieve all this optimization requires extensive research and careful planning.

Each country must follow its own path in order to develop workable and contextual sustainable development policies. To do so, they can, however, draw heavily on insights developed previously elsewhere. In this context, we consider policy frameworks that aid in generating sustainable development. For example, agricultural policies that are implemented by the government are aimed at realizing economic development to the country and social stability.<sup>105</sup> This is one way that policies lead to sustainable development in a given country, and examples from around the world abound. In a nutshell, the concept of sustainable development is principally anchored on three pillars, which are social stability, economic development and environmental protection. These pillars guide so that all policies are developed with the view of supporting sustainability and ultimately toward achieving the U.N. Sustainable Development Goals adopted in 2014. To better understand sustainability it is necessary to recall the origins of this concept.

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<sup>103</sup> Brundtland, Gro Harlem. *Report of the World Commission on Environment and Development: "Our Common Future."* United Nations, 1987.

<sup>104</sup> Brebbia, C A, and Élias Beriatis. *Sustainable Development and Planning V*. Southampton, UK: WIT Press, 2011. Print. 51

<sup>105</sup> Brebbia, C A, and Élias Beriatis. *Ibid.* 53

### 3.1 Conception of Sustainable Development

#### 3.1.1 IUCN – Caring for the Earth

Over the past several decades, there have been numerous documents, reports, and international meetings that have proven key to cultivating sustainable development policies in Saudi Arabia. They will remain particularly important for the country in the future.<sup>106</sup> The origins of Sustainable Development Policy are found in the 1980 document entitled Caring for the Earth (World Conservation Strategy). Caring for the Earth offers a strategy for sustainable living, the goal of which is to help improve the condition of the world's people, in two steps. The first step is to make a commitment to sustainable living and actually enforce sustainable practices. The second step is to integrate the concepts of conservation and development with each other. In this strategy, conservation is defined as a way of developing and building within the earth's natural resource capacity. Development is defined as a process that enables people everywhere to live long, healthy and fulfilling lives.

These two concepts sum up the message of the World Conservation Strategy, sponsored by the International Union for the Conservation of Nature ("IUCN), the World Wildlife Fund ("WWF), and the United Nations Environment Program ("UNEP) in 1980.<sup>107</sup> It argued that humanity, which exists as a part of nature, has no future unless natural resources are conserved.<sup>108</sup> It also asserted that conservation could not be achieved without development, which helps alleviate the poverty and misery of hundreds of millions of people in the world. Stressing the interdependence of conservation and development, the WCS first gave currency to the term "sustainable development." Unless both the fertility and productivity of the planet are

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<sup>106</sup> Blaser, Jürgen, Jane Carter, and D A. Gilmour. *Biodiversity and Sustainable Use of Kyrgyzstan's Walnut-Fruit Forests: Proceedings of the Seminar. Kyrgyzstan, 4-8 September 1995*. Gland, Switzerland: IUCN, 1998. Print. 18

<sup>107</sup> Terborgh, John. *Making Parks Work: Strategies for Preserving Tropical Nature*. Washington, D.C: Island Press, 2002. Print. 27-28.

<sup>108</sup> BAT. Conservation International, World Conservation Strategy. December 6, 2012. Website source.

protected, humans are at risk. The World Conservation Strategy emphasized three objectives: maintaining essential ecological processes and life-support systems must be maintained, genetic diversity must be preserved, and any use of species or ecosystems must be sustainable.

The WCS strategy was intended for use by those who shape policy and make decisions that affect the course of development and the condition of our environment; this is a very sizable group. Not only does it include politicians and executives in the public and private sectors at the national and international levels, but it also includes leaders, business people and other citizens in communities and settlements everywhere. Caring for the Earth promulgates, therefore, an ambitious interdisciplinary strategy that demands efforts from every facet of society.<sup>109</sup>

In 1987, the World Commission on Environment and Development advanced our understanding of global interdependence and the relationship between economics and the environment. In the same year, governments adopted an environmental Perspective to the Year 2000 and beyond, which defined a broad framework to guide national action and international cooperation for environmentally sound development.<sup>110</sup>

### **3.1.2 The Organization behind Caring for the Earth**

#### **a- International Union for Conservation of Nature and natural Resources (“IUCN”)**

The IUCN was founded in October 1948, as a network of environmental organizations, following an international conference in Fontainebleau, France.<sup>111</sup> The director of the United Nations Educational, Scientific, and Cultural Organization (“UNESCO”), Julian Huxley,

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<sup>109</sup> Chapin III, F. Stuart, Stewart TA Pickett, Mary E. Power, Robert B. Jackson, David M. Carter, and Clifford Duke. “Earth stewardship: a strategy for social–ecological transformation to reverse planetary degradation.” *Journal of Environmental Studies and Sciences* 1, no. 1 (2011): 44-53.

<sup>110</sup> Mekouar, Mohamed A. *The Environmental Impact of Economic Incentives for Agricultural Production: A Comparative Study*. Rome: Food and Agricultural Organization of the United Nations, 1990. Print. 40.

<sup>111</sup> IUCN. International Union for Conservation of Nature, about IUCN. Last updated on updated: December 7, 2014, 6:30 PM). IUCN Website.

originated the conference to explore establishing an institution to help solve the global environmental issues.<sup>112</sup> The organization that resulted, IUCN, is composed of states, governmental ministries, and international and regional non- governmental organizations. As such it constitutes the world's oldest and largest global environmental network. Based in Gland, Switzerland, it brings together governments, international organizations, non-government organizations ("NGOs), local communities, and private enterprises to engage in research and field projects that will develop solutions to the many problems plaguing our environment.<sup>113</sup>

The goals of the organization include helping local communities understand the crises in their own ecosystems, encouraging conservation at the local level, and promoting the conservation of nature and the ecologically sustainable use of natural resources. The organization tries to maintain the balance between necessary development and the preservation of the natural world.<sup>114</sup> The IUCN supports and participates in environmental and scientific research; promotes and helps implement national conservation legislation, policies, and practices; and it manages thousands of field projects worldwide. Its activities are organized into several theme-based programs, such as business and biodiversity. In addition, a smaller number of special initiatives draw upon the work of different programs to address specific issues. The volunteer work of more than 10,000 scientists and other experts is coordinated through six special commissions on education and communication; environmental, economic, and social policy; environmental law, ecosystem management, species survival, and protected areas. All of the IUCN's work is guided

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<sup>112</sup> Christoffersen, Leif E, IUCN: A Bridge-BUILDER for Nature Conservation. Green Globe Year Book. 1997.60.

<sup>113</sup> IUCN Academy of Environmental Law. International Union for Conservation of Nature Academy of Environmental Law, history of the academy. December 4, 2012, 11:30 AM. IUCN Website.

<sup>114</sup> Mensah, Adelina Maria and Luciana Camargo Castro. Sustainable Resource Use & Sustainable Development: A contradiction?! University of Bonn. 2004. Print. 7

by a global program,<sup>115</sup> which is adopted by “member organizations every four years at the IUCN World Conservation Congress.”<sup>116</sup>

The IUCN maintains the IUCN Red List of Threatened Species, a comprehensive assessment of the current risk of extinction of thousands of plant and animal species. The organization also publishes and co-authors hundreds of books, reports, and other documents each year. In addition, as an intergovernmental, international body, IUCN hosts the World Commission on Environmental Law. The IUCN was granted observer status at the United Nations General Assembly.<sup>117</sup>

b. The World Wildlife Fund (“WWF”)

The World Wildlife Fund (“WWF”) was established by IUCN in 1961, because a number of organizations around the world—such as the IUCN and the Conservation Foundation—were trying to meet conservation needs but were desperately short of funds.<sup>118</sup> The organization’s international secretariat was established in Switzerland, and national WWF offices were gradually set up across the world, beginning with the UK in November 1961.<sup>119</sup> Scientists, naturalists, politicians, and businessmen collaborated and established the World Wildlife Fund as an international fundraising organization to work alongside existing conservation groups and bring substantial financial support to the international conservation movement.

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<sup>115</sup> IUCN. What is the IUCN Programme. Working for people and nature. Last updated on updated: December 7, 2014 December 6, 2014, 6:30 PM). IUCN Website.

<sup>116</sup> Encyclopedia Britannica. International Union for Conservation of Nature. Accessed on December 4, 2012. (10:45 AM)

<sup>117</sup> Encyclopedia Britannica. Ibid.

<sup>118</sup> World Wildlife Fund. History. N.W. Washington, DC 2003. Accessed on December 5, 2012, 6:17. Website source.

<sup>119</sup> WWF. A brief history; the world’s leading independent conservation organization. Accessed on December 5, 2012, 7:10 PM. Website source.

The document that first recognized the need for financial support of conservation was the Morges Manifesto, which was signed in 1961 by 16 of the world's leading conservationists, including biologist and African wildlife enthusiast Sir Julian Huxley, IUCN vice president Sir Peter Scott and director-general of the British Nature Conservancy E. M. Nicholson. The Morges Manifesto stated that although the world had enough brainpower and intellect to protect the world environment, the world lacked mechanisms for channelling funding resources to support this type of research and protection.<sup>120</sup>

WWF's World Conservation Strategy warned that humanity had no future unless nature and the world's natural resources were conserved. It also introduced the concept of sustainable development – living within the limits of the natural environment without compromising the needs of future generations - which has been central to WWF's strategy ever since.<sup>121</sup>

c. United Nations Environment Programme (“UNEP”)

In 1971, the UN sponsored a series of meetings preparing for the United Nations Conference on the Human Environment, at which developed nations expressed concern about the environmental consequences of increasing global development while developing nations discussed their continuing need for economic development. Together, these two concerns led to the important global debate about environment and development, which ultimately produced the concept of “sustainable development.”

The United Nations Conference on the Human Environment, which met in Stockholm, Sweden from June 5 to 7, 1972, considered the need for a common outlook on the environment

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<sup>120</sup> WWF. Ibid.

<sup>121</sup> Indian Tiger Welfare Society. WWF-World Wide Fund for Nature. Accessed on December 5, 2012, 7:10 Pm. Website source.

and agreed-upon principles to inspire and guide the people of the world in the preservation and enhancement of the human environment.<sup>122</sup> After the conference, the General Assembly, established the United Nations Environment Programme (“UNEP”) in December 1972. This new entity led the efforts of the UN family in acting on behalf of both the global environment and the programme itself to assist developing countries in implementing environmentally sound policies and practices.<sup>123</sup> UNEP currently has six regional offices and various national offices. UNEP was established to coordinate and promote environmental activities in the UN system, assisting developing countries in implementing environmentally sound policies and practices. Unlike the other Specialized Agencies, UNEP does not have to execute and finance projects as its primary function. The program prioritizes environmental aspects of disasters and conflicts, ecosystem management, environmental governance, harmful substances, resource efficiency, and climate change.<sup>124</sup> The 1972 conference heightened awareness of the global nature of environmental problems and set in motion events that led to the general acceptance of the idea of sustainable development as a means of realizing the developmental needs of all people without sacrificing the earth’s capacity to sustain life.<sup>125</sup>

UNEP’s priorities are dealing with environmental aspects of disasters and conflicts, ecosystem management, environmental governance, harmful substances, resource efficiency, and climate change. In addition, the major motives behind the UNEP were to improve scientific and technological knowledge of environmental issues and make this knowledge available for environmental development and conservation; to develop an integrated approach to the planning

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<sup>122</sup> Audiovisual Library of International Law. Declaration of the United Nations Conference on the Human Environment 1972. Accessed on December 6, 2012, 11:20 PM. Website source.

<sup>123</sup> *Yearbook of the United Nations, 2004: Volume 58*. New York: Dept. of Public Information/United Nations, 2006. Print. 1037.

<sup>124</sup> *Yearbook of the United Nations*. 2006. Ibid. 1039.

<sup>125</sup> Green Economy Blue Full. UNEP, FAO, IMO, UNDP, IUCN, WorldFish Center, GRIDArendal. 2012. Print. 13.

and management of development in order to achieve maximum economic, sociological and environmental benefits; and to assist all countries—especially developing countries—in addressing environmental problems through provision of financing, information, technology and educational assistance.<sup>126</sup>

UNEP’s activities cover a wide range of issues regarding the atmosphere, marine and terrestrial ecosystems, environmental governance, and green economies. It has played a significant role in developing international environmental conventions, promoting environmental science and information, and working on the development and implementation of policy with national governments and regional institutions in conjunction with environmental NGOs. UNEP has also been active in funding and implementing environment related development projects.

UNEP is also responsible for creating or supporting other more specialized environmental organizations. Along with the World Meteorological Organization, UNEP established the Intergovernmental Panel on Climate Change (“IPCC”) in 1988. UNEP is also part of Implementing Agencies for the Global Environment Facility (“GEF”), the Multilateral Fund for the Implementation of the Montreal Protocol, and the United Nations Development Group.<sup>127</sup> The International Cyanide Management Code—a program that regulates chemical use in gold mining—was developed under UNEP’s aegis. Working on many fronts, UNEP is a key global player in environmental protection.

### **3.1.3 In World Commission on Environment and Development and Our Common Future**

The UN General Assembly created the World Commission on Environment and Development (“WCED”) in 1983 to address growing concern about the consequences of the

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<sup>126</sup> UNEP. Background Guide MMUN, Montessori Model United Nations MMUN 2012. 2012. Print.

<sup>127</sup> Schrijver, Nico. Development without Destruction: The UN and Global Resource Management 116 (United Nations Intellectual History Project Series. Bloomington, IN: Indiana University. 2010. Print.



increasing impacts on the human environment and the natural resources.<sup>128</sup> The General Assembly created the WCED as an independent body of twenty-two members.<sup>129</sup> The UN Secretary General appointed Mrs. Gro Harlem Brundtland of Norway as Chairman and Dr. Mansour Khalid of Sudan, as Vice-Chairman, and they in turn appointed the members of the Commission, at least half of whom were selected from the developing world. Saudi Arabian Professor Saleh Abdulrahman Al-Athel (b. 1940) was and remains a Commission member.<sup>130</sup> The Commission members serve in their individual capacities not as representatives of their governments. The Commission set out to reconsider big problems and to develop proposals to solve them. It aimed to define ways to raise the level of understanding on the issues of environment and development both nationally and internationally to ensure that humans will continue to preserve the world's natural resources for future generations. The Commission has operated in close collaboration with the intergovernmental inter-sessional preparatory committee of the Governing Council of the UN Environment Programme, which started preparing an intergovernmental report on environmental perspectives, beginning in 2000 and continuing to present day.<sup>131</sup> And in 1987, WCED produced a path-breaking report that launched sustainable development around the globe through the publication of the report 'Our Common Future.' The concept came from IUCN's "Caring For The Earth."

It is worthwhile to explore this history a bit further. In 1984, there was a meeting of the Commission in Geneva to adopt the rules of the new Commission and to appoint a Secretary General. The Commission selected eight issues for analysis and examined each from the

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<sup>128</sup> Peacock, Kathy W. *Natural Resources and Sustainable Development*. New York: Facts On File, 2008. Internet resource. 179

<sup>129</sup> Rio +20 United Nations Conference on Sustainable Development. *The History of Sustainable Development in the United Nations*. 2012. Website source.

<sup>130</sup> Neefjes, Koos. *Environments and Livelihoods: Strategies for Sustainability*. Oxford: Oxfam, 2000. Print. 14.

<sup>131</sup> United Nations Documents. *Gathering a body of global agreements*. 2012. United Nations websites.

perspective of their common sources in economic, social, and sectorial policies.<sup>132</sup> In addition, the Commission decided that its work would be visible and open to participation to ensure that its members would hear and understand a number of different views and receive advice on the issues that were addressed. Because of this, the Commission held meetings in all regions of the world to get a close-up view of environmental and development issues in those regions.<sup>133</sup> It also held open Public Hearings, at which senior government representatives, scientists and experts, research institute staff, industrialists, and representatives of non-governmental organization expressed their concerns.<sup>134</sup> The Commission created Advisory Panels on Energy, Industry, and Food Security to advise on the results of its various meetings and hearings. This advice was submitted through three separate reports, one for each panel. The Commission also held a series of regional presentations, hoping to build a body of public and governmental support.

The 1987 report of the World Commission on Environment and Development was strategically named 'Our Common Future'<sup>135</sup> to signify the need for unified and increased political will to address common challenges our common future.<sup>136</sup> The report was known informally as the Brundtland Report, in recognition of the signal role of the chair. It addressed how governments, businesses, and individuals can cooperate to deal with environmental and development policies. The report provided a full overview of the major global environmental problems and suggestions on how to solve these problems internationally.

Our Common Future is an agenda to let economies develop in ways that do not harm the

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<sup>132</sup> Jodoin, Sébastien, and Segger M.-C. Cordonier. *Sustainable Development, International Criminal Justice, and Treaty Implementation*. , 2013. Print. 20.

<sup>133</sup> United Nations World Commission On Environment And Development (WCED). Nd. Supra note 2, at 359.

<sup>134</sup> (WCED). Ibid. supra note 2, at 359.

<sup>135</sup> United Nations World Commission on Environment And Development (WCED). *Our Common Future 1* (Oxford University Press. 1987). Gro Harlem Brundtland was a former Prime Minister of Norway chosen in part for her strong background in the sciences and public health. She was appointed by Javier Pérez de Cuéllar, then Secretary General of the United Nations, in December 1983.

<sup>136</sup> United Nations World Commission On Environment And Development (WCED). Ibid.

environment. The Commission recognized that the time had come for the economy and ecology to cooperate. It was an urgent call by the General Assembly of the United Nations to ensure the growth of human progress through development without any effect on the resources of future generations.

The report's successes are several. There were some elements that made the report successful. The public hearings were highly successful because both the commissioners and the participants worked with the Commission. Additionally, cooperation between governments, business, science, and individuals made the Commission a key nexus of collaboration for sustainable development.<sup>137</sup> The Commission enabled people, organizations and governments to offer understanding and signal commitment to their work, and it included contributions in the report.

The Commission invited and requested all the suggestions; participation and support from individuals, scientific institutes, non-governmental organizations, specialized agencies and other bodies of the United Nations, and national governments concerned with environment and development issues to make the work and wishes become truth. Through its inclusiveness, the Commission achieved important results.

### **3.1.4 The Definition of Sustainable Development:**

Our Common Future and the “work of the World Commission on Environment and Development laid the groundwork for the UN general assembly’s decision<sup>138</sup> to convene the United Nations Conference on Environment and Development in 1992, known also as The Rio Earth Summit, which adopted the Rio Declaration on Environment and Development, and

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<sup>137</sup> Rodwell, Dennis. *Conservation and Sustainability in Historic Cities*. Oxford: Blackwell Publ, 2007. Internet resource. 54.

<sup>138</sup> Rodwell, Dennis. 2007. Ibid. 55

Agenda 21 and called for the establishment of the UN\_Commission on Sustainable Development. It opened for signature the texts of the first two Rio treaties United Nations Framework Convention on Climate Change and Convention on Biological Diversity.<sup>139</sup>

### **a. Defining Sustainability**

At the Rio Earth Summit, states expressed a consensus in favour pursuing sustainable development policies. Sustainable development involves devising a social and economic system which ensures that these goals are sustained, real incomes rise, educational standards increase, the health of the nation improves, and the general quality of life is advanced. Sustainable development embraces the notion that the costs of development should not negatively affect future generations.<sup>140</sup> The definition of this concept is based on the understanding that sustainability means: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” It contains within it two key concepts:<sup>141</sup>

- The concept of ‘needs’, in particular the essential needs of the world’s poor, to which overriding priority should be given; and
- the idea of limitations imposed by the state of technology and social organization on the environment’s ability to meet present and future needs.

The definition of sustainability is widely accepted because all the participating countries agreed to its provision in Agenda 21. These provisions were based on an agreed-upon basic concept of sustainable development and a broad strategic framework for achieving it. The definition came to be embodied in the two soft-law instruments adopted in 1992, Agenda 21 and the Rio

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<sup>139</sup> Müller, Joachim W. *Reforming the United Nations: New Initiatives and Past Efforts*. The Hague [u.a.: Kluwer Law Internat, 1997. Print. 11

<sup>140</sup> Dashmishra, Manasranjan. *Political Economy of Development and Environmental Degradation in India*. New Delhi: Concept Pub. Co, 2011. Print. 20

<sup>141</sup> Müller, Joachim W. *Ibid*. 15

Declaration and in the two treaties, the Convention on Biological Diversity (“CBD) are the UN Framework Convention on Climate Change (“UNFCCC).

Our Common Future, therefore, had a major impact in shaping the goals of socio-economic development policy. It recognized that the concept of sustainable development included the recognition that there will be many urgent situations that the planet will face that call for active participation of all sectors of society relating to sustainable development.<sup>142</sup> The report gathered different issues from different views related to environmental problems and related them to sustainability and development, which included social, economic, and political, issues. Our Common Future offered an agenda advocating for the growth of economies based on policies that do not harm, and can even enhance, the environment. In doing so, the Commission recognized that the time had come for a marriage of economy and ecology, in order to ensure the growth of human progress through development without bankrupting the resources of future generations.

The report was divided into three parts. The first part, “Common Concerns”, tackled key ideas for the future: sustainable development and the importance of the international economy. The second part, “Common Challenges,” focused on population and human resources, food security,<sup>143</sup> sustaining the potential, species and ecosystems, resources for development, energy, choices for environment and development, industry, producing more with less, and the urban challenge. The third part, “Common Endeavours”, considered managing the commons, peace, security, development, and the environment, and promoted common action: Proposals for institutional and legal change.<sup>144</sup>

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<sup>142</sup> Thomas, Ken D. and Helen E. Muga. *Handbook of Research on Pedagogical Innovations for Sustainable Development*, 2014. Internet resource. 775

<sup>143</sup> Thomas, Ken D, and Helen E. Muga. Ibid. 779

<sup>144</sup> United Nations World Commission on Environment and Development (WCED), *supra* note 2, at 27-308.

The concept of sustainable development focused attention on finding strategies to promote economic and social improvement in ways that avoid or minimize environmental degradation. It was an urgent call by the General Assembly of the United Nations to do the following:

To propose long-term environmental strategies for achieving sustainable development by the year 2000 and beyond; to recommend ways by which concern for the environment may be translated into greater co-operation among developing countries and between countries at different stages of economic and social development. This would lead to the achievement of common and mutually supportive objectives that take account of the interrelationships between people, resources, environment, and development and would consider ways and means by which the international community can deal more effectively with environment concerns. It would help define shared perceptions of long-term environmental issues and the appropriate efforts needed to deal successfully with the problems of protecting and enhancing the environment. It would create a long term agenda for action during the coming decades, and aspirational goals for the world community.<sup>145</sup>

In short, it proposed a transformational agenda for mankind.

## **b. The Environmental Problems**

Our Common Future's description of the world's leading environmental problems is still accurate today. Five trends most relevant to Saudi Arabia may be highlighted here:

### **b.1. Population and Human Resources:**

Every year, as the world population increases, our supply of natural resources diminishes. Our diminishing resources are not only due to this population increase, but are also a result of global poverty and resource degradation from their not being used properly or sustainably. Many governments do not have the ability to provide education, health care, and food security for the people and are therefore unable to adequately raise living standards.<sup>146</sup> Additionally,

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<sup>145</sup>WCED. Ibid. 27-308.

<sup>146</sup> Bradbrook, Adrian J. *The Law of Energy for Sustainable Development*. Cambridge, UK: Cambridge Univ. Press, 2005. Print. 570

consumption in each industrialized country depends more on natural resources than does a developing country. Therefore, governments must raise the proportion of awareness among people by education, health, and nutrition to allow them to better use the resources they command, and to stretch the resources further.

The world produces more food per head of population today than ever before in human history, and still there are places where too little is grown and large numbers cannot get food.<sup>147</sup> However, agricultural resources and the technology have been improved to feed growing populations. Governments must support the agricultural sectors in both developed and developing countries to make sure powerful strategies for sustainable food security are used.

#### b.2. Species and Ecosystems: Resources for Development

Animal species and natural ecosystems are two of the important elements in development. Both make many important contributions to human welfare. Conservation is a key idea to conserve species and ecosystems in the national parks, forests, preserves, monuments and in private hands as well.<sup>148</sup> Conservation of nature goes hand in hand with its cultivation.

#### b.3. Energy: Choices for Environment and Development

Looking at sustainable development through the lens of energy efficiency helps clarify the definition of sustainable development because the nature of energy systems offers a response to the controversial question of how many “future generations” should be considered. The Brundtland report, Our Common Future, recognized that a safe and sustainable energy path is crucial to sustainable development. It also laid out four key elements of sustainability that have to be reconciled: sufficient growth of energy supplies to meet human needs; energy efficiency

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<sup>147</sup> Endres, Alfred, and Volker Radke. *Economics for Environmental Studies: A Strategic Guide to Micro and Macroeconomics*. Berlin: Springer, 2012. Internet resource. 146.

<sup>148</sup> Orrego, Vicuña F. *The Changing International Law of High Seas Fisheries*. Cambridge, U.K.: Cambridge Univ. Press, 1999. Print. 29

and conservation measures; public health, recognizing the problems of risks to safety inherent in energy resources; and protection of the biosphere and prevention of more localized forms of pollution.<sup>149</sup> Each of these elements must be accounted for in a sustainable development plan.

#### b.4. Industry: Producing More with Less

Experience in the industrialized nations has proved that anti-pollution technology can be cost-effective in terms of reducing harm to health, property, and the environment. It has also made many industries more profitable by making them more resource-efficient.<sup>150</sup> While overall economic growth in all the countries has continued, the consumption of raw materials has been declining, and new technologies offer further efficiencies. Today, many countries are unable to offer to their citizens' new technology or raw materials because most of their natural resources have been degraded. This fact combined with the logic of sustainable development provides ever more incentives to reduce consumption and increase efficiency.

#### b.5. The Urban Challenge

Every year, more and more people are moving from small towns to major metropolises and other cities. In the more developed regions, people do not seem to care much about natural resources in developing new technologies because the environmental problems do not affect these regions as much as poorer regions.<sup>151</sup> But urbanization in the poorer countries has its own demonstrable and increasingly intolerable impact on the environment. The health impacts of this trend can be particularly harmful.

### **c. The Need For New Environmental Laws**

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<sup>149</sup> Bradbrook, Adrian J. Ibid. 540.

<sup>150</sup> Bruce, James P. *Economic and Social Dimensions of Climate Change: Contribution of Working Group Iii to the Second Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge [u.a.: Cambridge Univ. Press, 1996. Print. 280.

<sup>151</sup> Lichfield, Nathaniel. *Evaluation in Planning: Facing the Challenge of Complexity*. Dordrecht [u.a.: Kluwer Acad. Publ, 1998. Print. 177



In order to establish reforms, the Commission proposed that new laws be advanced. The Commission was assisted in its review of the role of law by a group of international legal experts chaired by Robert Munro of Canada. Their report was submitted to and considered by the Commission during the meeting in Harare in September 1986. It was published as a separate book under the title Legal Principles for Environmental Protection and Sustainable Development. The Commission then proposed its work to a common agenda of agreed actions that each nation—as well as the UN—could take to encourage sustainability worldwide. The Commission was not originally intended to continue after its report had been considered by the General Assembly. Because of this, when the Commission submitted the report to the UN General Assembly, the UNGA considered it and called for the UN Conference on Environment and Development.<sup>152</sup>

The issues in the report became the working background for the work of the UN General Assembly Preparatory Committee for the UN Conference on Environment and Development, chaired by Ambassador Tommy Koh of Singapore and the conference itself. Agenda 21 was the action plan adopted by this conference in Rio de Janeiro in 1992.

#### **d. Elaborating the Concept of Sustainable Development**

The definition of sustainability is widely acceptable because all the countries agreed to the general features, which flow from a consensus on the basic concept of sustainable development and on a broad strategic framework for achieving it. The elaboration of the concept is more difficult. This definition led the countries to expand the concept in Agenda 21, the Rio Declaration, CSD, and UNFCCC. Sustainable development should integrate all environmental, economic and social aspects of sustainability, as chapter 4 will discuss. As this topic discusses sustainable development policy, the next chapter will discuss Agenda 21, which essentially deals

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<sup>152</sup> Lichfield, Nathaniel. Ibid. 179

with environmental conservation and sustainable practices within the environment. Agenda 21 thus captures various incentives to preserve the environment, and outlines policies ideal for every country to commit to, just to ensure that the general environment remains favourable to human existence. This chapter will thus look at various facets of the environment including atmosphere, hydrosphere, and the biosphere within the Kingdom of Saudi Arabia, and how various policy frameworks have facilitated their corresponding existences.

### Works Cited for Chapter 3

- Audiovisual Library of International Law. Declaration of the United Nations Conference on the Human Environment 1972. December 6, 2012, 11:20 PM.  
<http://untreaty.un.org/cod/avl/ha/dunche/dunche.html>
- BAT. Conservation International, World Conservation Strategy. December 6, 2012.  
[www.batcon.org](http://www.batcon.org) › Media & Info › BATS Archives
- Blaser, Jürgen, Jane Carter, and D A. Gilmour. *Biodiversity and Sustainable Use of Kyrgyzstan's Walnut-Fruit Forests: Proceedings of the Seminar, Arslanbob, Dzalal-Abab Oblast, Kyrgyzstan, 4-8 September 1995*. Gland, Switzerland: IUCN, 1998. Print.  
<http://www.worldcat.org/title/biodiversity-and-sustainable-use-of-kyrgyzstans-walnut-fruit-forests-proceedings-of-the-seminar-arslanbob-dzalal-abab-oblast-kyrgyzstan-4-8-september-1995/oclc/40050395>
- Bradbrook, Adrian J. *The Law of Energy for Sustainable Development*. Cambridge [u.a.: Cambridge Univ. Press, 2005. Print. <http://www.worldcat.org/title/law-of-energy-for-sustainable-development/oclc/217957659>
- Brebbia, C A, G Passerini, and H Itoh. *Waste Management and the Environment VII*. Southampton: WIT Press, 2014. Internet resource. <http://www.worldcat.org/title/waste-management-and-the-environment-vii/oclc/878109177>
- Bruce, James P. *Economic and Social Dimensions of Climate Change: Contribution of Working Group Iii to the Second Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge [u.a.: Cambridge Univ. Press, 1996. Print. 280.  
<http://www.worldcat.org/title/economic-and-social-dimensions-of-climate-change-contribution-of-working-group-iii-to-the-second-assessment-report-of-the-intergovernmental-panel-on-climate-change/oclc/247086842>
- Brundtland, Gro Harlem. *Report of the World Commission on Environment and Development: "Our Common Future"*. United Nations, 1987.
- Chapin III, F. Stuart, Steward TA Pickett, Mary E. Power, Robert B. Jackson, David M. Carter, and Clifford Duke. "Earth stewardship: a strategy for social–ecological transformation to reverse planetary degradation." *Journal of Environmental Studies and Sciences* 1, no. 1 (2011): 44-53.
- Christoffersen, Leif E, IUCN: A Bridge-BUILDER for Nature Conservation. Green Globe Year Book. 1997.60.
- Dashmishra, Manasranjan. *Political Economy of Development and Environmental Degradation in India*. New Delhi: Concept Pub. Co, 2011. Print.  
<http://www.worldcat.org/title/political-economy-of-development-and-environmental-degradation-in-india/oclc/747944793>
- Encyclopedia Britannica. International Union for Conservation of Nature. December 4, 2012. (10:45 AM) <http://www.britannica.com/EBchecked/topic/291448/International-Union-for-Conservation-of-Nature-IUCN>
- Endres, Alfred, and Volker Radke. *Economics for Environmental Studies: A Strategic Guide to Micro and Macroeconomics*. Berlin: Springer, 2012. Internet resource.

- <http://www.worldcat.org/title/economics-for-environmental-studies-a-strategic-guide-to-micro-and-macroeconomics/oclc/809542591>
- Global Environment Outlook 5, Environment for the future we want  
<http://www.unep.org/geo/geo5.asp>
- Green Economy Blue Full. UNEP, FAO, IMO, UNDP, IUCN, WorldFish Center, GRIDArendal. 2012. Print. 13. [www.unep.org/pdf/Green\\_Economy\\_Blue\\_Full.pdf](http://www.unep.org/pdf/Green_Economy_Blue_Full.pdf)
- Indian Tiger Welfare Society. WWF-World Wide Fund for Nature. December 5, 2012, 7:10 Pm. Website source. <http://www.indiantiger.org/wildlife-organizations/wwf-world-wide-fund-for-nature.html>
- IUCN Academy of Environmental Law. International Union for Conservation of Nature Academy of Environmental Law, history of the academy. December 4, 2012, 11:30 AM. IUCN Website. <http://www.iucnael.org/en/about-us/history-of-the-academy.html>
- IUCN. International Union for Conservation of Nature, about IUCN. Last updated on updated: December 7, 2014 December 6, 2014, 6:30 PM). IUCN Website. <http://www.iucn.org/about/>
- IUCN. What is the IUCN Programme? Working for people and nature. Last updated on updated: December 7, 2014 December 6, 2014, 6:30 PM). IUCN Website. [http://www.iucn.org/what/global\\_programme/](http://www.iucn.org/what/global_programme/)
- Jodoin, Sébastien, and Segger M.-C. Cordonier. *Sustainable Development, International Criminal Justice, and Treaty Implementation.*, 2013. Print.
- Kelliher, Felicity, and Leana Reinl. *Green Innovation and Future Technology: Engaging Regional Smes in the Green Economy.*, 2014. Internet resource. <http://www.worldcat.org/title/green-innovation-and-future-technology-engaging-regional-smes-in-the-green-economy/oclc/89461058222> 22
- Lichfield, Nathaniel. *Evaluation in Planning: Facing the Challenge of Complexity.* Dordrecht [u.a.: Kluwer Acad. Publ, 1998. Print. <http://www.worldcat.org/title/evaluation-in-planning-facing-the-challenge-of-complexity/oclc/231763983>
- Mekouar, Mohamed A. *The Environmental Impact of Economic Incentives for Agricultural Production: A Comparative Study.* Rome: Food and Agricultural Organization of the United Nations, 1990. Print. <http://www.worldcat.org/title/environmental-impact-of-economic-incentives-for-agricultural-production-a-comparative-study/oclc/246503483>
- Mensah, Adelina Castro. *Luciana Sustainable Resource Use & Sustainable Development: A contradiction?!* University of Bonn. 2004. Print. 7
- Müller, Joachim W. *Reforming the United Nations: New Initiatives and Past Efforts.* The Hague: Kluwer Law International, 1997. Print. <http://www.worldcat.org/title/reforming-the-united-nations-new-initiatives-and-past-efforts-1/oclc/231713423>
- Neefjes, Koos. *Environments and Livelihoods: Strategies for Sustainability.* Oxford: Oxfam, 2000. Print. <http://www.worldcat.org/title/environments-and-livelihoods-strategies-for-sustainability/oclc/248635520>

- Orrego, Vicuña F. *The Changing International Law of High Seas Fisheries*. Cambridge, U.K. [u.a.: Cambridge Univ.Press, 1999. Print. <http://www.worldcat.org/title/changing-international-law-of-high-seas-fisheries/oclc/245816478>
- Peacock, Kathy W. *Natural Resources and Sustainable Development*. New York: Facts On File, 2008. Internet resource. <http://www.worldcat.org/title/natural-resources-and-sustainable-development/oclc/300450658>
- Rio +20 United Nations Conference on Sustainable Development. The History of Sustainable Development in the United Nations. 2012. Website. <http://www.uncsd2012.org/history.html>
- Rodwell, Dennis. *Conservation and Sustainability in Historic Cities*. Oxford: Blackwell Publ, 2007. Internet resource.54. <http://www.worldcat.org/title/conservation-and-sustainability-in-historic-cities/oclc/238366670>
- Schrijver, Nico. Development without Destruction: The UN and Global Resource Management 116 United Nations Intellectual History Project Series. Bloomington, IN: Indiana University Press, 2010. <http://books.google.com/books?id=oBaJ3OXWr9UC&pg=PA116#v=onepage&q&f=false>
- Terborgh, John. *Making Parks Work: Strategies for Preserving Tropical Nature*. Washington, D.C: Island Press, 2002. Print. 27-28. <http://www.worldcat.org/title/making-parks-work-strategies-for-preserving-tropical-nature/oclc/421970617>
- Thomas, Ken D, and Helen E. Muga. *Handbook of Research on Pedagogical Innovations for Sustainable Development*. , 2014. Internet resource. <http://www.worldcat.org/title/handbook-of-research-on-pedagogical-innovations-for-sustainable-development/oclc/874029531>
- UNEP. Background Guide MMUN, Montessori Model United Nations MMUN 2012. 2012. Print.
- United Nations Documents. Gathering a body of global agreements. 2012. United Nations web sites. <http://www.un-documents.net/ocf-a2.htm#I.1>
- United Nations Sustainable Development Goals (SDGs) <https://sustainabledevelopment.un.org/index.php?menu=1565>
- United Nations World Commission On Environment And Development (WCED). Nd. supra note 2. Website Source
- United Nations World Commission On Environment And Development (WCED). Our Common Future 1 (Oxford University Press. 1987).
- United Nations. Global issues, environment. 2012. Website source. <http://www.un.org/en/globalissues/environment/>
- World Wildlife Fund. History. N.W. Washington, DC 20037. December 5, 2012, 6:17. Website source. PMhttp://worldwildlife.org/about/history
- WWF. A brief history; the world's leading independent conservation organization. (December 5, 2012, 7:10PM) [http://www.wwf.org.uk/what\\_we\\_do/about\\_us/history/](http://www.wwf.org.uk/what_we_do/about_us/history/)

*Yearbook of the United Nations, 2004: Volume 58.* New York: Dept. of Public Information, United Nations, 2006. Print. <http://www.worldcat.org/title/yearbook-of-the-united-nations-2004-volume-58/oclc/76832892><http://www.un.org/en/globalissues/environment/>

## CHAPTER 4

### 4. Agenda 21 (1992)

The promulgation of Agenda 21 reflects a singular achievement. This widely celebrated United Nations document brought together remarkably diverse interests and issues. Its adoption at the 1992 Earth Summit in Rio de Janeiro highlighted issues that affected the environment and some social issues and factors that affect human existence. Adoption of Agenda 21 marks a major step in humanity's common efforts to remedy the long strife of suffering that results from environmental degradation. It is an Agenda that generated a common understanding about where conservation of the environment could be achieved as well as ensuring a comfortable human existence.

Formulation of Agenda 21 equally entailed concerns for various persistent social issues. This 1992 conference offered a means to address the environmental issues raised by Our Common Future on human sustainability through environmental improvement programs. Therefore, various social issues are featured under Agenda 21, such critical social conditions as food insecurity, widespread and pernicious poverty, and health threats facing individuals and whole populations.

As described in Chapter 3, Agenda 21 is the outcome of two environmental conferences. The first conference was: the United Nations Conference on the Human Environment in Stockholm, June 5-16, 1972, and the second was United Nations Conference on Environment and Development ("UNCED") in Rio de Janeiro, June 3-14, 1992.<sup>153</sup> Key legal instruments emerged from these conferences, "such as the Stockholm Declaration and Action Plan for the

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<sup>153</sup> Robinson, Nicholas A. *Agenda 21: Earth's Action Plan*. Oceana Publications, Inc., 1993 & Tladi, Dire. *Sustainable Development in International Law: An Analysis of Key Enviro-Economic Instruments*. Pretoria: Pretoria University Law Press, 2007. Print. 26

Human Environment at Stockholm and Agenda 21 at Rio.”<sup>154</sup> The declarations represent significant achievements. Adopted twenty years apart, “they represent major milestones in the evolution of international environmental law because they link together environmental laws from countries all around the world.”<sup>155</sup> They lay the foundation for sustainable development. In light of the subsequent history of sustainable development, this section will focus on the substance of Agenda 21.

In 1989, the United Nations General Assembly (“UNGA”) decided to convene the Earth Summit in 1992, twenty years after the Stockholm Conference on the Human Environment. The UNGA established a preparatory committee from both member states and non-members of the UN. One of the key objectives of the organizational session was to adopt a provisional agenda in preparation for the Earth Summit convened for two years. Ultimately, the “Earth Summit,” the UNCED was the largest conference that the UN had ever held. One hundred and sixteen heads of state or government, 8,000 delegates representing 172 states, 9,000 members of the press and 3,000 accredited representatives of non-governmental organizations attended the conference. On June 4, 1992, the Earth Summit adopted the Rio Declaration, Agenda 21 and the Statement of the Principles on Forests, and a resolution calling for the establishment of a UN Commission on Sustainable Development.<sup>156</sup> To achieve sustainability in the environment, each state was called upon to apply Agenda 21 nationally.

Saudi Arabia was an active participant in the Earth Summit. In order for Saudi Arabia, or any other nation, to do an effective job to manage the environment in accordance with Agenda

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<sup>154</sup> Burhenne, Wolfgang E, and Alexandre C. Kiss. *A Law for the Environment: Essays in Honour of Wolfgang E. Burhenne = Un Droit Pour L'environnement = Ein Recht Für Die Umwelt*. Gland, 1994. Print. 29

<sup>155</sup> Tladi, Dire. Ibid: 28

<sup>156</sup> Thorp, Teresa M. *Climate Justice: A Voice for the Future*. , 2014. Internet resource. 75. “Climate change represents an urgent and potentially irreversible threat to human societies and the planet. This book responds to human adversity by mobilizing climate justice as legal justice, to legitimize and realize a unified, transparent, comprehensible, accessible and responsive process that applies to all.”



21, all the ministers and the agencies that are in charge of environmental issues need to apply and incorporate Agenda 21 into their decision-making and planning. This chapter will examine Agenda 21 by focusing on nine selected chapters of Agenda 21, whose themes are particularly relevant to Saudi Arabia. The policy and legal implications for Saudi Arabia are noted.

#### **4.1 Agenda 21 chapter 3 “Poverty”**

Poverty is a very important topic because countries cannot improve their living standards without finding solutions to this problem. Moreover, poverty also poses substantial threats to the environment. There is a close link between poverty and environmental degradation. It is often said that the two conditions feed one another in a self-perpetuating negative spiral in which poverty accelerates environmental degradation and degradation results in or exacerbates poverty.<sup>157</sup> Poverty is not the only cause of environmental degradation, but it does lead to the most serious environmental threats in low-income and developing countries. The United Nations defined poverty as thus:

Total poverty refers to a denial of choices and opportunities, and in the extreme, a violation of human dignity. Poverty thus implies lack of basic capacity to participate effectively in society. Therefore, this condition means not having enough to feed and clothe a family, not having a school or clinic to go to; not having the land on which to grow one’s food or a job to earn one’s living, not having access to credit. Finally, poverty has the implication of insecurity, powerlessness and exclusion of individuals, households and communities. In a nutshell, poverty means susceptibility to violence, and it often implies living on marginal or fragile environments, without access to clean water or sanitation.

Poverty is, thus, an intricate multidimensional challenge faced by many nations around the world.

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<sup>157</sup> Ubero, N. K. *Environmental Management*. New Delhi: Excel Books, 2003. Print. 39

Employment is the best solution for fighting poverty.<sup>158</sup> If a nation cannot provide jobs to its people, many of them go abroad in search of employment. However, this alternative for obtaining employment is inconsistent and therefore is an unreliable solution. It also inflicts costs on the sending country; when some of its most ambitious and capable people leave, they deprive the economy of entrepreneurs and innovation while also destabilizing families and other social units which they might otherwise lead and support directly. To avoid these costs, countries must develop their own programs to alleviate with poverty through job development while attracting assistance at the international level. This parallel approach of seeking foreign support and creating jobs offers a more reliable solution to the problems of poverty.<sup>159</sup>

Recognizing the interconnectedness of human society and its economies, the struggle to eliminate poverty is the collective responsibility of the world as a whole. The elimination of poverty and hunger is tied to income from jobs and human resource development. Recognition of the fact that people struggling to escape hunger and poverty all depend on these same resources for their survival militates toward the adoption of a global development policy that addresses the demands of the conservation and the safeguarding of resources. Such a policy could have the greatest effect on poverty reduction and also offer a pathway to lasting success in the conservation of environment and its finite resources. Similarly, a developmental policy which concentrates mainly on enhancing the manufacture of goods without tackling the sustainability of the resources where production is the motive, will run ultimately face dwindling resources and consequential falling productivity, which would as well have the grave effect of feeding

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<sup>158</sup> Rieu-Clarke, Alistair. *International Law and Sustainable Development: Lessons from the Law of International Watercourses*. London: IWA Pub, 2005. Print. 82

<sup>159</sup> Goudzwaard, Bob, Vennen, M. R. Vander, and H. M. De Lange. *Beyond Poverty and Affluence: Toward an Economy of Care: with a Twelve-Step Program for Economic Recovery*. Grand Rapids MI: W.B. Eerdmans, 1995. 119

poverty.<sup>160</sup> Because of this, it is evident that an anti-poverty program must go hand in hand with sustainable advancement.

The leaders of the Kingdom of Saudi Arabia, like those in many other nations, recognize the need to ensure that its citizens are free from poverty. Although Saudi Arabia is an oil rich nation, many of its citizens exist in poverty, especially women. Key issues that apply to the Kingdom of Saudi Arabia include programs as well as projects aimed at eradicating poverty, job creation, the establishment of education centres for all civilians including those that are handicapped, and lastly, a social welfare system. This dissertation will touch on each as they relate to sustainable development.

Poverty is a peril to the environment and sustainable development principally because it causes people to exploit the environment in the pursuit of growing infrastructure and livelihoods in ways that are not sustainable.<sup>161</sup> Enlightened programs and projects such as those listed in the previous paragraph are relevant in eradicating poverty because they empower the poor with better jobs and survival tactics. Environmental law can play important roles in the elimination of poverty by ensuring that the environment is protected even as jobs are created and housing constructed for the poor. As stated by Agenda 21, such programs involve providing homes for the homeless, protecting populations through law from unjust expulsion from their homes, and helping the marginalized.

An administrative social insurance plan for the civilians of Saudi Arabia has long been in place. The objective of the social insurance plan is to provide important assistance by giving money to people in need, such as orphans, disabled citizens, women who lack support, disaster

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<sup>160</sup> Rieu-Clarke, Alistair, Ibid: 83.

<sup>161</sup> Nolon, John R. *Compendium of Land Use Laws for Sustainable Development*. Cambridge, UK: Cambridge University Press, 2006. Print. 26. This 2006 volume is a collection of land use laws that attempt to achieve sustainable development.

impacted individuals, and relatives of prisoners.<sup>162</sup> The social insurance agency is involved in various projects to help these people secure a living. Saudi Arabia aims to ensure that all its civilians are able to find jobs and earn a living for themselves and their families. The government projects and programs empower individuals by providing training and resources to ensure that they become self-sustaining. For example, the government finds the key to tackling poverty through education because part of the problem stems from social attitudes and behaviours. The government allocates a budget on the order of \$56 billion (SR210 billion) for education and training. There are voluntary associations involving civilians who are interested in social work. The government of Saudi Arabia also recognizes that persistent poverty is a major obstacle to environmental sustainability.<sup>163</sup> Stemming in part from this recognition, it strives to empower civilians through poverty eradication projects such as the poverty fund. These programs provide the needed resources to the marginalized, in the end ensuring that all citizens lead a comfortable life. The outcome of enabling individuals to attain sustainable livelihoods will permit policies to tackle matters of development, sustainable resource handling and poverty elimination concurrently.

Education is important for all individuals, and universal education can only be achieved with the commitment of governments. Agenda 21 realizes the need to avail all individuals with the chance of earning sustainable living.<sup>164</sup> It urges administrations to ensure collective admittance to fundamental schooling free of charge via formal or non-formal instruction. Fundamental schooling is necessary as it equips people with basic knowledge on how to

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<sup>162</sup> *Indicators of Sustainable Development: Guidelines and Methodologies*. New York: United Nations, 2001. 35

<sup>163</sup> *Go between*. Geneva, Switzerland: NGLS, 1900. Print 168.

<sup>164</sup> Sands, Philippe. *Principles of International Environmental Law*. Manchester, UK: Manchester University Press, 1995. Print. 53

communicate and interact with others. This implies that people can be able to find ways to sustain themselves through association and interaction with others in their environment.

The Kingdom of Saudi Arabia takes very seriously its commitment to ensuring universal education. In addition to its long-standing government supported schools for the majority of the population, it also strives to fill in gaps for society's less privileged. In this regard, the Kingdom established, through voluntary associations, schooling centers for those who are handicapped. In addition, the Kingdom established technical schooling centers for the handicapped and other marginalized individuals. The administration realizes that people with disabilities cannot readily sustain themselves.<sup>165</sup> Thus, they need to be empowered with survival skills that will ensure that they compete for better lives much as others do. Education is a matter of sustaining societies.

Sustainable development should be pursued in each sector of the community. Individuals' associations, women's associations and other non-governmental associations are relevant sources of innovation, as well as action at the regional stage, in addition to having a major, interest and established capability of enhancing sustainable livelihoods.<sup>166</sup> The government, in collaboration with appropriate international and domestic NGOs, should back a society-driven strategy to sustainability. This is notably pursued in Saudi Arabia through establishment of a network of society learning centres to promote capacity building and sustainable growth. Another approach would be via determining grass root strategies to permit sharing of experience and knowhow within societies.

Poverty poses major threats to the environment and sustainability. This is because left to their own devices, people in their efforts to escape poverty will pursue opportunity without regard for the sustainable management of resources. Social welfare approaches have been noted

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<sup>165</sup> *Go between. Ibid:* 170

<sup>166</sup> Sirāğ, al-Dīn I. A.-H. *Advancing Sustainable Development: The World Bank and Agenda 21*. Washington, DC: World Bank, 1997. Print. 9

as a strategy through which it becomes possible to deal with the challenges arising from poverty.<sup>167</sup> Amid the objectives of Agenda 21 in combating poverty, is the development for all poverty stricken regions of integrated techniques, as well as programs of sound and sustainable handling of the environmental resources, poverty elimination and income generation.

A strategy of social welfare in the kingdom is intended at social enhancement of the family, and particularly of children in challenging situations through confronting head on the obstacles they face.<sup>168</sup> Social welfare is ensured normally in the form of the social insurance programs, retirement structures and the Saudi industrial growth fund. The social insurance budget is intended to provide income to individuals with investment ideas. This ensures that people can come up with their own enterprises within their areas of expertise, acting as a form of empowerment for the poor.

The government has initiated a retirement system for its civilians reaching an age and after working for a specific period. Much as in other countries, this structure ensures that when individuals stop working, they still continue to live respectably. Without work people lack a source of income and might slowly fall into poverty.<sup>169</sup> However, with the retirement scheme, individuals continue to lead a sustainable life. The Saudi Arabian government also offers long-term loans for industrial projects. These projects employ people and are geared towards conserving the environment. The projects sustain many individuals who gain income from working in these industries. The loans also empower people to come up with development ideas. In these ways, the Saudi government promotes wise forms of social development, promoting the development of the economy in ways that sustain the natural environment.

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<sup>167</sup> Sirāğ, al-Dīn I. A.-H. Ibid. 11

<sup>168</sup> Nolon, John R. Ibid; 28.

<sup>169</sup> Jones, Tom. *Sustainable Development: Critical Issues*. Paris: OECD, 2001. Print. 112.

## 4.2 Agenda 21 chapter 4 “Consumption Patterns”

The concept of Sustainable Consumption and Production (“SCP”) was recognized in the Johannesburg Plan of Implementation adopted in 2002 at the World Summit on Sustainable Development (“WSSD”). It is about key issues of concern in regard to changing consumption patterns including enhancing more efficiency in the employment of energy and other resources, reducing waste generation and helping civilians make environmentally favourable sound purchasing decisions.<sup>170</sup>

Since the issue of alternate consumption patterns is broad, it is addressed in various sections of Agenda 21, mainly in those tackling energy and transportation as well as waste. It is also addressed in other areas on economic mechanisms and the transfer of technology. Poverty and environmental deprivation are directly linked. Whereas poverty leads to types of environmental stress, the main reason for the progressive deterioration of the global environment is the unsustainable pattern of consumption – and of course the systems of production generated to support it.<sup>171</sup> This occurs specifically in industrialized nations, which is an issue of significant concern, enhancing poverty imbalances. Measures to be embarked on at the global level for the safeguarding and improvement of the environment should take complete consideration of the present imbalances in the international patterns of consumption and production. Special attention should be given to the demand for natural resources created through unsustainable consumption and to the effective employment of the resources, in line with the objective of reducing depletion and waste. Enhancing realization of the significance of tackling consumption has not yet been

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<sup>170</sup> Coenen, Frans H. J. M. *Public Participation and Better Environmental Decisions: The Promise and Limits of Participatory Processes for the Quality of Environmentally Related Decision-Making*. Dordrecht: Springer, 2009. Print. 89. According to this article, public participation and its relationship to the strategies and implementation of environmental policy are examined in this volume, from a functional perspective

<sup>171</sup> Coenen, Frans H. J. M. Ibid: 89

linked to a comprehension of its consequences.<sup>172</sup> Some economists question ideas of economic development and underline the relevance of undertaking economic goals that take into consideration the complete value of natural resource capital. A lot remains unclear on the function of consumption in regard to economic development in formulating rational global and countrywide policies.<sup>173</sup> The other objective involves developing an advanced comprehension of the function of consumption and the manner of resulting in sustainable consumption sequences.

Like all nations, Saudi Arabia has an interest in minimizing the amount of energy, as well as materials employed per unit in the manufacture of goods and services. The Kingdom is interested in the both the elimination of environmental stress and enhancing the economic, industrial production and competition. Governments, in association with industrial sectors, should strengthen endeavours to employ energy and resources in a cost-effective and environmentally conscious manner. This is achieved through endorsing the dissemination and use of best available technologies, encouraging study and progress in environmentally sound techniques, endorsing the environmentally friendly employment of renewable and recyclable energy sources, and endorsing the environmentally sound and sustainable employment of reusable natural resources.<sup>174</sup>

Saudi Arabia is becoming an industrialized nation through industrial growth. Those industries that are engaged in the manufacture of plastics, steel, fertilizer and other products are likely to cause environmental pollution and degradation within Saudi Arabia unless they are carefully supervised. Thus, the government realizes the need to implement laws for reducing the

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<sup>172</sup> Miller, Christopher. *Planning and Environmental Protection: A Review of Law and Policy*. Oxford ; Portland, Or: Hart, 2002. Print. 215.

<sup>173</sup> Miller, Christopher. Ibid: 217.

<sup>174</sup> *Labour and the Environment: A Natural Synergy*. Nairobi, Kenya: Major Groups and Stakeholders Branch, Division of Regional Cooperation, United Nations Environment Programme, 2007. Print. 83. *This article focuses on issues ranging from climate change and energy, chemicals management, and corporate social responsibility and accountability to future involvement of workers and trade unions with the environment and with efforts to move towards sustainability.*



amount of emissions and pollution in the manufacturing industries. In ensuring that all industrial sectors involved in the manufacture of goods comply with the environmental conservation policy, the government works with all industries in driving effective strategies for environmental management.<sup>175</sup> The continuous use of natural resources results in depletion, hence the need to avoid depletion through use of recyclable and reusable manufacturing resources. Recycling saves a large percentage of the raw materials required to manufacture new products and is one part of the solution for problem of depleting natural resources. Now, the government requires environmentally friendly technologies, which it expects industries to employ to ensure sustainable economic development.<sup>176</sup>

Waste is a principal cause of environmental pollution and degradation. This is because 1) waste normally contains pollutants and when discharged into the environment without appropriate treatment, cause serious environmental destruction and health effects in humans upon exposure. 2) Waste results in a strain on governments, as they expend knowhow and financial resources to deal with its proper disposal and treatment or remediation. Otherwise, individuals might dispose of the waste at any location, which would result in environmental degradation. 3) Users of materials require regulation regarding waste disposal for materials that lack further use. Waste might be produced in the extraction of raw materials and then the manufacturing process transforming them into consumer products. Some waste products readily break down into non-toxic compounds in the environment, which do not pose a major peril to the environment or human health.<sup>177</sup> Others do not. There are other waste compounds that must be burned or properly disposed of to ensure that the wastes are not toxic to the environment. Such

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<sup>175</sup> *Labour and the Environment. Ibid:83*

<sup>176</sup> Hackett, Steven C. *Environmental and Natural Resources Economics: Theory, Policy, and the Sustainable Society*. Armonk, NY: M.E. Sharpe, 2011. Print. 384

<sup>177</sup> *Towards Sustainable Consumption Patterns: A Progress Report on Member Country Initiatives*. Paris: OECD Publishing, 2000. 8

wastes include plastics, pesticides, heavy metals and other petroleum compounds that do not break down easily or that become more toxic over time. So the choices companies make determine the amount, type and toxicity of waste. If they are not required to internalize the costs, then they are likely to make less responsible decisions. This demonstrates that society should come up with efficient ways of handling the challenge of disposing of waste products.

The issue of waste management and disposal is a major challenge for most countries, and Saudi Arabia is no exception.<sup>178</sup> Wastes disposed into the Red Sea and the Arabian Gulf seas are the main concern. This refers to both wastes from maritime vessels and land-based pollution sources that are dumped into the ocean. Governments, in association with industries, households as well as the public, should make a specific attempt to minimize waste generation. These efforts should focus on endorsing recycling of waste products in industrial procedures and at the consumption level, minimizing wasteful product packaging and endorsing the initiation of more environmentally friendly products.

The increasing trend of nations to have more environmentally sound consumption patterns, coupled with enhanced interests of some industries on the selection of some industries in producing environmentally conscious consumer goods is a relevant advancement that should be endorsed.<sup>179</sup> Governments and international organizations, along with the individual sector, should come up with standards and methodologies for the environmental resources through the complete life cycle of products and procedures. Outcomes of the evaluations on decision-making patterns should instruct consumers on making decisions. Agenda 21 endorses the need for a more informed consumer public and can help individuals arrive at environmentally informed

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<sup>178</sup> Burhenne, Wolfgang E. and Alexandre C. Kiss. Ibid. 32

<sup>179</sup> Hackett, Steven C. Ibid. 384

decisions.<sup>180</sup> This is achieved by information sharing by governments and public awareness campaigns supporting environmentally friendly goods. Consumers should be made aware of health and environmental impacts of products, via consumer legislation and labelling. Reducing waste generation and helping individuals make environmentally friendly decisions is a significant concern of Agenda 21. The leaders of Saudi Arabia intend to ensure that the nation's water and land resources are environmentally safe, which can be achieved through working with the principal generators of waste as they consume products.

#### **4.3 Agenda 21 chapter 6 “Protecting and promoting human health conditions”**

The health and development of a nation are closely linked. Insufficient development results in poverty and unsustainable growth leading to overconsumption. These factors along with high population could lead to grave environmental health challenges in developing as well as developed nations.<sup>181</sup> Action items stipulated in Agenda 21 should tackle the basic health needs of the nation's population because they are important to the attainment of the objectives of sustainable development and basic environmental care. The connection of well-being and socio-economic improvements calls for inter-sectorial endeavours. Endeavours generated by public works projects, associations, housing, enterprises, learning institutions and religious bodies can allow individuals to pursue the goal of sustainable development. Instead of relying completely on remediation and management, prevention plans are also important. Nations should come up with plans for priority programs, which are the result of cooperative efforts by governments, non-governmental organizations and societies.<sup>182</sup> A relevant global association, such as the World Health Organization (“WHO”), should synchronize the activities among nations. The objectives

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<sup>180</sup> *Labour and the Environment*. Ibid:85

<sup>181</sup> Sirāğ, al-Dīn I. A.-H. *Advancing Sustainable Development: The World Bank and Agenda 21*. Washington, DC: World Bank, 1997. Print. 21. This report is part of the bank's efforts to review the progress made over the previous five years and to make plans for improved effectiveness for the future.

<sup>182</sup> Sirāğ, al-Dīn I. A.-H. Ibid. 22

of Agenda 21 under this World Health Organization section involve meeting the fundamental needs of well-being for the special health services.<sup>183</sup> It also involves synchronizing the inclusion of individuals and government agencies dealing with health concerns to create coherent plans for dealing with health-related challenges. As a priority issue, health service coverage should be attained for populations in major need, specifically those in rural regions. Especially important is the involvement of illness prevention programs instead of depending completely on treatment and cure. Key issues to the Kingdom of Saudi Arabia include a health education program, regulation of communicable illnesses and capacity building. Tackling these challenges as part of a coherent strategy will likely lead to better outcomes for health, development and the environment.

It is recognized that health education is key to improving health standards in a nation. This requires a health education program to enhance awareness and instruction in areas of cardio-pulmonary resuscitation, chemical peril, and safety measures, as well as such global issues as cancers, HIV/AIDS, and heart disease.<sup>184</sup> Via such a program, health information is exchanged and enhanced on how to promote human health situations. In addition, the program observes occupational health hazards prevailing at the workplace, offers recommendations on how to reduce them, and observes the wellbeing of workers vulnerable to these hazards. Organization actions linked to safety are formulated to avoid or reduce the incidence of car accidents because a car accident happens every second, and in Saudi Arabia an average of 17 people are killed each day. In addition to reduction in pollution exposure to hydrocarbons, and different toxic materials, which might have a negative effect on the environment and human

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<sup>183</sup> Marien, Michael. *Environmental Issues and Sustainable Futures: A Critical Guide to Recent Books, Reports, and Periodicals*. Bethesda, MD: World Future Society, 1996. Print. 34

<sup>184</sup> Dernbach, John C. *Stumbling Toward Sustainability*. Washington, DC: Environmental Law Institute, 2002. Print. 667

health, instruction in treatment and disposal of medical wastes, as well as toxic substances, is regarded as important daily practices of the companies that are engaged in these activities.<sup>185</sup>

The Ministry of Health of Saudi Arabia realizes that most industries are accountable for causing peril to human health conditions. This is because most people are usually within the vicinity of the industry or work there. Thus, the need to ensure worker safety is important. Notably, Saudi Aramco's program for the conservation of the environment states that the company mandates that its operations do not cause avoidable perils which harm the environment or the public's wellbeing, and that its operations will be executed to safeguard the land and water from pollution. Every department in Saudi Aramco is accountable for ensuring operation of the facilities in a way that will not result in unwanted perils to public wellbeing.

The Kingdom of Saudi Arabia is also required by Agenda 21 to tackle the difficult issue of fighting communicable diseases is a difficult issue. Happily, progress in the advancement of vaccines and health education has resulted in the control of many communicable diseases. However, there are many other communicable illnesses for which protection is essential, specifically in the areas of tuberculosis and HIV/AIDS.<sup>186</sup> In all such cases, measures, either as an important aspect of basic health care or undertaken from the health sector, form an indispensable aspect of approaches to regulation of general illness, in line with wellbeing and hygiene instruction. With HIV infection rates forecast to increase, the socio-economic effect of this disease is expected to be devastating for all nations, and especially for females and youth. Along with considerable costs for well-being, they will be dwarfed through the indirect expenses of the disease, mostly expenses linked with the loss of income and reduced productivity of the afflicted workers. The disease will inhibit the development of sectors and industrial sections and

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<sup>185</sup> Dernbach, John C. Ibid: 669

<sup>186</sup> Marien, Michael. Ibid. 36

it will be important to enhance human capacity building and retraining. This shows the need to ensure that human health is protected. Agenda 21 notes that its major objectives involve ensuring that all individuals' health is improved in all aspects.<sup>187</sup>

One of the most effective strategies involves the creation of health programs to prevent the spread of communicable illnesses among individuals. Communicable illnesses impede the effectiveness of the workforce, by causing individuals to fail to work, which results in poverty. When individuals fail to work they are compelled to rely on the government for assistance. In the spirit of “pay me now or pay me later,” the government has to set aside resources for safeguarding and promotion of human health conditions.

Agenda 21 provides guidance on various tools to address health concerns. For example, these tools include capacity building and awareness campaigns. Capacity building is an effective strategy for protecting and ensuring that populations progress to lead healthy lives. Agenda 21 notes that governments are expected to think about adopting strategies intended at promoting the participation of societies in ensuring their individual needs, as well as supporting health care provisions.<sup>188</sup> There should be a focus on awareness campaigns founded on the wellbeing and health importance for a healthy nation. National plans ought to operate in line with structures at the district level both in the urban, semi urban and rural areas, with the view of upholding the well-being of all citizens. In addition, this mandate should promote the delivery of health projects at all stages of life, and the advancement and backing of referral services. When individuals are supported in ways of ensuring their individual health needs are met, it becomes possible for an administration to achieve higher health care standards. Citizens need to be instructed on manners through which they can ensure that they lead healthy lives.

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<sup>187</sup> Collin, Robin M. and Robert W. Collin. *Encyclopedia of Sustainability*. Santa Barbara: ABC-CLIO, 2009. 138

<sup>188</sup> *Selected Texts of Legal Instruments in International Environmental Law*. Nairobi, Kenya: United Nations Environment Programme, 2005. 5. Print. 9.

The Saudi Ministry of Health is geared towards building the needs of community towards progressive development in the health sector. Capacity building is an effective strategy through ensuring that the environment is sustained, via its eventual benefit of resulting in healthy living. Through healthy living, it becomes an easier task to ensure a sustainable surrounding. It incorporates education and training<sup>189</sup> on current ways of ensuring and maintaining human health. As stated above, capacity building and awareness campaigns are important methods of applying Agenda 21 to solve health related concerns.

#### **4.4 Agenda 21 chapter 9 “Protection of the atmosphere”**

Protection of the atmosphere is a broad and technical subject encompassing several sectors of economic growth. The alternatives and measures in chapter nine of Agenda 21 are suggested for implementation by governments in their endeavors to safeguard the atmosphere. A majority of the matters examined in the chapter are tackled in such global agreements as the 1985 Vienna Convention towards the Protection of the Ozone Layer and also the Convention on Climate Change.<sup>190</sup> In the context of this section on the protection of the atmosphere in Agenda 21, governments are free to execute extra measures. Actions, which might be undertaken in search of the goals of this chapter, should be coordinated with social and fiscal policies to achieve sustained economic advancement and the elimination of poverty. Concern over climate alteration and climate inconsistency, air pollution and ozone depletion demands scientific, economic and social data to understand these issues further.<sup>191</sup>

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<sup>189</sup> Collin, Robin M. and Robert W. Collin. Ibid: 142

<sup>190</sup> Larsson, Marie-Louise. *The Law of Environmental Damage: Liability and Reparation*. (The Hague: Kluwer Law International, 2009) 67.

<sup>191</sup> Koh, Kheng L., Lin H. Lye, and Jolene Lin. *The Crucial Issues in Climate Change and the Kyoto Protocol: Asia and the World*. (Singapore: World Scientific Pub. Co, 2010). This book provides the most comprehensive insight to the climate change discourse within Asia to date by drawing on the diverse disciplines and experience of legal practitioners, climate change consultants, government officials and academics. Individual chapters address issues such as how the various Asian countries - highly disparate in their cultures, socio-economic conditions and political

Enhanced comprehension of how health and socioeconomic aspects of issues impact ecosystems is required. The objectives of this chapter include enhancing the comprehension of procedures, which impact and are affected by the earth's atmosphere on an international, regional scale involving *inter alia*, biological and social impacts. Other objectives involve building capacity to improve global association, enhance comprehension of the economic and social aftermaths of atmospheric alterations, in addition to mitigation and reaction, measures tackling such alterations.<sup>192</sup> Key issues of concern to the Kingdom of Saudi Arabia in regard to this chapter are industrial development, transportation, marine resource development, utilization of land and avoiding the use of stratospheric ozone depleting products.

Industry is relevant for the manufacture of goods as well as services and is the main source of employment and earning. Hence, industrial development is appropriate to economic enhancement. Industrial actions lead to emissions into the atmosphere as well as to the surface and subsurface environments.<sup>193</sup> Safeguarding the atmosphere can be improved through enhancement of resources, the effectiveness of materials and effectiveness and improvement of pollution control technologies. Chlorofluorocarbons and different ozone-depleting substances should be phased out to minimize their particularly pernicious form of waste.

There are numerous objectives intended for the industrial development program by the Saudi administration. The fundamental aim involves endorsing industrial improvements in ways that reduce adverse effects on the atmosphere. This can be achieved through enhancing the effectiveness of all materials and resources, through pollution control strategies, and by

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systems - are responding to climate change, the challenges of mitigating and adapting to climate change, and the effective implementation of the Kyoto Protocol in Asia. 15

<sup>192</sup> Larsson, Marie-Louise. *The Law of Environmental Damage: Liability and Reparation*. (The Hague: Kluwer Law International, 2009) 68.

<sup>193</sup> Larsson, Marie-Louise, *Ibid.* 75



deploying green environmental friendly technologies.<sup>194</sup> Governments, with the applicable UN bodies, should assess and endorse cost efficient programs aimed at the reduction of industrial pollution. The government should encourage industry to enhance its capability to develop technologies and procedures that are safe and less polluting and make more effective use of all resources involving energy. This will also improve the economy. Also, there should be cooperation at international levels for the advancement of techniques and capacity building to address the effects of industry on the atmosphere, resulting in the production of less waste. The government should also be involved in the promotion of effective materials and resources, taking into consideration the products' life cycles. This is with the intention of realizing the economic and surrounding gains of employing resources more effectively and coming up with less waste.

#### **4.5 Agenda 21 chapter 10 “Integrated approach to the planning and management of land resources”**

Agenda 21 has a program area containing a strategy for the organization and handling of land resources. Under this agenda, the Rio conventions of 1992 articulate a concept of sustainable land use system in which the consumption of current land resources does not compromise the availability of resources to the future generations.<sup>195</sup> This program tackles the re-arrangement and strengthening of the public system, involving prevailing policies, planning and development processes and techniques. Such programs can help in placing an integrated strategy for land resources management. Chapter 10 in Agenda 21 does not tackle the operational factors of organization and management, which are more suitably handled in the sector programs. Because the programs in this chapter handle the relevant cross-sector factors in

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<sup>194</sup> Koh, Kheng L., Lin H. Lye, and Jolene Lin. *Ibid*:17

<sup>195</sup> Genske, Dieter D. *Urban Land: Degradation, Investigation, Remediation: with 28 Tables*. (Berlin [u.a.: Springer, 2003), 271. *This article talks about soil sustainability as a concept of agenda 21. In addition, the authors reiterate the value of land amid the application of the soil sustainability agenda. Further chapters illustrate intricate concepts of agenda 21 with regard to the value of land and general sustainability concepts.*

making decisions towards sustainable enhancement, they are intimately linked to several different programs that tackle the matter directly. Land resources are used for several reasons; which are associated and also compete.<sup>196</sup> Hence, it is relevant to plan and organize all use in an inclusive manner. Inclusion should occur at two phases but in unison, on one hand, all social and economic aspects and, on the other, all environmental and resource aspects.

Land-use and resource policies are affected by changes in the atmosphere. Endeavors linked to terrestrial as well as to marine resources and utilization of land can reduce greenhouse gas buildup while, at the same time, they can enhance atmospheric emissions.<sup>197</sup> The loss of biological diversity might reduce the flexibility of ecosystems to respond to climatic changes and air pollution harm. Atmospheric alterations can have relevant effects on forests, biodiversity, and freshwater, as well as marine ecosystems and economic actions, like agriculture.<sup>198</sup> Policy goals in diverse sectors might frequently diverge and will need to be dealt with collaboratively. The objectives of marine resource advancement and utilization of land use involve encouraging terrestrial and marine resource use and relevant land utilization endeavors, which add to the reduction of atmospheric pollution or restricting anthropogenic emissions of greenhouse gases; the preservation, sustainable handling and development, where relevant; maintenance and sustainable employment of natural and surrounding resources.<sup>199</sup> Other objectives of the program include making certain that actual and probable atmospheric alterations and their socio-economic and ecological effects are considered prior to their taking effect. This is important especially in planning and implementing rules in regard to use of marine resources and land utilization

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<sup>196</sup> Genske, Dieter D. Davy, Ibid, 271. *This paragraph talks about various integrated land use and how they compete.*

<sup>197</sup> Steger, Ulrich. *The Sustainable Development and Innovation in the Energy Sector*. (Berlin: Springer, 2005) 67. "Almost every energy scenario assumes an enormous growth in the demand for energy in the coming decades, Meanwhile, at international conferences and other venues, the primary concern is massive reduction of greenhouse gas emissions, especially of the CO<sub>2</sub> produced by fossil-fuel energy consumption."

<sup>198</sup> Snape, William J. and Oliver A. Houck. *Biodiversity and the Law*. Washington DC: Island Press, 1996. Print. 133

<sup>199</sup> Larsson, Marie-Louise, *ibid*:75

endeavors. The government can meet the objectives of the program through endorsing sustainable organization and cooperation in the conservation and improvement of sinks as well as reservoirs for the greenhouse gases, involving biomass, forests and oceans, in addition to differing terrestrial ecosystems.<sup>200</sup>

The government should also consider enhancing terrestrial and marine resources, in addition to land use endeavors, which will be more flexible in responding to changing atmospheric conditions. Marine sustainability is of great significance for Saudi Arabia, particularly considering that the country is surrounded by ocean. This means that Saudi Arabia has a lot of marine life in its surrounding areas. This marine life could be endangered by many factors and most notably for our current purposes, by harmful atmospheric gasses; thus the need for planning to ensure that marine resources are conserved.

Evaluation of current scientific information has confirmed the progressive depletion of the world's stratospheric ozone layer through reactive chlorine, as well as bromine from man-made emissions. Destruction to the ozone layer has been a principal issue among international bodies. Not only is the issue raised in Agenda 21 relevant, but also there have been various attempts by governments to protect the ozone layer.<sup>201</sup> Various control measures have been identified as effective strategies in avoiding progressive ozone depletion. Governments with the support of UN bodies should implement the Montreal Protocol as well as its 1990 adjustments to create substitutes for products and substances that lead to the depletion of the ozone layer. Governments should back further development of the international ozone observing structure through facilitating the establishment of additional systematic observation stations. Based on the outcomes of studies on the impacts of the extra ultraviolet radiation reaching the earth's surface,

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<sup>200</sup> Crabbé, Philippe J. *Implementing Ecological Integrity: Restoring Regional and Global Environmental and Human Health*. (Dordrecht: Kluwer Academic Publishers, 2000) 272.

<sup>201</sup> Crabbé, Philippe J. *Ibid.* 273

Agenda 21 mandates that governments take relevant remedial steps in the areas of human wellbeing, agriculture and marine environment.<sup>202</sup> Depletion of the ozone layer could lead to significant challenges for the globe. This implies that all nations involved in the emission of greenhouse gasses should take effective measures towards ensuring that they reduce ozone layer depletion. Saudi Arabia is no exception, and as a party to the implementation of Agenda 21, the government should work together with industries, private and public sectors towards coming up with and implementing effective strategies for ensuring reductions in the emissions of gases harmful to the surrounding atmosphere.

Essential components of land are natural resources, which are soil, minerals, bio mass and water. These elements are arranged in ecosystems, which avail an array of services that are important for their own maintenance and productivity. Land is described as a restricted resource, whereas the natural resources it supports can differ with time and with regard to management situations and employment. Increasing human demands and economic actions are putting ever expanding pressures on land resources,<sup>203</sup> resulting in tighter competition and frequent disagreements and often leading to suboptimal use of land resources. With such pressures, land use thus attracts both property in land and wealth, which are seen as the continuum between wealthy land owners and the landless people.<sup>204</sup> This is thus the origin of contention in land use as the two different parties contend, each with differing land policies amid right to land ownerships. If human necessities are to be produced sustainably, it is relevant to solve disagreements and progress towards ever more efficient use of land and its natural resources. Evaluations of proper land use, which make the most effective trade-offs and result in an

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<sup>202</sup> Koh, Kheng. Ibid. 16

<sup>203</sup> Davy, Benjamin. *Land Policy: Planning and the Spatial Consequences of Property*. (Burlington, VT: Ashgate, 2012). Print. 136. *Chapter 5 of this article talks exclusively on property in land and the policy frameworks, and how these terms have escalated conflicts in land use and distribution.*

<sup>204</sup> Davy, Benjamin. Ibid: 134

integrated approach, find balance amid the coordination of the sector planning and development actions related to several factors of land resource utilization.

Key issues that apply to the Kingdom of Saudi Arabia to the development and organization of land resources are the development of supportive land policies, the development of planning and management structures and the improvement of scientific comprehension of the land resource structure. By tackling each of these issues proactively, the Kingdom can best ensure sustainable development of its precious land resources.

The development of supportive land policies is important to the environment because it ensures that effective measures are employed for dealing with land issues. One such policy includes the enhancement of scientific understanding of the land resource system.<sup>205</sup> Land is critical for human survival, and its depletion is a threat to the environment. Without habitable land, people will have nowhere to live, build industries or grow food. The issue of supportive land policies ensures the implementation of sustainable land measures and can create strategies to use the land effectively. These strategies ensure that the land is used sparingly to ensure that it is not exhausted. One of the reasons that land use is relevant to environmental law and sustainable development is because governments are expected to protect land on behalf of current citizens and for future generations. In cases where land is ineffectively utilized, the government should be answerable to its citizens.<sup>206</sup> That does not mean that the government is accountable for ensuring only that land is used effectively. Governments should also make sure that policies and policy mechanisms support the best probable land use, as well as sustainable management of land resources. In desert regions such as the Saudi peninsula, concentration

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<sup>205</sup> Nolon, John R. *Compendium of Land Use Laws for Sustainable Development*. (Cambridge, UK: Cambridge University Press, 2006), 46. *This book elaborate Agenda 21 in the context of development policies supportive to sustainable environmental and land development. Here various principles are established which support the United National initiatives on environmental development.*

<sup>206</sup> Nolon, John R. *Ibid.* 51

ought to be directed towards the cultivation of agricultural land in order to best ensure a sustainable, reliable and healthy source of foodstuff.

Saudi Arabia is known to use its land for the cultivation of exportable food crops, in addition to human settlement and the extraction of oil and gas. Currently there is very little central planning of land use. As a result, the land use is frequently inefficient. In order to ensure effective land use, the Kingdom of Saudi Arabia should come up with incorporated goal setting and policy formulation at the country, provincial and local levels, which take into consideration environment, community, demographic and financial matters.<sup>207</sup> It is also necessary to evaluate the regulatory structure, involving rules, restrictions, and enactment processes. This will permit the government to back sustainable utilization of land and management of land resources. In addition, this policy framework is essential as it helps in shifting the use of arable land to other productive means, as appropriate.

The other issue of interest to Saudi Arabia in regard to the chapter on land use is the development of planning and management structures. Planning and management are the main methods through which the Kingdom of Saudi Arabia can effectively manage how its land will be used. This issue is relevant to environmental law because relevant land laws have to be taken into consideration when management plans are made. An authoritative review of Agenda 21 observes that governments at the relevant phase, with the help of regional and global associations, should evaluate and, if suitable, amend planning and management structures in facilitating an incorporated strategy.<sup>208</sup> This is achieved through adoption of planning and management structures, which make possible consideration of environmental factors like air, water, land and various natural resources. This occurs through the use of landscape ecological

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<sup>207</sup> Kwiatkowska, Barbara. *International Organizations and the Law of the Sea: Documentary Yearbook*. London: Graham & Trotman, 1987. Print. 771

<sup>208</sup> Kwiatkowska, Barbara. *Ibid.* 772

arrangement or various strategies that focus on an entire watershed. Proper land planning can as well be achieved by creating an overall framework for land use and outward planning through which, particular and more informed sectorial plans can be enhanced through integrated land resource management.<sup>209</sup> Note that the issue provides a basis for the Kingdom to evaluate and determine innovative and flexible strategies for program funding. Land resource management under Agenda 21 is a relevant factor for all nations. This is because nations should ensure that they safeguard land for all citizens. Saudi Arabia is a nation with an influx of people with many industries and hence, the use of land is diverse. Land use strategies can enable the country to follow environmental law. Environmental law, in turn, can ensure that land is put to effective use while supporting preservation of resources for citizens and future generations.

Improving scientific comprehension of the land resource structure is an effective strategy of environmental conservation. Scientific understanding is related to the environment and sustainability since it results information that enables governments and societies to adopt the most applicable approaches for dealing with the maintenance of land.<sup>210</sup> Environmental law is applicable to the area of land use as the law mandates that land be put into use in the most appropriate manner. Governments, in unison with the state and global scientific society, should endorse environmental studies on the land resource structure for sustainable enhancement and management practices. Research on the issue of improving scientific comprehension of the land resource structure indicates that the evaluation of land potential and how the ecosystem works is an effective manner to ensure that land is used appropriately.<sup>211</sup> For instance, proper ecosystem associations amid land resources and social, economic and environmental structures are ensured.

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<sup>209</sup> Sands, Philippe, Jacqueline Peel, Aguilar A. Fabra, and Ruth Mackenzie. *Principles of International Environmental Law*. Cambridge: Cambridge University Press, 2012. Print. 132. *This article gives deeper meaning into agenda 21 and the manifestation of international environmental law.*

<sup>210</sup> Sands, Phillipe, Jacqueline Peel, Aguilar A. Fabra and Ruth Mackenzie. Ibid,132.

<sup>211</sup> Sands, Philippe, Jacqueline Peel, Aguilar A. Fabra and Ruth Mackenzie. Ibid, 47.

Review on the issue notes that studies via pilot projects ensure that the scientific comprehension of land resources is accurate. It is through scientific study that new policies and approaches of employing land are realized. These approaches are meant to ensure that land is used with an understanding of the need to sustain land resources. Saudi Arabian land use policies at all levels of government would benefit from such systematic analysis.

#### **4.6 Agenda 21 chapter 18 “Protection of the quality and supply of freshwater resources”**

Freshwater resources are essential aspects of the globe’s hydrosphere and a very important section of all earthly ecosystems.<sup>212</sup> The freshwater environment lives according to the hydrological cycle, involving floods as well as droughts, which in several areas have become tremendous and result in dramatic effects. Global climate change and atmospheric pollution might also have an influence on freshwater resources and their presence, via sea-level rise and the flooding of low-lying coastal regions and tiny island ecosystems. Water is required in all phases of life. The overall goal is to make sure that ample supplies of clean water are ensured for the whole population of the planet. To maintain the hydrological and natural roles of ecosystems, adapting human actions within the capacity restrictions of nature and dealing with vectors of water linked illnesses is necessary.<sup>213</sup> Innovative technologies, involving an understanding of local water demands, are required to use limited groundwater and water resources most efficiently and to protect existing resources from pollution. The fact of prevalent shortages and increasing damage from pollution of freshwater resources around the world, call for increasnllyg

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<sup>212</sup> McIntyre, Owen. *Environmental Protection of International Watercourses Under International Law*. Aldershot, England: Ashgate, 2007. Internet resource. 297. *Explains the legal means by which requirements of environmental protection influence the determination of an equitable regime for allocating rights to riparian states to utilise shared freshwater resources.*

<sup>213</sup> McIntyre, Owen. *Ibid.* 303



integrated water resources planning and management.<sup>214</sup> Certainly, Saudi Arabia could benefit from more comprehensive water management programs. Such planning and management should regulate use and misuse of all kinds of interlinked freshwater bodies, involving both surface and groundwater, and take into consideration water quantity and safety factors. The multi-sectorial nature and multi-interest use of water resources should be realized for the socio-economic advancement of water. Rational water use schemes for the enhancement of the surface – as well as underground water supply sources – have to be backed by concurrent water conservation and waste reduction measures to achieve the best outcomes. Currently Saudi Arabia (like many countries) does not enjoy enough of these policies.

Flood control and prevention strategies are relevant to the conservation of the environment. Floods regularly result in horrendous damage to the environment. They destroy homes, result in casualties, sweep away vegetation and could even lead to catastrophic landslides. Thus, it is necessary to ensure that floods are prevented wherever possible by means of effective prevention strategies.<sup>215</sup> This issue is relevant to environmental law as it is the duty of governments to ensure that countries are safeguarded from calamities like floods.

The law also stipulates that effective control measures ought to be put in place towards the preservation of freshwater resources. Flood control and prevention strategies can be implemented through educational strategies among other means. Careful review on this issue leads to the conclusion that the protection of water resources management at the local level calls for instruction and training water management staff at all phases. Techniques linked to some water management functions have to be enhanced through municipal administration and

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<sup>214</sup> Salman, Salman M.A. and Daniel D. Bradlow. *Regulatory Frameworks for Water Resources Management: A Comparative Study*. Washington, DC: World Bank, 2006. 10. This article examines how regulatory frameworks have addressed the various basic issues related to water resources management. It also provides a comparative analysis of those issues.

<sup>215</sup> Salman, Salman M.A. and Daniel D. Bradlow. *Ibid*: 11

administration at the individual, regional and state levels, as well as by non-governmental associations and various water associations.<sup>216</sup> Instruction of the public regarding the management of water is also required to get the best results. Education includes awareness through the formation of programs that involve the mobilization of commitment at all phases and the initiation of international and regional action to enhance such programs. “Instruction of water managers is required for proper decision-making.”<sup>217</sup>

Because of its unique geography, water conservation and waste reduction schemes are particularly relevant to the Kingdom of Saudi Arabia. The country is surrounded by water bodies, which increases risk of contamination of scarce fresh-water resources. Wastewater could be caused through dumping in freshwater resources and the flow of waste to freshwater resources from industries and citizens, as well as other water bodies. This makes water conservation and wastewater reduction schemes necessary in ensuring that the environment, in the form of freshwater resources, is protected from pollution; hence ensuring the sustainability of clean and fresh water. Under Saudi environmental law, individuals are restricted from engaging in actions that result in the depletion of freshwater resources. “Water conservation and waste reduction are important issues of environmental law, which ensures that national rules for ensuring freshwater conservation are implemented.”<sup>218</sup> A review of the relevant literature shows that they involve water resource evaluation, involving the identification of possible sources of freshwater supply. This also includes the determination of all water sources and identification of all human activities that have negative impacts on the resources. Such evaluation comprises the practical foundation

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<sup>216</sup> Brans, Edward H. P. *The Scarcity of Water: Emerging Legal and Policy Responses*. London: Kluwer Law International, 1997. Print. 50

<sup>217</sup> Brans, Edward H. P. *Ibid.* 51

<sup>218</sup> Scanlon, John, Angela Cassar, and Noémi Nemes. *Water As a Human Right?* Gland, Switzerland: IUCN Publications, 2006. Print. 38-39.

for their sustainable management and a precondition for the assessment of the probabilities for their improvement. Saudi Arabia would benefit significantly from such an assessment.

Likewise, the Kingdom would benefit from a more systematic understanding of how its people and industry manage water resources. Major challenges include lack of knowledge and capacity for water resources evaluation, the divided manner of hydrologic services and the as of yet inadequate supply of qualified personnel. Similarly, advanced technology for information capture, as well as management, is progressively difficult to access for developing nations. Creation of national databases is material to water resources evaluation and to alleviate the impacts of pollution. Building them requires will, resources and great deal of concentrated effort.

Creating modern management of the transportation and recreation sectors are the other issues that appear relevant to the Kingdom of Saudi Arabia. Due to the presence of large water bodies in the region, salt water intrusion poses a pervasive threat to the environment generally and particularly to the coastal freshwater resources. Freshwater resources are easily tainted through seawater intrusion. Modern environmental law is specific in the need to ensure that freshwater resources are not polluted through illegal dumping and recreational practices.<sup>219</sup> Under these circumstances, the functions of the government involve mobilization of financial and human resources, laws, setting standards and various regulatory roles, evaluating the use of water and land resources, and creating opportunities for public participation. Global agencies and donors have a relevant function to play in providing support for developing nations in the management of integrated water bodies.<sup>220</sup> Review of the international literature suggests that Saudi Arabia's institutional capability for applying incorporated water management ought to be

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<sup>219</sup> Serageldin, Ismail, and Joan Martin-Brown. *Partnerships for Global Ecosystem Management: Science, Economics and Law: Proceedings and Reference Readings*. Washington, DC: World Bank, 1998. Print . 253

<sup>220</sup> Serageldin, Ismail, and Joan Martin-Brown. *Ibid*; 254.

scrutinized and expanded when gaps exist. Governments will frequently be addressing regional water resources management, though the need might come up for management at the national level. This includes river catchment regions, the district advancement, and regional society organizations. Though the water is handled at several institutions within the socio-political structure, demand-driven handling calls for the advancement of a water linked structure capable of harmonizing policies within all relevant institutions, taking into consideration the further requirement for integration with land use handling.<sup>221</sup>

Key issues of interest to Saudi Arabia in regard to this chapter of Agenda 21 include desalination of seawater, flood control and prevention strategies, water conservation, and waste reduction schemes, transportation, and recreation management. Each of these key areas has the potential for great destruction or great good, depending in part on how well they are managed to optimize sustainability.

#### **4.7 Agenda 21 chapter 20 “environmentally sound management of hazardous wastes, including prevention of illegal international traffic in hazardous wastes”**

Hazardous waste issues have resulted in global, state and regional initiatives involving the government and industrial sectors. Though great progress in the industrial sector has been made in developed nations, much remains to be done. Grave challenges have to be met in managing hazardous wastes, particularly in less developed economies and in countries in which governments have not been held accountable.<sup>222</sup> Happily, an increasing number of nations globally have adopted or are adopting regulatory frameworks for the regulation of trans boundary movements for hazardous. However, even when such progressive laws are established among nations, they are not always enforced properly. Although more nations are building waste

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<sup>221</sup> Scanlon, John, Angela Cassar, and Noémi Nemes. Ibid. 39

<sup>222</sup> Dernbach, John C. *Stumbling Toward Sustainability*. Washington, DC: Environmental Law Institute, 2002. Print, 445. *This article describes various stipulations to Agenda 21, and how they have enhanced waste management efforts and environmental sustainability.*

treatment facilities, in numerous nations the existing capabilities are insufficient to handle present demands. Around the world, numerous dumpsites of hazardous wastes, resulting from previous inappropriate waste disposal, pose significant threats to human wellbeing and the environment. These come predominantly in the form of soil contamination and groundwater pollution.<sup>223</sup> The expenses linked with the clean-up of the sites can run astonishingly high. As a result of increasing recognition of the enormous environmental, health and financial costs of improper disposal of hazardous waste, there is an increasing global perception of the need to adopt a preventive strategy that includes cleaner production to decrease waste, prevent pollution and more effective use of raw materials.

Waste management is relevant to environmental law since the law outlines ways that the government can effectively manage waste. Management of hazardous waste is a key area where Saudi Arabia needs to improve. Through more enlightened management practices, it becomes possible to deal with the issues that arise in regard to sustainability of the environment.<sup>224</sup> Since the management of hazardous wastes is an essential environmental issue, all stakeholders should be involved and ensure that effective approaches are employed. Management and environmental law should work together to ensure that the environmental measures are implemented. Management has always been an effective strategy in the handling of sustainability issues.<sup>225</sup> It is not merely an effective strategy towards sustainability, but a careful review of the historical record demonstrates that, through management, nations come up with strategic ways of ensuring the elimination of hazardous waste. Hazardous waste is perilous to most nations since hazardous

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<sup>223</sup> Dernbach, John C. Ibid: 448

<sup>224</sup> Carraro, Carlo, A. Haurie, and Georges Zaccour. *Environmental Management in a Transition to Market Economy: A Challenge to Governments and Business : Proceedings of the International Conference Held at the University of Geneva, January 6-8, 1993*. Paris: Éditions Technip, 1994, 48. This article tackles various international initiatives to hazardous waste management.

<sup>225</sup> Kummer, Katharina. *International Management of Hazardous Wastes: The Basel Convention and Related Legal Rules*. Oxford: Oxford University Press, 1999. Print. 47.

waste could be transmitted from one nation to another. Also, hazardous waste should also be properly managed to ensure effective means are used in its elimination. This, in turn, results in the overall objective of environmental conservation. Waste management is a framework for determining the manner through which nations dispose of their waste and ensure that a general strategy is used towards collection and elimination of hazardous waste.

Because it offers so much benefit at relatively little cost, education on hazardous waste is a key issue of interest to the Kingdom of Saudi Arabia. Through education, individuals become more perceptive about their environment. This means that people are less likely to engage in careless dumping, especially of hazardous waste. It also improves other human behaviours that result in greater environment sustainability. Education is related to environmental law as it informs nations and governments of the relevant rules to follow to ensure a sustainable environment.<sup>226</sup> Through education, scientific research is conducted to reduce environmental pollution effectively. People need to be educated that hazardous waste could harm the environment in which they live exposing them to significant dangers. A review of literature about the management of hazardous wastes shows that education is an effective manner of ensuring that governments arrive at effective sustainability measures for the environment. Saudi Arabia is an industrialized country, which implies that it requires a lot of education and training in many sectors on how to ensure that hazardous wastes are properly disposed. This involves recycling and reuse strategies that are used by different nations. Saudi Arabia also needs to safeguard its oceans by informing people that hazardous wastes are a peril to the environment.<sup>227</sup>

Reducing the production of new pollutants is an effective (if fairly obvious) strategy towards the overall elimination of pollution. Hazardous wastes pose perils to the environment as

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<sup>226</sup> Sands, Philippe. *Principles of International Environmental Law*. New York: Cambridge University Press, 2003. Print. 706

<sup>227</sup> Sands, Philippe. *ibid.*:. 707

they generate pollution. Increased dumping of the waste implies increased pollution. Reducing the amount of pollution generated is correlated to improving the environment. Sustainability is significantly promoted when the level of pollutants generated is lowered.<sup>228</sup> The Kingdom of Saudi Arabia notes reduction of pollution as an issue of national interest since pollution poses so many threats to the environment and human health. Thus, the government of Saudi Arabia adheres to the strategies outlined in Agenda 21 that would result in greater environmental sustainability. A review of literature on environmentally sound management of hazardous waste shows that Saudi Arabia has been involved in numerous pollution reduction programs. These follow strategies that include raising public awareness of pollution, enacting laws targeting industries involved in hazardous waste production and rolling out other sustainability strategies. Review of foreign environmental laws provides governments with new perspectives on the measures that might be imposed in ensuring the sustainability of the environment. Some of these regulations make citizens accountable for reducing pollution. This is because individuals are compelled to dispose of waste in environmentally sustainable ways.

Key issues of interest to Saudi Arabia are management of hazardous waste, education and training, public awareness and reduction of pollution. Each of these issues is illuminated by practices developed outside the Kingdom. And each offers significant opportunities for improving environmental conditions within Saudi Arabia, if studied carefully and applied sensibly.

#### **4.8 Agenda 21 chapter 21 “environmentally sound management of solid wastes and sewage-related issues”**

The inclusion of a chapter on management of solid wastes in Agenda 21 was in response to a General Assembly decision. The assembly vowed that the Conference should explain

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<sup>228</sup> Kummer, Katharina, Ibid; 50

techniques and measures to stop and mitigate the impacts of environmental degradation.<sup>229</sup> The United Nations Conference on Environment and Development aimed at instituting a framework to improve state and global attempts to enhance sustainable and environmental protection in all nations. This chapter affirms that environmentally sound management of solid wastes is among one of the environmental matters of principal concern in ensuring the safety of the environment. Specifically, the chapter focuses on achieving environmentally sound and sustainable advancement for solid waste management in all nations. Solid wastes involve all domestic refuse and non-hazardous wastes,<sup>230</sup> such as commercial and institutional wastes, waste from streets and construction debris. Program sectors incorporated in the chapter involve protection of freshwater resources, enhancing sustainable human settlements, safeguarding and supporting human health situations, and altering consumption sequences. In several nations, the solid waste management structures also address human wastes, ashes, sludge from the septic tank and sludge in sewage treatment. If these wastes manifest hazardous properties, they should be handled as hazardous wastes. Environmentally conscious waste management should go beyond the mere safe disposal or recovery of wastes and address the issue of unsustainable sequences of manufacture and consumption. The concept of life cycle handling offers a unique opportunity to reconcile environmental enhancement with environmental protection.

The issue of waste reduction is important to the environment because it ensures that pollution is minimized. Through waste reduction, fewer waste products are released to the environment ensuring that more measures are implemented,<sup>231</sup> towards conservation and sustainability of the environment. The issue of waste management is also linked to

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<sup>229</sup> Dernbach, John C. Ibid: 467.

<sup>230</sup> Kuokkanen, Tuomas. *International Law and the Environment: Variations on a Theme*. The Hague: Kluwer law international, 2002. Print.265

<sup>231</sup> Kuokkanen, Tuomas. Ibid: 267



environmental law. In many states, the law mandates that waste is managed in appropriate ways intended to reduce environmental pollution and increase sustainability. Still, around the world, unsustainable consumption and production sequences are increasing the quantity and variety of waste streams at unprecedented and dangerous levels.<sup>232</sup> This occurrence could increase the amount by four to five times that of current levels by 2025. A preventive waste management strategy concentrating on changes in ways of life and in manufacturing and consumption patterns offers the best alternative for reversing present trends. Waste reduction is relevant for every country. Saudi Arabia is no exception. Such a program results in the stabilization and minimization of the manufacture of wastes intended for final disposal, thereby lowering burdens down stream and reducing the impact on the environment quite efficiently. This can be achieved over time by formulating concrete goals based on waste quantities, volume and composition and techniques for waste separation to facilitate waste recycling.

Maximization of solid waste reuse and recycling offers an important strategy for waste reduction, sustainability and maintenance of the environment.<sup>233</sup> This seems particularly true for countries such as Saudi Arabia, in which sources of fresh water are so severely limited. The issue is relevant to environmental law as it is intended to conserve the environment. Undertaking a progressive assessment of the efficiency of all waste reuse and recycling instruments, and determining which strategies could most sensibly be used, and determining strategies through which instruments might be made operational at the state level, are important. Review of the literature leads to the conclusion that enlightened environmental law is also necessary to ensure that nations implement strategies for the recycling of waste at all regional levels. According to

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<sup>232</sup> Dhamija, Urvashi. *Sustainable Solid Waste Management: Issues, Policies, and Structures*. New Delhi: Academic Foundation, 2006. Print. 96

<sup>233</sup> Woodsworth, Anne, and William D. Penniman. *Management and Leadership Innovations*. Bingley, U.K: Emerald, 2014. 283. *This article illustrates the importance of international and national cooperation for ensuring proper waste management and various policies that contribute to environmental friendly practices.*

Agenda 21, each government is responsible for instituting effective waste management strategies.<sup>234</sup> Better laws make this possible.

Endorsing environmentally conscious waste disposal and treatment is another issue relevant to Saudi Arabia where industries are the main source of waste production.

Environmental laws usually mandate that industries dispose of their wastes in an environmentally sound manner. Some of the numerous ways through which governments can ensure environmentally sound waste disposal include education initiatives and endorsing of adequate preservation methods, and endorsing public mandates. They can also provide regulatory and non-regulatory incentives that support the alteration of products and minimize industrial wastes.<sup>235</sup> This is achieved by structuring incentives to promote cleaner production techniques and endeavours which encourage industries and consumers to use packaging that can be safely reused. Another strategy for encouraging environmentally conscious waste disposal and treatment involves determining the most efficient processes for transport, maintenance and management of agricultural products and other perishable goods. This helps to minimize loss of the product, which would have resulted in the production of solid wastes. Thus, every aspect of production that could generate waste is relevant. In the field of solid waste, less is better. And governments can do a great deal to discourage its production.

Issues of interest to Saudi Arabia in reference to this chapter involve waste reduction, maximization of solid waste reuse and recycling facilities and supporting environmentally conscious waste disposal and treatment. More widely applicable systematic approaches to solid waste management – informed largely by practices developed in other countries – can help the

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<sup>234</sup> Kwiatkowska, Barbara. *International Organizations and the Law of the Sea: Documentary Yearbook*. London: Graham & Trotman, 1987. Print. 395

<sup>235</sup> Woodsworth, Anne, and William D. Penniman. Ibid: 284

Kingdom to reduce the environmental and health dangers posed by solid waste, while encouraging greater economic development in sustainable ways.

#### **4.9 Agenda 21 chapter19 “Environmentally sound management of toxic chemicals, including prevention of illegal international traffic in toxic and dangerous products”**

The principles underlying sustainable development offer important opportunities for better dealing with toxic waste. Efficient regulation of the creation, maintenance, management, recycling and reuse, conveyance and disposal of toxic chemicals and dangerous products has increasing relevance for proper wellbeing,<sup>236</sup> environmental protection, natural resource management and sustainable development. This will mandate the active participation of international organizations, governments and industry. Industry involves major industrial organizations and transnational associations as well as more purely local industries. The twin objectives of preventing of the generation of toxic wastes and treating contaminated sites present myriad challenges. Both tasks call for improved expertise, facilities, and technical resources and scientific capabilities. A general integrated strategy to address the management of dangerous chemicals is essential. There is global apprehension that the movement across boundaries of toxic chemicals continues virtually unabated despite prevailing national legislation and related global instruments. This is to the disadvantage of the environment and public wellbeing of all nations. The general objective of this chapter is to help avoid the worst outcome by offering insights into how to reduce the generation of dangerous goods and better manage such toxic chemicals as are produced, in ways most likely to prevent their becoming dangerous to wellbeing and the environment. The overarching overall objective is to reduce the harms inflicted by toxic

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<sup>236</sup> Dernbach, John C. Ibid: 40

waste by: limiting the generation of toxic chemicals, incorporating cleaner production strategies, minimizing trans-boundary movements of dangerous goods.<sup>237</sup>

Environmentally safe chemical management alternatives should be pursued in all nations, as appropriate to their needs and abilities. Key issues of interest to the Kingdom of Saudi Arabia with respect to this subject are two: first, the reduction of the use of toxic chemicals and, second, intensifying the study and development of actions related to global and regional cooperation and coordination. The reduction of toxic chemicals is a “low hanging fruit” solution that will help yield significantly greater environmental sustainability.<sup>238</sup> It is among one of the main issues of interest to the Kingdom of Saudi Arabia since the country has experienced widespread dumping of dangerous chemicals in the open deserts.

According to widely adopted tenets of environmental law, countries are mandated to ensure that they do not dispose of wastes and toxic chemicals in other countries. This applies to oceans, which are a principal zone impacted by the disposal of hazardous waste. Furthermore, the issue of dumping of hazardous waste can be controlled by enforcement of the relevant laws. Through transnational environmental law, governments can enforce requirements that nations dumping wastes in other nations be held accountable.

Part of the problem is simply that we generate too much toxic waste. Human wellbeing and environmental quality are facing increasing degradation through the large amounts of dangerous chemicals being manufactured.<sup>239</sup> There are progressively increasing direct and indirect expenses to the community connected and to the generation, management and disposal of such chemicals. It is hence necessary to increase knowledge on the economics of prevention

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<sup>237</sup> Thorp, Teresa M. *Climate Justice: A Voice for the Future*. 2014. 559. This book includes information on grants and other funding opportunities, physical hazards, patent literature, and technical reports.

<sup>238</sup> Hens, Luc and Bhaskar Nath. *The World Summit on Sustainable Development: The Johannesburg Conference*. Dordrecht: Springer, 2005. Internet resource. 137

<sup>239</sup> Hens, Luc and Bhaskar Nath. *Ibid.* 138

and management of toxic chemicals to incorporate the use of capital investments and economic incentives. Toxic chemical management can be approached by pollution reduction and cleaner production strategies.<sup>240</sup> Technology use and modification and enhancement of low-waste technologies are a major focus of toxic chemical reduction. They offer significant promise to countries like Saudi Arabia which have the means and the incentives to reduce the toxicity of waste and the overall amount of toxic waste.

Intensification of study and development actions is the other issue of interest to Saudi Arabia in regard to Agenda 21. Governments should strengthen research and development actions to find cost efficient options for methods to prevent the generation of toxic chemicals and other toxic wastes. These wastes pose challenges for environmentally conscious disposal or management and eventual elimination of hazardous chemicals and toxic wastes.<sup>241</sup> Economically viable alternatives must be considered. Governments, UN agencies and industries should support and embrace the creation of waste management facilities. The government of Saudi Arabia should support the increase of exchanges of environmental technologies and knowledge of clean technologies. Research into effective methods of toxic chemicals control is an effective manner through which the country can address ways of dealing with toxic waste. Toxic waste management calls for effective management measures that incorporate scientific strategies. Happily, Saudi Arabia has been involved in productive international studies intended to reduce this noxious form of pollution.

Another important issue of interest to Saudi Arabia is cooperation and coordination at the national, global and regional levels for better managing toxic waste. Cooperation at the global and regional levels should enhance the implementation of the environmental conventions such as

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<sup>240</sup> Thorp, Teresa M. 560

<sup>241</sup> Hens, Luc and Bhaskar Nath. Ibid; 139.

Agenda 21 chapter 39, evaluated in this chapter by states.<sup>242</sup> Regional cooperation will be important for the enhancement of similar conventions in areas of the Middle East if so needed. Additionally, there are requirements for efficient coordination of global regional and national policies, as well as instruments. A different method suggested is cooperating in monitoring the impacts of the management of toxic chemicals and wastes. Global and regional cooperation and coordination are important factors in environmental law. This is because environmental law is internationally used by governments to implement bi- or multi-lateral actions necessary to ensure the sustainability of the environment. Chapter 37 of Agenda 21 is a tool for nations to address issues through the implementation of environmental laws.

#### **4.10 The Rio+20 Conference (2012)**

The UN Rio+20 Conference was held in Rio de Janeiro, Brazil, because nations were slow to implement Agenda 21. While nations had made some progress in implementation of Agenda 21, many reports showed overall environmental conditions worsened around the world (See UNEP GEO-5 report).<sup>243</sup> Nations convened twenty years after the Earth Summit to consider how to speed up sustainability action. Therefore, a Rio +20 conference came about because of the failure to achieve the previous stipulations under Agenda 21. The policy guidelines and outcome document, entitled “The Future We Want,” that emanated from the Rio+20 conference in Brazil, acts as a bridge between Agenda 21 and the formation of the UN Sustainable Development Goals (“SDGs”) in 2014. In addition, this conference came as a reprieve to some loopholes that existed in the previous agreements under Agenda 21. The following are some highlights that were realized at the Rio+20 Conference in Rio de Janeiro, Brazil.

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<sup>242</sup> Dernbach, John C. Ibid: 410.

<sup>243</sup> UNEP, Global Environment Outlook 5, *Environment for the future we want*.

The Rio+20 Conference, also known as the United Nations Conference on Sustainable Development, was held June 20-22, 2012. The main purpose of this conference was to gather ideas and generate sustainable measures towards sustainable development.<sup>244</sup> The conference reaffirmed Agenda 21 but could not decide on new measures to adopt. This conference did lead to the formulation of a political outcome document, “The Future We Want,” which details clear and practical measures necessary for the implementation of sustainable development.<sup>245</sup> This conference deferred decisions on next steps on sustainability to the United Nations General Assembly.

During this conference, various member states agreed to negotiate a new set of sustainable development goals (“SDGs”), as a successor to the Millennium Development Goals (“MDGs”).<sup>246</sup> The SDGs were needed to advance the sustainable development agenda. Picking up where the MDGs left off, these goals were intended to frame the 2015th World Development Agenda. The concept of elaborating sustainable development did not stop with a call for SDGs, but equally entailed adoption of ground-breaking guidelines on the green economy. Green economy is one such stipulation that featured during the conference, as member states view it as a matter of urgency for environmental conservation.<sup>247</sup> In addition, governments of the respective nations agreed to establish an intergovernmental process under the General Assembly with the view of preparing options for a strategy for sustainable development financing.

Other declarations made during this conference include: Governments agreed to strengthen the United Nations Environmental Program on several perspectives, where actions

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<sup>244</sup> *Preparations for the Rio +20 Summit: Eighth Report of Session 2010-12*. London: Stationery Office, 2011. Print. 3

<sup>245</sup> Chasek, Pamela S, and Lynn M. Wagner. *The Roads from Rio: Lessons Learned from Twenty Years of Multilateral Environmental Negotiations*. New York: RFF Press, 2012. Print. 35

<sup>246</sup> *Preparations for the Rio +20 Summit: 4*

<sup>247</sup> Manfredo, Michael J. *Understanding Society and Natural Resources: Forging New Strands of Integration Across the Social Sciences*, 2014. Internet resource.

were to be taken during the forthcoming 67th session of the General Assembly.<sup>248</sup> Environmental protection was the epitome of this conference as sustainable developments revolve around clean and safe environment. Principally, various conservation efforts were postulated during this conference, with all member states committing to fight back against global phenomena of environmental degradation.

Political stability is yet another agenda item featured during this conference, and, as a result, the governments present agreed that a high political forum for sustainable development would be established.<sup>249</sup> This point came into consideration after it was seen that environmental conservation and development of sustainable principles depend on the nature of political fabrics in a country. Peace and political stability are some elements that invoke better social and administrative structures, which are prerequisites to sustainable development.

The Rio+20 conference equally led to proposals regarding the establishment of the new work in areas of measurable progress. The request was made with the view of complementing gross domestic product and better-informed policy decisions.<sup>250</sup> The governments adopted a 10-year framework of programs on sustainable consumption and production patterns. In line with the designated responsibilities, Rio+20 delegates invited the General Assembly to ratify a decision requiring a member state body to take any necessary steps to operationalize the framework fully. The conference undertook forward-looking decisions in various areas like energy, food, security, oceans, cities and expressed their commitment to hold a third international conference on Small Island Developing States (“SIDS”) in the year 2014. Finally, the Rio+20 Conference achieved recognition that a joint environmental and developmental agenda required

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<sup>248</sup> Das, Onita. *Environmental Protection, Security and Armed Conflict: A Sustainable Development Perspective*. Cheltenham, UK: Edward Elgar Pub, 2013. Print. 18

<sup>249</sup> Das, Onita. *Ibid.* 19

<sup>250</sup> Chasek, Pamela S, and Lynn M. Wagner. *The Roads from Rio: Lessons Learned from Twenty Years of Multilateral Environmental Negotiations*. New York: RFF Press, 2012. Print. 67



global attention. The term sustainable development and production appear during this conference, and the government appreciated the need to conserve the environment.<sup>251</sup> This conference set the stage for action by the UN General Assembly, ultimately leading to the negotiation and acceptance of the SDGs.

#### **4.11 Sustainable Development Goals (“SDGs”)**

The formulation of Sustainable Development Goals emanated due to the inherent weaknesses of Rio+20 Conference to do more than adopt a declaration on “The Future We Want” and the failure to tackle most of the action points under Agenda 21. The SDG’s are the latest of the policies and goals stipulated under the United Nations. The intergovernmental objective aimed to agree on various goals that were to be implemented within the shortest period of time. Therefore, SDGs are seen as successors to the Millennium Development Goals, and set the world’s development agenda for the next 15 years; the SDGs embody many environmental provisions first raised by Our Common Future and Agenda 21. Therefore, the weaknesses of the Rio+20 Conference’s outcome document led to the drafting of SDGs. The SDGs provide clear guidelines for enforcing and implementing sustainable development among the UN member states.

The SDGs are targets for future international development. They build upon the Millennium Development Goals, and complete the unfulfilled MDG objectives.<sup>252</sup> These goals were negotiated by an open working group under the United Nations General Assembly, which in 2013-14 drafted 17 goals, with 169 targets covering sustainable development issues. Some of the goals suggested by the UN General Assembly’s open working group include: the aim to end poverty in the world, set sustainable plans on healthcare and education improvements, ensure

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<sup>251</sup> Manfredo, Michael J. Ibid.

<sup>252</sup> Kelliher, Felicity and Leana Reinl. *Green Innovation and Future Technology: Engaging Regional SMEs in the Green Economy*, 2014. Internet resource. 22

that cities become sustainable, curtail climatic change and take action towards protecting oceans and seas. Although some viewed the proposals covered under the Sustainable Development Goals as Millennium Development Goals in disguise,<sup>253</sup> in fact the SDGs are much stronger for sustainability than were the MDGs. More than one-half of the SDGs embody environmental sustainability provisions drawn from Agenda 21.

From this summary, it is imperative to note that Sustainable Development Goals promote national action on most challenges that many countries face. They also promote international cooperation in pursuit of goals that states are unable to handle on their own. This transnational cooperation is a brainchild of the Rio+20 conference, which upheld proposals for a short term objective towards improving social and environmental welfare.<sup>254</sup> The stalemate at Rio+20 enabled the General Assembly to secure agreement on the SDGs. Through an all-inclusive intergovernmental process, which was open to all stakeholders, with the view of developing globally accepted and sustainable development goals that would be agreed to by the General Assembly.

Rio+20 had proposed that Sustainable Development Goals would be achieved if the following sets of guidelines are followed and respected by the member states: The SDG must be based on Agenda 21 and the Johannesburg Plan for Implementation.<sup>255</sup> In addition, Rio+20 decided that the SDGs must fully adhere to and respect the Rio Principles. The goals were to be built upon already existing international commitments. Besides, these goals were to be consistent with international law and contribute to the full implementation of the outcomes of all major

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<sup>253</sup> Kelliher, Felicity, and Leana Reinl. Ibid. 23

<sup>254</sup> Thoresen, Victoria W, Robert J. Didham, Jørgen Klein, and Declan Doyle. *Responsible Living: Concepts, Education and Future Perspectives.* , 2015. Internet resource 11

<sup>255</sup> Fitzmaurice, M., Sandrine Maljean-Dubois, and Stefania Negri. *Environmental Protection and Sustainable Development from Rio to Rio+20 =: Protection De L'environnement Et Développement Durable De Rio À Rio+20.* , 2014. Internet resource.

summits in the environmental and social fields.<sup>256</sup> There were other sets of policy limits under this conference. They focus on the key priority areas with the view of achieving sustainable development as guided by the outcome document.<sup>257</sup> The Rio+20 Conference underscored the importance of the SDGs and further agreed that they must be concise, action-oriented, easy to enumerate, aspirational, and global in nature.

The SDGs were intended to contribute directly to the achievement of sustainable development and help in serving as a driver for implementing and mainstreaming sustainable development in the UN system, also addressing priority areas for the achievement of sustainable goals.<sup>258</sup> In order to achieve these objectives, the Rio+20 outcomes proposed for the establishment of an inclusive and transparent intergovernmental process on the SDGs that is open to all stakeholders.<sup>259</sup> In a nutshell, the document leading to the drafting of SDGs authorized the formation of an inter-governmental Open Workshop Group that would submit the report to the 68<sup>th</sup> session of the General Assembly.

As discussed above in chapter three, Caring for Earth is one of the strategies for sustainable living, which aims at improving the conditions of the world's people. The kingdom of Saudi Arabia has not yet adopted its framework to enforce the implementation of these strategies and goals aimed at improving the living conditions and the status of the Earth<sup>260</sup>. In Saudi Arabia, the guidelines issued by the IUCN and by the UN are given as preamble to policies and frameworks by which the country can remain committed to sustainable practices and healthy living through caring for the earth. The adoption of the SDGs is useful to the Kingdom because

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<sup>256</sup> Thoresen, Victoria W, Robert J. Didham, Jørgen Klein, and Declan Doyle. Ibid. 12

<sup>257</sup> Fitzmaurice, M, Sandrine Maljean-Dubois, and Stefania Negri. Ibid.

<sup>258</sup> Publishing, OECD. *Development Co-Operation Report 2014: Mobilising Resources for Sustainable Development*. Paris: OECD Publishing, 2014. Internet resource.

<sup>259</sup> Publishing, OECD. *Development Co-Operation Report 2014*. Ibid

<sup>260</sup> Bricker, Kelly S, Rosemary Black, and Stuart Cottrell. *Sustainable Tourism & the Millennium Development Goals: Effecting Positive Change*. Burlington, MA: Jones & Bartlett Learning, 2013. Print. 56

the SDGs support laws and policies to protect the terrestrial and marine environments, water resources and cities. The SDGs reaffirm the policies for sustainability presented previously. For example, the WCS strategy integrates various facets of the society since caring for the earth is a wide area that requires integrated efforts.<sup>261</sup> These facets include control of global warming, poverty reduction, provision of affordable health care services and enhancing conservation of nature. The Kingdom of Saudi Arabia has laws and programs on these themes. The concepts of caring for the earth and our common future and the SDGs are relevant to the Kingdom, and as such the country must implement relevant policies that will promote the implementation of these policies and guidelines.

This chapter has reviewed various policies on sustainability and how they contribute to defining environmental sustainability. These policies are supportive of global conferences that discussed stipulations under sustainability. For example, the Agenda 21, Rio Declaration and the UN General Assembly World Summit on Sustainability Development (Johannesburg 2002) outlined stipulations to be followed by member countries just to ensure that each member country has a sustainable environment.<sup>262</sup> At the UN “Rio+ 20” world summit in 2012, the “Outcome Document” reaffirmed all past decisions.<sup>263</sup> The facets of sustainability call upon states to re-examine their economic restructuring policies, and various social policies and political reforms.

From the foregoing discussion, it is imperative to appreciate the benefits of Agenda 21 for most UN member states, especially Saudi Arabia. Implementation of Agenda 21 would lead to inception of various policies within Saudi Arabia, which would produce improvements to the

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<sup>261</sup> Bricker, Kelly S, Rosemary Black, and Stuart Cottrell

<sup>262</sup> Gökçekus, Hüseyin, Umut Türker, and James W. LaMoreaux. *Survival and Sustainability: Environmental Concerns in the 21st Century*. Berlin, Heidelberg: Springer-Verlag 2011. Internet resource. 362

<sup>263</sup> Rio 20 - United Nations Conference on Sustainable Development.” *Rio 20 - United Nations Conference on Sustainable Development*. United Nation Website.

country's social and economic wellbeing. As the SDGs reveal, many Agenda 21 policy recommendations must still be implemented. Therefore, Agenda 21 addressed crucial issues that affected Saudi Arabia and its people in entirety.<sup>264</sup> For instance, poverty, health and environmental conservation are some key ideas that are featured in this agenda, and Saudi Arabia has since responded to culminating any extreme side of the three features. In this context, the country has made significant efforts in addressing poverty through fostering relevant economic and social policies that empower people.

In addition, the Saudi Government has implemented various environmental laws, and this encourages action conservation of the environment. Therefore, Agenda 21 has led to significant changes in the social, economic and even political systems in Saudi Arabia.<sup>265</sup> Careful attention to implementing the SDGs will continue the Kingdom's progress toward sustainable development. The next chapter deals with the central role of Islam in providing norms of conduct. This chapter is particular as it handles specific roles contributed by religious groups towards enhancing environmental sustainability.

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<sup>264</sup> Hens, Luc and Bhaskar Nath. Ibid. 139

<sup>265</sup> Burhenne-Guilmin, Françoise. *Environmental Law in Developing Countries: Selected Issues*. Gland, Switzerland: IUCN, 2001. Print. 11

#### Works Cited for chapter 4

- Brans, Edward H. P. *The Scarcity of Water: Emerging Legal and Policy Responses*. London: Kluwer Law International, 1997. Print. <http://www.worldcat.org/title/scarcity-of-water-emerging-legal-and-policy-responses/oclc/36423508>
- Bricker, Kelly S, Rosemary Black, and Stuart Cottrell. *Sustainable Tourism & the Millennium Development Goals: Effecting Positive Change*. Burlington, MA: Jones & Bartlett Learning, 2013. Print. 56
- Burhenne, Wolfgang E, and Alexandre C. Kiss. *A Law for the Environment: Essays in Honour of Wolfgang E. Burhenne = Un @droit Pour L'environnement = Ein @recht Für Die Umwelt*. Gland, 1994. Print. <http://www.worldcat.org/title/law-for-the-environment-essays-in-honour-of-wolfgang-e-burhenne-un-droit-pour-lenvironnement-ein-recht-fur-die-umwelt/oclc/246962216>
- Burhenne-Guilmin, Françoise. *Environmental Law in Developing Countries: Selected Issues*. Gland, Switzerland: IUCN, 2001. Print.
- Carraro, Carlo, A Haurie, and Georges Zaccour. *Environmental Management in a Transition to Market Economy: A Challenge to Governments and Business: Proceedings of the International Conference Held at the University of Geneva, January 6-8, 1993*. Paris: Éditions Technip, 1994. Print. <http://www.worldcat.org/title/environmental-management-in-a-transition-to-market-economy-a-challenge-to-governments-and-business-proceedings-of-the-international-conference-held-at-the-university-of-geneva-january-6-8-1993/oclc/33048572>
- Chasek, Pamela S, and Lynn M. Wagner. *The Roads from Rio: Lessons Learned from Twenty Years of Multilateral Environmental Negotiations*. New York: RFF Press, 2012. Print. 35
- Coenen, Frans H. J. M. *Public Participation and Better Environmental Decisions: The Promise and Limits of Participatory Processes for the Quality of Environmentally Related Decision-Making*. Dordrecht: Springer, 2009. Print. <http://www.worldcat.org/title/public-participation-and-better-environmental-decisions-the-promise-and-limits-of-participatory-processes-for-the-quality-of-environmentally-related-decision-making/oclc/260208418>.
- Collin, Robin M, and Robert W. Collin. *Encyclopedia of Sustainability*. Santa Barbara: ABC-CLIO, 2009. Internet resource. <http://www.worldcat.org/title/encyclopedia-of-sustainability/oclc/709839339>
- Crabbé, Philippe J. *Implementing Ecological Integrity: Restoring Regional and Global Environmental and Human Health*. Dordrecht: Kluwer Academic Publishers, 2000. Print. <http://www.worldcat.org/title/implementing-ecological-integrity-restoring-regional-and-global-environmental-and-human-health/oclc/247848486>
- Das, Onita. *Environmental Protection, Security and Armed Conflict: A Sustainable Development Perspective*. Cheltenham, UK: Edward Elgar Pub, 2013. Print.
- Davy, Benjamin. *Land Policy: Planning and the Spatial Consequences of Property*. Burlington, VT: Ashgate, 2012. Print. <http://www.worldcat.org/title/land-policy-planning-and-the-spatial-consequences-of-property/oclc/765880718>

- Dernbach, John C. *Stumbling Toward Sustainability*. Washington, DC: Environmental Law Institute, 2002. Print. <http://www.worldcat.org/title/stumbling-toward-sustainability/oclc/50404884>
- Dhamija, Urvashi. *Sustainable Solid Waste Management: Issues, Policies, and Structures*. New Delhi: Academic Foundation, 2006. Print. <http://www.worldcat.org/title/sustainable-solid-waste-management-issues-policies-and-structures/oclc/72871653>
- Environmental Law. Cambridge: Cambridge University Press, 2012. Print. 44
- Genske, Dieter D. *Urban Land: Degradation, Investigation, Remediation*, Berlin: Springer, 2003. Print. <http://www.worldcat.org/title/urban-land-degradation-investigation-remediation-with-28-tables/oclc/231974096>
- Go between*. Geneva, Switzerland: NGLS, 1900. Print. <http://www.worldcat.org/title/go-between/oclc/26686877>
- Gökçekus, Hüseyin, Umut Türker and James W. LaMoreaux. *Survival and Sustainability: Environmental Concerns in the 21st Century*. Berlin, Heidelberg: Springer-Verlag Berlin Heidelberg, 2011. Internet resource
- Goudzwaard, Bob, Vennen M. R. Vander, and Lange H. M. De. *Beyond Poverty and Affluence: Toward an Economy of Care: with a Twelve-Step Program for Economic Recovery*. Grand Rapids, MI: W.B. Eerdmans, 1995. Print. <http://www.worldcat.org/title/beyond-poverty-and-affluence-toward-an-economy-of-care-with-a-twelve-step-program-for-economic-recovery/oclc/611234461>
- Hackett, Steven C. *Environmental and Natural Resources Economics: Theory, Policy, and the Sustainable Society*. Armonk, NY: M.E. Sharpe, 2011. Print. <http://www.worldcat.org/title/environmental-and-natural-resources-economics-theory-policy-and-the-sustainable-society/oclc/607084151>
- Hens, Luc, and Bhaskar Nath. *The World Summit on Sustainable Development: The Johannesburg Conference*. Dordrecht: Springer, 2005. Internet resource. <http://www.worldcat.org/title/world-summit-on-sustainable-development-the-johannesburg-conference/oclc/209847997>
- Indicators of Sustainable Development: Guidelines and Methodologies*. New York: United Nations, 2001. Internet resource. <http://www.worldcat.org/title/indicators-of-sustainable-development-guidelines-and-methodologies/oclc/312371665>
- Jones, Tom. *Sustainable Development: Critical Issues*. Paris: OECD, 2001. Print. *Go between*. *Ibid*: 112. <http://www.worldcat.org/title/sustainable-development-critical-issues/oclc/150153927>
- Kelliher, Felicity, and Leana Reinl. *Green Innovation and Future Technology: Engaging Regional Smes in the Green Economy*. , 2014.
- Koh, Kheng L, Lin H. Lye, and Jolene Lin. *The Crucial Issues in Climate Change and the Kyoto Protocol: Asia and the World*. Singapore: World Scientific Pub. Co, 2010. Internet resource. <http://www.worldcat.org/title/crucial-issues-in-climate-change-and-the-kyoto-protocol-asia-and-the-world/oclc/613343377>

- Kummer, Katharina. *International Management of Hazardous Wastes: The Basel Convention and Related Legal Rules*. Oxford: Oxford University Press, 1999. Print.33
- Kuokkanen, Tuomas. *International Law and the Environment: Variations on a Theme*. The Hague: Kluwer law international, 2002. Print. <http://www.worldcat.org/title/international-law-and-the-environment-variations-on-a-theme/oclc/491290088>
- Kwiatkowska, Barbara. *International Organizations and the Law of the Sea: Documentary Yearbook*. London: Graham & Trotman, 1987. Print. <http://www.worldcat.org/title/international-organizations-and-the-law-of-the-sea-documentary-yearbook-vol-1-1985/oclc/225028356>
- Labour and the Environment: A Natural Synergy*. Nairobi, Kenya: Major Groups and Stakeholders Branch, Division of Regional Cooperation, United Nations Environment Programme, 2007. Print. <http://www.worldcat.org/title/labour-and-the-environment-a-natural-synergy/oclc/173500078>
- Larsson, Marie-Louise. *Law of Environmental Damage: Liability and Reparation*. The Hague: Kluwer Law International, 1999. Print. <http://www.worldcat.org/title/law-of-environmental-damage-liability-and-reparation/oclc/186591115>
- Manfredo, Michael J. *Understanding Society and Natural Resources: Forging New Strands of Integration Across the Social Sciences*, 2014. Internet resource. <http://www.worldcat.org/title/understanding-society-and-natural-resources-forging-new-strands-of-integration-across-the-social-sciences/oclc/881474202> 248
- Marien, Michael. *Environmental Issues and Sustainable Futures: A Critical Guide to Recent Books, Reports, and Periodicals*. Bethesda, MD: World Future Society, 1996. Print. <http://www.worldcat.org/title/environmental-issues-and-sustainable-futures-a-critical-guide-to-recent-books-reports-and-periodicals/oclc/34283750>
- McIntyre, Owen. *Environmental Protection of International Watercourses Under International Law*. Aldershot, England: Ashgate, 2007. Internet resource. <http://www.worldcat.org/title/environmental-protection-of-international-watercourses-under-international-law/oclc/648340284>
- Miller, Christopher. *Planning and Environmental Protection: A Review of Law and Policy*. Portland, OR: Hart, 2002. Print. <http://www.worldcat.org/title/planning-and-environmental-protection-a-review-of-law-and-policy/oclc/799178346>
- Nolon, John R. *Compendium of Land Use Laws for Sustainable Development*. Cambridge: Cambridge University Press, 2006. Print. <http://www.worldcat.org/title/compendium-of-land-use-laws-for-sustainable-development/oclc/61687789>
- Publishing, OECD. *Development Co-Operation Report 2014: Mobilising Resources for Sustainable Development*. Paris: OECD Publishing, 2014. Internet resource. <http://www.worldcat.org/title/development-co-operation-report-2014-mobilising-resources-for-sustainable-development/oclc/897071714>
- Rieu-Clarke, Alistair. *International Law and Sustainable Development: Lessons from the Law of International Watercourses*. London: IWA Pub, 2005. Print. <http://www.worldcat.org/title/international-law-and-sustainable-development-lessons-from-the-law-of-international-watercourses/oclc/426931634>



- Rio 20 - United Nations Conference on Sustainable Development.” *Rio 20 - United Nations Conference on Sustainable Development*. United Nation Website
- Robinson, Nicholas A. *Agenda 21: Earth’s Action Plan Annotated*. New York: Oceana Publications, 1993. Print. <http://www.worldcat.org/title/agenda-21-earths-action-plan-annotated/oclc/29610457>
- Salman, Salman M. A, and Daniel D. Bradlow. *Regulatory Frameworks for Water Resources Management: A Comparative Study*. Washington, DC: World Bank, 2006. Print. <http://www.worldcat.org/title/regulatory-frameworks-for-water-resources-management-a-comparative-study/oclc/31372962>
- Sands, Philippe, Jacqueline Peel, Aguilar A. Fabra, and Ruth Mackenzie. *Principles of International Environmental Law*. Cambridge: Cambridge University Press, 2012. Print. <http://www.worldcat.org/title/principles-of-international-environmental-law/oclc/760904889>, 239
- Sands, Philippe. *Principles of International Environmental Law*. Manchester: Manchester University Press, 1995. Print. <http://www.worldcat.org/title/principles-of-international-environmental-law/oclc/317113846>
- Sands, Philippe. *Principles of International Environmental Law*. New York: Cambridge University Press, 2003. Print. <http://www.worldcat.org/title/principles-of-international-environmental-law/oclc/424071128>
- Scanlon, John, Angela Cassar, and Noémi Nemes. *Water As a Human Right?* Gland, Switzerland: IUCN Publications, 2006. Print. 38-39.
- Selected Texts of Legal Instruments in International Environmental Law*. Nairobi, Kenya: United Nations Environment Programme, 2005. Print. <http://www.worldcat.org/title/selected-texts-of-legal-instruments-in-international-environmental-law/oclc/76765808>
- Serageldin, Ismail, and Joan Martin-Brown. *Partnerships for Global Ecosystem Management: Science, Economics and Law: Proceedings and Reference Readings*. Washington, DC: World Bank, 1998. Print. <http://www.worldcat.org/title/partnerships-for-global-ecosystem-management-science-economics-and-law-proceedings-and-reference-readings/oclc/239784311>
- Sirăgă, al-Dīn I. A.-H. *Advancing Sustainable Development: The World Bank and Agenda 21*. Washington, D.C: World Bank, 1997. Print. <http://www.worldcat.org/title/advancing-sustainable-development-the-world-bank-and-agenda-21/oclc/237642382>
- Snape, William J, and Oliver A. Houck. *Biodiversity and the Law*. Washington D.C: Island Press, 1996. Print. <http://www.worldcat.org/title/biodiversity-and-the-law/oclc/840290480>
- Steger, Ulrich. *The Sustainable Development and Innovation in the Energy Sector*. Berlin: Springer, 2005. Internet resource <http://www.worldcat.org/title/sustainable-development-and-innovation-in-the-energy-sector/oclc/209862118>
- Thoresen, Victoria W, Robert J. Didham, Jørgen Klein, and Declan Doyle. *Responsible Living: Concepts, Education and Future Perspectives*. , 2015. Internet resource.

- <http://www.worldcat.org/title/responsible-living-concepts-education-and-future-perspectives/oclc/902846594> 11
- Thorp, Teresa M. *Climate Justice: A Voice for the Future*, 2014.  
<http://www.worldcat.org/title/climate-justice-a-voice-for-the-future/oclc/883513288>
- Uberoi, N K. *Environmental Management*. New Delhi: Excel Books, 2003. Print.  
<http://www.worldcat.org/title/environmental-management/oclc/86074456>
- United Nations Environment Programme. Global Environment Outlook- 5 (GEO-5) report.  
<http://www.unep.org/geo/geo5.asp>
- Woodsworth, Anne, and William D. Penniman. *Management and Leadership Innovations*. Bingley, U.K: Emerald, 2014. Internet resource.  
<http://www.worldcat.org/title/management-and-leadership-innovations/oclc/883335733>

## CHAPTER 5

### 5. The Central Role of Islam in providing norms of conduct

As Agenda 21 emphasised,<sup>266</sup> environmental conservation is the role of everyone in the society. Sustainable development thus involves both government and various organization groups of civil society. Organized religious society should be key to ensuring proper management of the environment in a country whose culture is shaped by religion. Religious teachings can further sustainable development policies and laws. Already many religions support the concept of environmental conservation and sustainability. In general terms, religious groups whether Muslims, Christians, or Hindus, hold the environment in high regard, and their efforts inspire people in protecting their respective ecosystems.

Muslims have programs aimed at conserving the environment and its natural life and aesthetics. In this context, it is worth noting that the Islamic religion is sensitive towards the conservation of environment and promoting healthy practices among its followers. Thus, this chapter aims at describing various perceptions of policies undertaken by the Muslim community towards sustainable practices and conserving the environment, especially in Saudi Arabia. Islamic principles of environmental protection are fundamental to concepts of sustainability.

#### 5.1 Islamic principles for conservation of the natural environment

The protection of the environment in Islam is based on the *Qur'an* and on what the prophet Muhammad declared.<sup>267</sup> God created the universe and everything was given different functions that were carefully measured and meticulously balanced. Therefore, everyone who lives in this universe has the responsibility to protect the environment.<sup>268</sup> God says, “Verily, all

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<sup>266</sup> See chapter 23 of Agenda 21

<sup>267</sup> ‘Izz, al-Dīn M. Y. *The Environmental Dimensions of Islam*. Cambridge: Lutterworth Press, 2000. Print. 11

<sup>268</sup> ‘Izz, al-Dīn M. Y. *Ibid.* 13

things have we created by measure”<sup>269</sup> and “Everything to Him is measured”<sup>270</sup> and He says, “We have produced therein everything in balance.”<sup>271</sup> The dictates express His will that there be order and harmony.

### **5.1.1 A general introduction to Islam’s attitude toward the environment**

The first of the pillars on which Islam is based is to comply with the orders of God and what Prophet Muhammad says.<sup>272</sup> God says, “It is he who hath produced you from the earth and settled you therein.”<sup>273</sup> And the Prophet (God bless him and grant him peace) says, “On Doomsday, if anyone has a palm shoot in hand, he should plant it.”<sup>274</sup>

The universe was not only created for human use because there is a diversity in functions. In Islamic belief, humans must be aware of the environment.<sup>275</sup> They are not the owners of the world but God provided authority to them and to animals to use the environment. There is a relationship between human and the universe as defined and clarified in the *Qur’an*. This relationship encompasses the power of God and worship God, inhabitation and construction of the land, utilization and development of nature for human benefit and enjoyment and appreciation of beauty.

In the *Qur’an*, humans must keep, maintain and preserve the environment honestly and must act within the limits dictated by honesty.<sup>276</sup> Therefore, humans should take every safety measure to ensure the benefits and rights of others who live in this world since they are equal partners on earth. Humans should not view the environment as limited to one generation above

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<sup>269</sup> Qur’an: Surat al-Qamar (54), ayah 49.

<sup>270</sup> Qur’an: Surat ar-Ra’d (13), ayah

<sup>271</sup> Qur’an: Surat al-Hijr (15), ayah 19.

<sup>272</sup> ‘Izz, al-Dīn M. Y. Ibid. 18

<sup>273</sup> Qur’an: Surat Hud (11), ayah 61.

<sup>274</sup> Hadith of sound authority, related by al-Bukhari and Muslim on the authority of Anas.

<sup>275</sup> Renard, John. *Understanding the Islamic Experience*. New York: Paulist Press, 2002. Print. 62

<sup>276</sup> Hallaq, Wael B. *The Origins and Evolution of Islamic Law*. Cambridge: Cambridge University Press, 2010. Print.

all other generations. For example, in 2010 Saudi Arabia's King Abdullah bin Abdulaziz issued a royal order to stop exploration missions of new oil fields to save this resource and pass it on to future generations.<sup>277</sup> He said "Just leave the underground wealth for our sons and their sons."<sup>278</sup> The environment should be jointly owned in a way in which each generation does their best to save the environment, without disrupting or upsetting the interests of future generations.<sup>279</sup>

### **5.1.2. Protection of the environment**

Islamic principles are the basic for all law, including environmental law, in Saudi Arabia. Islam is highly protective of the natural environment. The protection of water, air, plants and animals are some elements of environmental issues addressed in the *Qur'an*.<sup>280</sup> This section explores those requirements.

#### **a. Water**

Water is the source and origin of life. God says, "We made from water every living thing." Plants, animals and man all depend on water for life and existence. God says, "It is He who sends down water from the sky; and thereby we have brought forth the plants of every kind."<sup>281</sup> He also said, "We send down pure water from the sky, thereby to bring to life a dead land and slake the thirst of that which We have created—cattle and men in multitudes."<sup>282</sup> God also reminds us that water is very important. God says, "Have you considered, if your water were one morning to have seeped away, who then could bring you clear-flowing water?"<sup>283</sup> Islam can let anyone go to heaven if he helps any thirsty human or animal to get water. Water is from God,

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<sup>277</sup> Daily Kos New. Saudi King: We've halted new oil field exploration.. 2010. Website source

<sup>278</sup> Saudi Gazette New oil fields saved for future generations: King. 2014. Print

<sup>279</sup> Ba Kader, A. Alsabbagh, A. and Alglenid, Azzidien, M. Islamic Principles for the conservation of the natural environment.. Nd. 13-25.

<sup>280</sup> *The Muslim World League Journal*. Makkah al-Mukarramah, Saudi Arabia: Press and Publications Dept., Muslim World League, 1980. Print. 32

<sup>281</sup> Qur'an: Surat an-Nahl (16), ayah 14

<sup>282</sup> Qur'an: Surat al-Furqan (25), ayah 48-49

<sup>283</sup> Qur'an: Surat al-Mulk (67), ayah 30

and every one can use it without monopoly, usurpation, despoilment, wastage or abuse. God said, “Tell them that the water is to be divided between them.”<sup>284</sup> In Islamic law, whatever is indispensable to fulfil the imperative obligation of preserving life is itself obligatory.<sup>285</sup> The judicial rule is “what leads to the forbidden is itself forbidden.”<sup>286</sup> Therefore, any corruption in this element of life, whether by polluting or spoiling it with any material would cause an unsuitable environment and it will be forbidden because it will lead life to stop. To prevent any activity that might lead to the pollution of water sources or activities that spoil the purity and characteristics of water, and to prevent extra consumption of water, Islam rations all and regular utilization of water and water sources.<sup>287</sup>

## **b. Air**

Everything in this world has functions. Sometimes we see them and sometimes they are not perceived. But God made and knows the functions for everything, and He has reasons for it. God said, “We send the fertilizing winds,”<sup>288</sup> and He said, “Verily in the creation of the heavens and the earth; in the alternation of night and day, in the change of the winds, and the clouds compressed between heaven and earth—surely there are signs for a people who have sense.”<sup>289</sup> Air is one of the important elements in the atmosphere. Therefore any attempt at polluting it or damaging its functions will necessarily lead to cessation of life itself and, therefore, this act in Islam is forbidden.

## **c. Plants and Animals**

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<sup>284</sup> Qur'an: Surat al-Qamar (54), ayah 28.

<sup>285</sup> Qur'an: Surat al-Qamar (54), ayah 28.

<sup>286</sup> Bagader, A. & Alsabbagh, A. & Alglénid, A. & Izzidien, M. Islamic Principles for the conservation of the natural environment. PP 15.

<sup>287</sup> Jian, Song, and Jakob Nüesch. *Food & Water: A Question of Survival*. Zürich: vdf, Hochschulverlag an der ETH Zürich, 1997. Print. 192

<sup>288</sup> Qur'an: Surat al-Hijr (15), ayah 22.

<sup>289</sup> Qur'an: Surat al-Baqarah (2), ayah 164

Plants and animals have different functions. God created them for many reasons. One of these reasons is to provide happiness and enjoyment to humans. Another reason is to provide sustenance for life and for man. Therefore, all humans must protect the environment because they are not the owners of the environment. God created everything in this world and these creatures should worship God for everything that He made. God said “Have you seen the fire you kindle, was it you who grew its timber or did We grow its timber or did we grow something more. The response was, “We have made it a reminder and a comfort for the desert dwellers.”<sup>290</sup> He also said, “There is not an animal on the earth, nor any being that wings its flight, but is a people like unto you”<sup>291</sup> and God said, “Do you not see that all things bow down in worship to God that are in the heavens and on the earth- the sun, the moon, the stars, the mountains, the trees, the animals?”<sup>292</sup> He also said, “To God bow all beings in the heavens and the earth- with good will or in spite of themselves.”<sup>293</sup> Each of these prescriptions admonishes us to respect God’s creations.

God sent Prophet Muhammad to the earth to spread blessings and peace. God said, “A mercy to all beings.”<sup>294</sup> He has shown the whole world how to care about the environment through his commandments and life. All the guidance and recommendations of Prophet Muhammed are mandatory for Muslims. Since he became the Prophet of Islam, Muhammed cared for the environment. The Prophet of Islam said that there was a woman who would be sent to hell because of a cat she locked up without feeding and released the cat to be fed on by the vermin of the earth.<sup>295</sup> Also, God thanked a serf who saved a dog from death by giving it water

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<sup>290</sup> Qur’an: Surat al-waqi’ah (56), ayah 71-73.

<sup>291</sup> Qur’an: Surat al-An’am (6), ayah 38.

<sup>292</sup> Qur’an: Surat al-Hajj (22), ayah 18

<sup>293</sup> Qur’an: Surat ar-Ra’d (13), ayah 15.

<sup>294</sup> Qur’an: Surat al-Anbiya’ (21), ayah 107.

<sup>295</sup> Ahmad, Mirza G, and Mirza G. Ahmad. *Our Teaching*. Islam International, 1996. Print. 34

to drink, thus quenching its thirst. Islam looks upon these created beings, both animals and plants, in two ways:<sup>296</sup> as living beings in their own right, glorifying God and attesting to His power and knowledge and as creatures subjected in the service of man and other created beings, fulfilling vital roles in the development of this world. These twin obligations inform our choices every day.

### **5.1.3 Rule of Islam's environment law**

Based on the *Qur'an* and the sayings of the Prophet Muhammad, there are several rules in Islamic law to protect the environment. Protection and development of the environment is mandatory in Islam. Muslims must save and expand all the things around him that are protecting himself and the community.<sup>297</sup> It is binding for all Muslims to protect each other regardless of their belief, colour or nationality.

Human duty is to do one's best to realize the interests of oneself and of the society as a whole. Therefore, any harm or damage to particular individuals could be established as general damage to the society and the environment as a whole.<sup>298</sup> For example, the harm caused to individuals as a result of the heavy rains in Jeddah on 2011 might be linked to global climate change. It can also be linked to corruption in the planning of residential neighbourhoods. The extreme rainfall event that occurred in Jeddah was an environmental disaster that caused a lot of problems for people. Although there is insufficient scientific evidence about the impacts of climate change on Saudi Arabia, the recent record rains (90 millimetres in November 2009 and 111 millimetres in January 2011) seem to be caused or at least exacerbated by climate change.<sup>299</sup>

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<sup>296</sup> Ba Kader, A., Alsabbagh, A. Alglénid, A. and Izzidien, M. Ibid. 17.

<sup>297</sup> Taylor, Dorceta E. *Environment and Social Justice: An International Perspective*. Bingley, UK: Emerald, 2010. Print. 453

<sup>298</sup> Coward, Harold G. *Population, Consumption, and the Environment: Religious and Secular Responses*. Albany, NY: State University of New York Press, 1995. Print. 135

<sup>299</sup> Emirates Meteorology Portal. 2011. Website source.



Under the Islamic system that constitutes the legal system of Saudi Arabia, there are laws to protect the environment from destruction. Religious guidelines must be considered during the utilization of the earth, especially in terms of lack of extravagance and waste. This is in addition to other Islamic injunctions, which save and protect the environment.<sup>300</sup> Since all Saudis are Muslim, they must follow the Qur'an and words of Prophet Mohammed. All of these environmental protection approaches described in Islam are key to Saudi Arabia's future in sustainable development. Because these concepts are clearly defined, it is necessary to observe Saudi Arabia's codified environmental laws and decide whether or not they fulfil the ideals of environmental protection and sustainability that Islam prescribes.

Islamic teachings derive their authority from the Qur'an, which is regarded as the holy book of Allah. This book entails various regulations to humanity, and how people can best handle themselves within their perceived environments. Here, we realize that the Qur'an and the prophet Muhammad are ultimate sources underlying Islam and its teaching regarding environmental conservation. Therefore, Islamic teaching is supported by different scriptures and specifically prescribes environmental conservation and protection.<sup>301</sup> In a nutshell, Islamic teachings to their followers are consistent with the general terms and policies of environmental conservation.

In addition, religious policies are decrees that must be followed by every member of a given faith, and Muslims emphasize on the importance of following Qur'an and Prophet Muhammad declared teachings. This is the foundation that Islamic texts contribute to environmental conservation in Saudi Arabia and other Islamic countries. The next chapter reviews and specifically describes the various environmental laws of Saudi Arabia. This chapter

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<sup>300</sup> Halabi, Ahmed. Security environment in Islam, security magazine, No 13.1995.

<sup>301</sup> Halabi, Ahmed. Ibid.

is essential as it demonstrates how law combines the policies of the previous chapters into a one accord.

## Works Cited For Chapter 5

- Ahmad, Mirza G, and Mirza G. Ahmad. *Our Teaching*. Islam International, 1996. Print.  
<http://www.worldcat.org/title/our-teaching/oclc/223163155>
- Ba Kader, A., Alsabbagh, A. and Alglenid, Azzidien, M. Islamic Principles for the conservation of the natural environment. 13-25.  
[https://www.iucn.org/about/work/programmes/environmental\\_law/elp\\_resources/elp\\_res\\_publications/?uPubsID=746](https://www.iucn.org/about/work/programmes/environmental_law/elp_resources/elp_res_publications/?uPubsID=746)
- Bagader, A., Alsabbagh, A. Alglenid, and M. Izzidien. *Islamic Principles for the conservation of the natural environment*.
- Coward, Harold G. *Population, Consumption, and the Environment: Religious and Secular Responses*. Albany, NY: State University of New York Press, 1995. Print.
- Daily Kos New. Saudi King: Website source. *We've halted new oil field exploration*. 2010.  
<http://www.dailykos.com/story/2010/07/05/879306/-Saudi-King-We-ve-halted-new-oil-field-exploration>
- Emirates Meteorology Portal. 2011. Website Source.  
<http://www.meteo.ae/blog/2011/01/26/jeddah-floods-january-2011>
- Encyclopaedia of the Qur'ān*: 3. Leiden: Brill, 2003. Print.  
<http://www.worldcat.org/title/encyclopaedia-of-the-quran-3-j-o/oclc/174929278>
- Hadith of sound authority, related by al-Bukhari and Muslim on the authority of Anas.
- Halabi, Ahmed. Security environment in Islam, Security Magazine, No 13.1995.
- Hallaq, Wael B. *The Origins and Evolution of Islamic Law*. Cambridge: Cambridge University Press, 2010. Print. <http://www.worldcat.org/title/origins-and-evolution-of-islamic-law/oclc/723483283>
- ‘Izz, al-Dīn M. Y. *The Environmental Dimensions of Islam*. Cambridge, Eng: Lutterworth Press, 2000. Print. <http://www.worldcat.org/title/environmental-dimensions-of-islam/oclc/869010128>
- Jian, Song, and Jakob Nüesch. *Food & Water: A Question of Survival*. Zürich: vdf, Hochschulverlag an der ETH Zürich, 1997. Print. <http://www.worldcat.org/title/food-water-a-question-of-survival/oclc/83672971>
- Renard, John. *Understanding the Islamic Experience*. New York: Paulist Press, 2002. Print.  
<http://www.worldcat.org/title/understanding-the-islamic-experience/oclc/49626923>
- Saudi Gazette. “New oil fields saved for future generations” King. 2014. Website source.  
<http://www.saudigazette.com.sa/index.cfm?method=home.regcon&contentID=2010070377026>

Taylor, Dorceta E. *Environment and Social Justice: An International Perspective*. Bingley, UK: Emerald, 2010. Print. <http://www.worldcat.org/title/environment-and-social-justice-an-international-perspective/oclc/681544246>

*The Muslim World League Journal*. Makkah al-Mukarramah, Saudi Arabia: Press and Publications Dept., Muslim World League, 1980. Print. <http://www.worldcat.org/title/muslim-world-league-journal/oclc/9273501>

## **CHAPTER 6**

### **6. The Environmental Law of Saudi Arabia**

Laws and regulations control the conduct of people in a country. Laws confirm social values and norms, and thus are guidelines that control social conduct towards one another or regarding public or private property. In a nutshell, laws provide for order in society at all levels. In line with this, every country has a legal system to promulgate laws and policies that regulate the conduct of people towards natural resources and the environment generally. The Kingdom of Saudi Arabia shares with other countries this tradition of adopting different laws within its territory for its people and their welfare. These laws can contribute to the sustainability of all life forms. Agenda 21 in chapter eight called on countries adopt effective laws for environmental development.

Environmental laws are the laws that control the conduct of people in utilizing the environment. Saudi Arabia has well articulated laws that outline restrictions on the conduct of its people in relation to the environment. These laws serve to align environmental demands to human conduct. The enforcement of environmental law in Saudi Arabia has contributed much toward environmental protection and sustainability. The Kingdom's distinct environmental legal policies will be discussed in this chapter.

#### **6.1 Overview of Saudi Arabia Legal System:**

The government of Saudi Arabia is a hereditary monarchy based on Islam. The Saudi King holds a great deal of power in all decision-making about politics and law, including

forming laws about sustainability and environment.<sup>302</sup> He is not only the head of the country's government, but is also the commander in chief of the military.<sup>303</sup> The King appoints a Crown Prince to help him with his duties.<sup>304</sup> The Crown Prince is second in line to the throne.<sup>305</sup> In order to establish any significant and influential laws, in Saudi Arabia one must have the support of these two figures as well as the King's royal cabinet. The country is constituted with 13 provinces, each with a governor and deputy governor. Each province has its own council that advises the governor and deals with the development of the province. All the 13 provinces advise and contribute to the Ministry of Interior.<sup>306</sup>

#### **6.1.1 Basic law of governance:<sup>307</sup>**

A royal order was issued enacting the Law of the Council of Ministers. Article (19) of this Law provided that the Council of Ministers be comprised of several departments, including the Department of Technical Experts that guide the preparation of new laws and regulations. The current Law of the Council of Ministers was issued, following Royal Order no. (A/13), amending the name of the Department of Experts to the Bureau of Experts. The tasks and powers of the Bureau of Experts are; (1) to review and study case-files referred by the Prime Minister, and (2) to prepare draft laws and their required studies, in cooperation with the agency concerned with

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<sup>302</sup> Lippman, Thomas W. *Saudi Arabia on the Edge: The Uncertain Future of an American Ally*. Washington, D.C: Potomac Books, 2012. Print.26

<sup>303</sup> *Journal of South Asian and Middle Eastern Studies*. Villanova, PA.: Published under the auspices of the Pakistan American Foundation, 1977. Print. 56.

<sup>304</sup> K.S.A .Succession Commission Law. Nd. Article (7).

<sup>305</sup> K.S.A. bid. Article (6)

<sup>306</sup> K.S.A, article. Law of provinces. Published in Umm alQura Gazette No. 3397, 2 Ramadan 1412H - 5 March 1992. Article (2,4) Royal Order No. (A/92)27 Sha'ban 1412H.

<sup>307</sup> Royal order no(A/90). Basic law of governance.) 1 March 1992.

each law, and (3) to review and propose amendments to current laws. Therefore, the Bureau helps the Council of Ministry to establish laws under the Basic Law of Governance.<sup>308</sup>

This Basic Law of Governance includes the general principles for the country and society. The system of governance in the Kingdom of Saudi Arabia is monarchical,<sup>309</sup> with the King responsible for administering all duties of government and authorities of the state. The foundation of Saudi society is the family. The economic principles are based on the following premise ‘All God’s bestowed wealth, be it underground, on the surface, or in national territorial waters, on the land or maritime domains are under the State’s control and all such resources are the property of the State as defined by the Law’.<sup>310</sup> The principles of government provide that the State shall protect the Islamic creed, apply its Shari’ah, “support the good and prohibit evil, and carry out the duty of calling to God.”<sup>311</sup> Authorities of the state consist of the judicial authority, executive authority and regulatory authority. These authorities cooperate in the discharge of their functions in accordance with this Basic Law and other laws. Financial provisions govern state revenues and their delivery to the public treasury of the state, and revenues shall be recorded and disbursed in accordance with the rules prescribed by law.<sup>312</sup> The King is their final authority.<sup>313</sup>

#### **a. Executive Authority:**

The Executive authority is comprised of the Council of Ministers over which the King presides. He is assisted in the discharge of his functions by the members of the Council. The Law of the Council of Ministers sets forth the power of the Council with respect to internal and

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<sup>308</sup> Royal Order No. A/13. 3 Rabi’ I 1414H. The bureau of experts at the council of ministers,. Published in *Umm al Qura Gazette*, No. 3468. 10 Rabi’ I 1414H / 27. August 1993.

<sup>309</sup> Al-Tawail, Mohammed A. *Public Administration in the Kingdom of Saudi Arabia: A Study Presented to the Twentieth Congress of Administrative Sciences Organized by the International Institute of Administrative Sciences, Amman, Jordan, September 1986*. Saudi Arabia?: publisher not identified, 1986. Print. 72

<sup>310</sup> Legum, Colin, Haim Shaked, Itamar Rabinovich, Ami Ayalon, and Bruce Maddy-Weitzman. *Middle East Contemporary Survey*. New York: Holmes & Meier, 1977. Print. 691.

<sup>311</sup> Legum, Colin, Haim Shaked, Itamar Rabinovich, Ami Ayalon, and Bruce Maddy-Weitzman. Ibid. 692.

<sup>312</sup> *Empty Reforms: Saudi Arabia’s New Basic Laws*. New York: Human Rights Watch, 1992. Print. 44.

<sup>313</sup> *Empty Reforms*. Ibid. 11

foreign affairs, and to the organization of the agencies of the government and coordination among them.”<sup>314</sup> The King appoints ministers. Some local officials are elected.

#### **b. Legislation and rule making:**

Regulation authority is divided into three aspects: the King, the Council of Ministers and the Shura Council. While the Shura Council gives the King and the Council of Ministers advice, the King and Council of Ministers exercise all regulatory authority. The King creates the law of the Shura Council and appoints its members.<sup>315</sup> The King has two distinct functions: the first as king and the second as the prime minister.

#### **6.1.2 Law of the Shura Council**

The King is advised by a legislative body called the Shura or Consultative Council. The Council proposes new laws and amends existing ones. It consists of 150 members who are appointed by the King for four-year terms that can be renewed. However, when a new council is formed, the number of the newly selected members shall not be less than half of the Council’s members. The King in Saudi Arabia has a major and independent rulemaking function. The Basic System “identifies the King as the final authority over all state authorities.”<sup>316</sup> He has the authority, as the Head of State and the Head of the Council of Ministers, to repeal, enact, or amend any laws and regulations by Royal Order as the King of the country.<sup>317</sup> The legislative process includes the enactment of international treaties, agreements, regulations and concessions. These concessions are approved and amended by Royal Decrees by the prime minister, after first

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<sup>314</sup>Temperman, Jeroen. *State-religion Relationships and Human Rights Law: Towards a Right to Religiously Neutral Governance*. Leiden: Martinus Nijhoff Publishers, 2010. Print. 22

<sup>315</sup> K.S.A . Law of the Shura Council. Nd. Article (3,13)

<sup>316</sup> K.S.A. Ibid. Article. 67.

<sup>317</sup> Abdullah F. Ansary. *A Brief Overview of the Saudi Arabian Legal System*. July 2008.



being reviewed by the Kingdom's legislative authority (the Council of Ministers and the Shura Council).<sup>318</sup> The King is free to accept or reject from either of the two legislative authorities.

### **6.1.3 Law of the Council of Ministers**

The King governs with the help of the Council of Ministers. There are 22 government ministries that are part of the Council of Ministers. Each ministry specializes in a different part of the government, such as petroleum and mineral resources, justice and higher education.<sup>319</sup> The Council of Ministers also has regulatory and executive powers.<sup>320</sup>

Since Saudi Arabia is an Islamic country, the judicial system is based on Islamic law (Shari'ah). The King is the head of the legal system. The government system does not identify a separation between the branches. Therefore, the King can act as the final court and can issue pardons.<sup>321</sup> The King also appoints judges. There are four primary sources that the judge can refer to in the Sharia: The Qur'an, the Sunna (the Prophet's tradition), Consensus of Muslim Jurists (Ijma), and the Analogy (Qiyas) or reasoning (aql).<sup>322</sup>

In addition to these four primary sources, there are extra sources of Islamic law, which include: Al- Istihsan, or deviation on certain issues, from the rule of precedent made in the past which applies to another rule for a more related legal reason that is required for some issue. Al- Istihsan is an unprecedented judgment motivated by public interest to which neither the Qur'an nor the Sunna explicitly refer. Al-Urf is the customs and habits of a particular society both in speech and in deeds.

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<sup>318</sup> *Comparative Criminal Justice Systems: Global and Local Perspectives*. Burlington, Mass: Jones & Bartlett Learning, 2012. Print. *Basic Law of Governance*. 401

<sup>319</sup> K.S.A. Law of the Council of Ministers. Article (7,29).

<sup>320</sup> K.S.A. Ibid. Article (20, 24)

<sup>321</sup> Mallat, Chibli. *Introduction to Middle Eastern Law*. Oxford: Oxford University Press, 2007. Print. 161

<sup>322</sup> Abdullah K Al-Ayoub, *Legal Systems in the Gulf States*. Nd. supra note (23) at 5A.80.6.

In the Kingdom, according to the Law of Judicial Authority of 1975, the highest court in the land was the *al-Majlis* (High Court Council or Supreme Court). Under it, there were two appeals courts in Makkah (or “Mecca”) and an appeals court in Riyadh. Under the appeals courts are several first-degree courts that consist of general courts and summary courts.<sup>323</sup> However, the judiciary law of 2007 changed this system. On October 1, 2007, King Abdullah issued a Royal Decree on judicial reform which took three years to implement, and completion of which occurred in 2011. For this judicial improvement, the Government invested the equivalent of two billion dollars for the construction of infrastructure and facilities, including the training of new judges and building a new court in every city in the Kingdom.<sup>324</sup> Based on this 2007 Judiciary Law, the High Court Council no longer serves as the Supreme Court. It is the administrative centre of the courts. One of its duties includes issuing regulations about the function and authority of the heads of courts and their assistants. It may also issue regulations related to the duties of judges upon the approval of the King.<sup>325</sup>

The independence of the judiciary is enshrined in Article 46 of the Basic Law of Governance, which states that the judiciary shall be an independent authority and that, in their administration of justice, judges shall be subject to no authority other than that of the Islamic Shari’ah.<sup>326</sup> Furthermore, the independence of the judiciary is based on the Shari’ah court. The Shari’ah court is divided into three courts. The first is the High Court which will function as the Supreme Court. The High Court will assume the previous Supreme Judicial Council’s main

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<sup>323</sup> James R Silkenat, Jeffrey M. Aresty. *The ABA Guide to International Business Negotiations*. 852 Jacqueline Kloser editors. 2009. Print

<sup>324</sup> James R Silkenat, Jeffrey M. Aresty. *Ibid*.

<sup>325</sup> Royal Decree. The Law of the Judiciary. Oct. 1, 2007. No. M/78, art. 5.

<sup>326</sup> Cotran, Eugene, and Martin Lau. *Yearbook of Islamic and Middle Eastern Law: Vol. 14*. Leiden: Martinus Nijhoff, 2009. Print. 14.

function as the highest authority in the judicial system. It will have a General Council presided over by the Chief of the High Court.<sup>327</sup>

The second court is the Courts of Appeals which can overturn decisions by lower courts or confirm the decisions. Each court will function through specialized circuits. The Court of Appeals consists of: 1- Civil Circuits, 2- Criminal Circuits, 3- Personal Status (Family Law) Circuits, 4- Commerce Circuits, and 5- Labor Circuits. Each circuit will be composed of a president appointed by the Chief of the Appellate Court. Judges holding the rank of Appellate Judge. The Courts of Appeals will hear appealable decisions from lower courts. They will render their judgment after hearing the litigants' arguments in accordance with the Law of Procedure before Shari'ah Courts and the Law of Criminal Procedure.<sup>328</sup>

The third court is the First Degree Courts which will be established in the Kingdom's provinces, counties and districts in accordance to the needs of the system.<sup>329</sup> Mirroring the Courts of Appeals, the First Degree Courts consist of: 1- General Courts, 2- Criminal Courts, 3- Personal Status Courts, 4- Commerce Courts, and 5- Labor Courts.<sup>330</sup>

In 2007, the Council of Unjust Acts Court became the Board of Grievances, an Administrative Court. The Board of Grievances has an administrative judicial council, which is based in the city of Riyadh and is an independent administrative judicial commission responsible directly to the King.<sup>331</sup> The courts of the Board of Grievance consist of the High Administrative Court, the Administrative Court of Appeals and the First Level Administrative Court. The High Administrative Court will exercise its jurisdiction through specialized circuits and will be

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<sup>327</sup> *Saudi Arabia: A Justice System Without Justice: End Secrecy, End Suffering*. New York: Amnesty International USA, 2000. Print. 11

<sup>328</sup> Legum, Colin, Haim Shaked, Itamar Rabinovich, Ami Ayalon, and Bruce Maddy-Weitzman. *Middle East Contemporary Survey*. New York: Holmes & Meier, 1977. Print. Labor Law and Practice in. Washington: U.S. Government printing office, 1972. Print. 691

<sup>329</sup> Legum, Colin, Haim Shaked, Itamar Rabinovich, Ami Ayalon, and Bruce Maddy-Weitzman. *Ibid*. 691.

<sup>330</sup> Cotran, Eugene, and Martin Lau. *Ibid*. 340.

<sup>331</sup> Royal Decree. The Law of the Board of Grievances. No. M/78, Article 23 19/9/1428H, Oct. 1, 2007.

composed of three-judge panels.<sup>332</sup> The Administrative Court of Appeals will serve through Specialized Circuits composed of three-judge panels, which will hear appealable decisions from the lower Administrative Courts. They will render their judgment after hearing the litigants' arguments in accordance with the Law of Procedure before Shari'ah Courts and the Law of Criminal Procedure.<sup>333</sup> The First Level Administrative Court will function through specialized circuits. The First Level and Appeals Administrative Courts consist of the following circuits: 1- Disciplinary Circuits, 2- Administrative Circuit, 3- Subsidiary Circuits, 4- Other Specialized Circuits.

Criminal law plays a special role in the legal system. It is mandatory for judges to apply criminal law because it is mentioned in the Qur'an and in the Sunna. The Criminal Court consists of the following specialized circuits: Qisas (Retaliatory Punishment) Cases Circuits, Hudud Cases Circuits (Prescribed Punishment), Ta'zir (Discretionary Punishment) Cases Circuits, and Juvenile Cases Circuits. The Criminal Court will be composed of a three-judge panel. Other cases (offences) specified by the Supreme Judicial Council will be heard by one judge. "It is worth noting that all existing Summary Courts will be transmitted to Criminal Courts."<sup>334</sup>

## **6.2 National Environmental Law**

The Kingdom of Saudi Arabia established the 'General Environmental Law' ("GEL") and 'Rules for Implementation' ("RFI") in October 15, 2001. Combined, the two laws are referred to as the "General Environmental Law and Rules for Implementation" ("GERRI"). The Kingdom, represented by the Presidency of Meteorology and Environment ("PME"), has played a pioneering role in protecting the environment through the development of the 'General

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<sup>332</sup> O'Kane, Michael. *Doing Business in Saudi Arabia*. , 2013. Print. 28.

<sup>333</sup> Nerz, Alexander. *Das Saudi-Arabisches Rechtssystem*. Bremen: Europäischer Hochschulverl, 2011. Print.152

<sup>334</sup> Silkenat, James R., Jeffrey M. Aresty, and Jacqueline Klosek. *The ABA Guide to International Business Negotiations: A Comparison of Cross-Cultural Issues and Successful Approaches*. Chicago: American Bar Association, Section of International Law, 2009. Print. 909

Environmental Law’ and its ‘Rules for Implementation’ and the protection standards. Protection of the environment is preserved in the Kingdom of Saudi Arabia’s Basic Law of Governance whose purpose it is to sustain Article (32) of the Kingdom’s Constitution to conserve, protect and develop the environment, and guard it from pollution.<sup>335</sup> Article 32 also proposes to protect public health from all activities and acts damaging the environment, conserve and develop natural resources and conserve their use, establish environmental planning as an integral part of national development planning in all fields, and promote environmental awareness among all parts of the society.

The ‘General Environmental Law’ consists of twenty-four articles. The first is on the definitions and goals. The Minister of Defense has principle responsibility for the environment and has the authority to issue the rules for implementation.<sup>336</sup> This Law and Its Rules for Implementation are aimed at achieving the following goals: to 1) preserve, protect and develop the environment and safeguard it from pollution, 2) protect public health from activities and acts that harm the environment, 3) conserve and develop natural resources and ration their use, 4) include environmental planning as an integral part of overall development planning in all industrial, agricultural, architectural and other areas and 5) raise awareness of environmental issues and strengthen individual and collective feelings of the sole and collective responsibility for preserving and improving the environment and encourage national voluntary efforts in this area.<sup>337</sup> These goals offer a comprehensive environmental agenda.

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<sup>335</sup> Al-Tawail, Mohammed A. *Public Administration in the Kingdom of Saudi Arabia: A Study Presented to the Twentieth Congress of Administrative Sciences Organized by the International Institute of Administrative Sciences, Amman, Jordan, September 1986*. Saudi Arabia?: publisher not identified, 1986. Print. 72.

<sup>336</sup> *A Study on the Evaluation of Environmental Impact Assessment in Selected ESCWA Countries*. New York: UN, 2002. Print. 37

<sup>337</sup> Taher, Nahed, and Bandar Hajjar. *Energy and Environment in Saudi Arabia: Concerns & Opportunities*. Cham: Imprint: Springer, 2014. Internet resource. 10

A requirement for Environmental Impact Assessment (hereinafter referred to as “EIA”)<sup>338</sup> is included in the General Environment Law. This creates a role for each licensing authority to ensure that any project which may have negative impact on the environment is subject to the requirement of the preparation of an EIA. The PME has the licensing authority responsible for project implementation. PME must ensure that the EIA is undertaken in accordance with the Environmental Protection Standards. The fundamentals and standards for EIA’s of industrial and development projects are divided into projects owned by persons and those of Publicly, Concerned or Licensing Agencies.<sup>339</sup>

As regards to enforcement on a regional and local level, the Governorates of the Kingdom of Saudi Arabia has a Province Municipality in governorates (“AMANA”) that has a comprehensive autonomy to execute and ensure enforcement. Their responsibilities are established as a result of both their status as being a Public Agency, a Licensing Agency or a Concerned Agency as mentioned in the RFI, article 1, nos. 4) - 6) and also from the PME having delegated its powers to AMANA. Besides the PME and the Ministries in line, the AMANA, other agency with jurisdiction within environmental management, have assignments for enforcement. However, the concrete extent of their enforcement powers and tasks are less clear - not least when it comes to distinguishing their roles and responsibilities from the more official authorities’ powers such as the PME and the AMANA. Such ambiguity invites clarification.

The environment law contains a general obligation on all persons involved in servicing, manufacturing or other activities with similar impact to take the necessary precautions to achieve

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<sup>338</sup> An EIA is mandated by Rio Principle 17 (Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.)

<sup>339</sup> Environmental Protection Standards, appendix-2. More information (Environmental assessment of development projects information from first category projects and from second category projects. Guidelines for compiling an environmental impact assessment study.)

the following: to 1) prevent direct or indirect contamination of surface, ground and coastal waters that may be caused by solid or liquid residues, 2) preserve the soil and land and curb its deterioration or contamination, and 3) limit noise pollution, particularly when operating machinery or other equipment or using horns or loudspeakers. Noise levels shall not exceed allowable environmental standard limits set forth in the Rules for Implementation.<sup>340</sup>

Violation and remediation work is very important to be included in this law because responsible parties should bear the burden of solving the problems they cause. By internalizing the costs, the responsible parties will have the right incentives to avoid the harm in the first instance. PME has the authority to check the environmental criteria and standards. When it is confirmed to them that any of these have been violated, the PME shall coordinate and obligate the violator to: 1) eliminate any negative impacts, stopping them and rectify their effects within a specified time, as required by the environmental criteria and standards, and 2) submit a report showing the steps taken by the violator to prevent future recurrence of the violations of the criteria and standards. The proposed steps must meet the approval of the Competent Agency according to law. If the situation is not rectified according to what is mentioned here-above, the Competent Agency shall in coordination with the concerned agencies or the licensing agencies, take necessary actions to force the violator to correct his situation in accordance with the provisions of this General Environmental Law.<sup>341</sup> This article of the law has not been successful since the law was passed because there are ambiguities in their functions. Moreover, there are some ambiguities in the roles of the Ministers. The Competent Minister (the Minister of Defense) may define and identify projects of a special nature that shall be subject to the required

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<sup>340</sup> Sands, Philippe and Paolo Galizzi. *Documents in International Environmental Law*. Cambridge: Cambridge University Press, 2004. Print. 814.

<sup>341</sup> Bourquain, Knut. *Freshwater Access from a Human Rights Perspective: A Challenge to International Water and Human Rights Law*. Leiden: Martinus Nijhoff Publishers, 2008. Print. 76

grace period given to arrange conditions in accordance with the provisions of the “General Environmental law and its Rules for Implementation.”<sup>342</sup>

The penalties in this law relate to acts involving the following: 1. Hazardous, poisonous or radioactive wastes are prohibited from entering the Kingdom of Saudi Arabia or its territorial waters and exclusive economic zone. 2. Persons in-charge of the production, transportation, storage, recycling, treatment and final disposal of poisonous, hazardous or radioactive materials must comply with the procedures and controls set forth in the Rules for Implementation.

3. Any harmful pollutants; poisonous, hazardous or radioactive wastes are prohibited from being disposed of, or discharged from vessels or the like in the Kingdom’s territorial waters or its exclusive economic zone.<sup>343</sup> In these instances penalties can include the following: 1.

Imprisonment for up to five years; 2. A fine not to exceed SR500, 000 (\$133,000); 3. An appropriate compensation; 4. The violator shall be obligated to eliminate the violation. 5. Closure of a facility or detention of a vessel for up to 90 days. Moreover, anyone who violates any of the provisions of the environmental law shall be subject to the following: 1. A fine of up to SR10,000 (\$2,600). 2. Elimination of the violation by remediation work. 3. Closure of the facility for up to 90 days.<sup>344</sup> The Grievance Bureau shall have the jurisdiction to apply the penalties on violators of the provisions of this law.<sup>345</sup> Moreover, the Competent Minister (the Minister of Defense) shall create one or more committees comprising three members each, with at least one member specialized in the regulation to review the violations and apply penalties set forth herein.

Decisions of the committee shall be decided by majority vote of its members and approved by the Competent Minister. Either all or at least two should be specialized by majority rule.

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<sup>342</sup> Bourquain, Knut. Ibid. 76

<sup>343</sup> Taher, Nahed, and Bandar Hajjar. Ibid. 20

<sup>344</sup> Sands, Philippe, and Paolo Galizzi. Ibid. 451

<sup>345</sup> Sandler, Deborah. *Protecting the Gulf of Aqaba: A Regional Environmental Challenge*. Washington, DC, 1993. Print. 43.



Furthermore, they must be specialized in environmental issues and that could happen if the government starts training judges.

### **6.3 Presidency of Meteorology and Environment (“PME”)**

A major step in Saudi environmental policy was taken in 1981, when the Meteorology and Environmental Protection Administration (“MEPA”) was granted jurisdiction over environmental protection.<sup>346</sup> Prior to 1981, there had been many different laws and legislations regulating the environment but no central administration. During this period, pollution was introduced as a major factor in local environmental issues and the government started to be concerned about the environment. Different bodies and agencies were also established to work on environmental issues. The Environmental Protection Co-ordination Committee (“EPCC”), which subsequently became the Preparatory Committee for the Ministerial Committee for the Environment (“PCMCE”), was established with the mandate to co-ordinate all agencies involved in environmental issues.<sup>347</sup> The National Commission for Wildlife Conservation and Development (“NCWCD”), established in 1986, was given responsibility for the conservation, protection and development of land and marine wildlife by ensuring ecological balance. Ultimately, in 1990, the Ministerial Committee for the Environment (“MCE”) was established to serve as the national body responsible for drawing up environmental policies at national and international levels and for co-ordinating environmental policy- making between the involved agencies and ministries. The competent minister of the environment is the minister of defence who is also the president of the MCE.

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<sup>346</sup> Al-Gilani, A. and S. Filor. Environmental Policies in Saudi Arabia, *Journal of Environmental Planning and Management*. 1997. 775–788.

<sup>347</sup> Al-Shuwalkhat, H and Aina, Y. Implementation of Strategic Environmental Assessment in Saudi Arabia 47(2). 2004. Print. 306-308.

The PME prepared the General Environmental Code in conjunction with the bureau of experts at the Council of Ministers for the Kingdom. And since then it has been responsible for preparing environmental standards and undertaking monitoring and control of environmental indicators as well as carrying out EIAs in cooperation with other relevant agencies.<sup>348</sup> The MCE prepared the National Report to the United Nations Conference on Environment and Development in 1992 and has been reviewing international agreements and approving local policies and laws. It has also facilitates the process of environmental decision-making by co-ordinating different bodies and agencies. The Ministerial Committee on Environment (“MCE”) is the top such policy-making body in the country. Its job is to co-ordinate and submit policies and proposed legislation from different agencies and ministries to the Council of Ministers for approval. Most policy suggestions and draft legislation are discussed and negotiated by the Preparatory Committee for the Ministerial Committee on the Environment (“PCMCE”). A second level of decision-making is at the level of environmental agencies that include: the Meteorology and Environmental Protection Administration (“MEPA”), the National Commission for Wildlife Conservation and Development (“NCWD”) and the Ministry of Agriculture and Water Resources (“MAW”).<sup>349</sup> All these agencies propose environmental policies and legislation that are relevant to their mandate. They then send them to the appropriate authority for approval by the MCE.

The PME has the duties of preserving the environment and preventing its deterioration. Their duties consist of the following: to 1) review and evaluate the condition of the environment, develop observational means and tools for the collection of information and conduct environmental studies, 2) document and publish environmental information, 3) prepare, review,

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<sup>348</sup> Al-Shuwalkhat, H and Aina, Y..Ibid. 307

<sup>349</sup> The Government of Saudi Arabia. Institutional aspects of sustainable development in Saudi Arabia, Sustainable Development. April 1997. Website source.

develop, interpret and issue environmental protection standards, 4) prepare environmental regulations relevant to its areas of responsibility, 5) ensure that public agencies and individuals abide by the environmental regulations, standards and criteria, as well as adopt necessary procedures thereof in coordination and cooperation with the concerned and licensing agencies, 6) review the latest developments in the field of the environment and its management at the regional and international levels, and 7) promote environmental awareness at all levels.<sup>350</sup> A number of ministries work in partnership with PME. The most salient among these are the Ministries of:<sup>351</sup>

- Agriculture and Water, particularly with respect to use of rangelands, agricultural lands, water resources, wildlife and national parks;
- Petroleum and Mineral Resources with respect to minerals, petroleum and its industries;
- Municipality and Rural Affairs which carries out many activities pertaining to urban services, especially sewerage, water networks, management and disposal of wastes, cleaning of the cities and towns and development of public parks, playgrounds and other relevant utilities; and
- Industry and Electricity which is primarily concerned with the comprehensive industrial development of Saudi Arabia and the proper geographical location of industries in all provinces in a way that gives due consideration to environmental aspects.

All told, the government's approach to regulating the environment is quite comprehensive and proactive.

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<sup>350</sup> Taher, Nahed and Bandar Hajjar. Ibid.12.

<sup>351</sup> The Government of Saudi Arabia. Ibid.

#### **6.4 Saudi civil society dedicated to working on environmental issues**

The Kingdom wants a clearly structured strategy for environmental awareness. Most successful activities are carried out by independent agencies and organizations, while the PME has no national plan. Recently and particularly in the last couple of years, there has been a growth in civil society groups dedicated to environmental sustainability and research regarding a greener Saudi Arabia. In 2008, a public advocacy group, Save Corniche Jeddah, started by lobbying for the safe and hazard-free development of Corniche Jeddah, the country's main seaport in the western region. After that, the same activists founded a second group called "Muwatana", which literally means "Citizenship." Muwatana was a key non-governmental group participating in the disaster relief initiative providing humanitarian aid and efforts to ensure environmental sustainability after the tragic floods that occurred in Jeddah in November 2009.<sup>352</sup>

Another more focused environmental group is Naqa'a. The name Naqa'a is an Arabic term for the word "Purity." The group works in pursuit of the purity of air, water and land, in order to save the planet for the coming generations.<sup>353</sup> Naqa'a is the country's first youth-driven environmental movement. Launched in Jeddah, it and has now spread elsewhere across the Kingdom. The vision of Naqa'a is to incorporate ecologically sensitive life standards into social values in society through promoting pioneering green practices. Supporting research and increasing public awareness are major parts of the activities of Naqa'a. Spreading environmental awareness will encourage people to take up activities such as recycling and will promote understanding of it as an essential value of the "green life." Naqa'a facilitates recycling for the local community in the city Jeddah. Its leaders hope this will become a model for all the cities of

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<sup>352</sup> Fatani, rafid. Saudi Arabia Strategic Consulting (SASIC). Nd. 207.

<sup>353</sup> Kannan, A. *Global Environmental Governance and Desertification: A Study of Gulf Cooperation Council Countries*. New Delhi: Concept Pub. Co, 2012. Print. 366

the Kingdom. The first major project that Naqa'a worked on was called "Smart Recycling."<sup>354</sup>

The myriad of developmental projects introduced by Naqa's are seen as a major milestone towards realising sustainable solutions to social problems in the country. As such, Naqa'a offers an inspiring model for how the people of Saudi Arabia can contribute to their own well being through direct action and advocacy.

The next chapter talks about fresh water, oil, climate change and alternative energy, which is one of the projects that this dissertation suggests to be championed by the government of Saudi Arabia. Here is the detailed description on four environmental topics, from among the nine discussed in Chapter Four that have great implications for Saudi Arabia and its environmental laws.

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<sup>354</sup>Fatani, rafid. Ibid, 207

## Works Cited for Chapter 6

- A Study on the Evaluation of Environmental Impact Assessment in Selected Escwa Countries.* New York: UN, 2002. Print. <http://www.worldcat.org/title/study-on-the-evaluation-of-environmental-impact-assessment-in-selected-escwa-countries/oclc/123415224>
- Abdullah F. Ansary. *A Brief Overview of the Saudi Arabian Legal System.* July 2008. <http://www.nyulawglobal.org/globalex/saudi> .
- Abdullah K Al- Ayoub, *Legal Sustems in the Gulf states.* Nd. supra note (23) at 5A.80.6.
- Al-Gilani, A. and Filor, S. Environmental policies in Saudi Arabia, *Journal of Environmental.*Nd
- Al-Shuwalkhat,H and Aina,Y. *Implementation of Strategic Environmental Assessment in Saudi Arabia* 47(2). 2004. Print.
- Al-Tawail, Mohammed A. *Public Administration in the Kingdom of Saudi Arabia: A Study Presented to the Twentieth Congress of Administrative Sciences Organized by the International Institute of Administrative Sciences, Amman, Jordan, September 1986.* Saudi Arabia?: publisher not identified, 1986. Print. <http://www.worldcat.org/title/public-administration-in-the-kingdom-of-saudi-arabia-a-study-presented-to-the-twentieth-congress-of-administrative-sciences-organized-by-the-international-institute-of-administrative-sciences-amman-jordan-september-1986/oclc/28981008>
- Bourquain, Knut. *Freshwater Access from a Human Rights Perspective: A Challenge to International Water and Human Rights Law.* Leiden: Martinus Nijhoff Publishers, 2008. Print. <http://www.worldcat.org/title/freshwater-access-from-a-human-rights-perspective-a-challenge-to-international-water-and-human-rights-law/oclc/233697428>
- Comparative Criminal Justice Systems: Global and Local Perspectives.* Burlington, Mass: Jones & Bartlett Learning, 2012. Print. <http://www.worldcat.org/title/comparative-criminal-justice-systems-global-and-local-perspectives/oclc/820693192>
- Cotran, Eugene, and Martin Lau. *Yearbook of Islamic and Middle Eastern Law: Vol. 14.* Leiden: Martinus Nijhoff, 2009. Print. 14. <http://www.worldcat.org/title/yearbook-of-islamic-and-middle-eastern-law-vol-14-2008-2009/oclc/573397926>
- EIA is mandated by Rio Principle 17 (Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority)
- Empty Reforms: Saudi Arabia's New Basic Laws.* New York: Human Rights Watch, 1992. Print. 44.
- Environmental protection standards, appendix-2. More information's (Environmental assessment of development projects information from for first category projects and from second category projects. Guidelines for compiling an environmental impact assessment study.)

- Sands, Philippe, and Paolo Galizzi. *Documents in International Environmental Law*. Cambridge: Cambridge University Press, 2004. Print. 814.
- Fatani, rafid. Saudi Arabia Strategic Consulting (SASIC). Nd. [www.sasiconsult.com](http://www.sasiconsult.com)
- <http://www.worldcat.org/title/documents-in-international-environmental-law/oclc/465476520>
- James R Silkenat, Jeffrey M Aresty. *The ABA guide to international business negotiations*. 852 Jacqueline kloser editors. 2009. Print
- Journal of South Asian and Middle Eastern Studies*. Villanova, Pa.: Published under the auspices of the Pakistan American Foundation, 1977. Print.
- Kingdom of Saudi Arabia. Law of the Shura council. Nd. Article (3,13)
- Kingdom of Saudi Arabia. Succession Commission Law. Nd. Article (7).
- Kingdom of Saudi Arabia, article. Law of provinces. Published in Umm alQura Gazette No. 3397, 2 Ramadan 1412H - 5 March 1992. Article (2,4) Royal Order No. (A/92)27 Sha'ban 1412H.
- Kingdom of Saudi Arabia. Law of the Council of Ministers. Article (7,29).
- Kannan, A. *Global Environmental Governance and Desertification: A Study of Gulf Cooperation Council Countries*. New Delhi: Concept Pub. Co, 2012. Print.  
<http://www.worldcat.org/title/global-environmental-governance-and-desertification-a-study-of-gulf-cooperation-council-countries/oclc/768399264>
- Legum, Colin, Haim Shaked, Itamar Rabinovich, Ami Ayalon, and Bruce Maddy-Weitzman. *Middle East Contemporary Survey*. New York: Holmes & Meier, 1977. Print.
- Lippman, Thomas W. *Saudi Arabia on the Edge: The Uncertain Future of an American Ally*. Washington, D.C: Potomac Books, 2012. Print. <http://www.worldcat.org/title/saudi-arabia-on-the-edge-the-uncertain-future-of-an-american-ally/oclc/728840649>
- Mallat, Chibli. *Introduction to Middle Eastern Law*. Oxford: Oxford University Press, 2007. Print. <http://www.worldcat.org/title/introduction-to-middle-eastern-law/oclc/86166549>
- Nerz, Alexander. *Das Saudi-Arabische Rechtssystem*. Bremen: Europäischer Hochschulverl, 2011. Print. <http://www.worldcat.org/title/saudi-arabische-rechtssystem/oclc/723513361>
- O'Kane, Michael. *Doing Business in Saudi Arabia*. 2013. Print.  
<http://www.worldcat.org/title/doing-business-in-saudi-arabia/oclc/869738587>
- Royal Decree. The Law of the Board of Grievances. No. M/78, Article 23 19/9/1428H, Oct. 1, 2007. <<http://www.boe.gov.sa/ViewSystemDetails>
- Royal Decree. The Law of the Judiciary. Oct. 1, 2007. No. M/78, art. 5.  
<http://www.boe.gov.sa/ViewSystemDetails.aspx>

- Royal Order No. A/13. 3 Rabi' I 1414H. The bureau of experts at the council of ministers.  
Published in Umm al Qura Gazette, No. 3468 .10 Rabi' I 1414H / 27. August 1993.
- Sandler, Deborah. *Protecting the Gulf of Aqaba: A Regional Environmental Challenge*.  
Washington, D.C, 1993. Print. <http://www.worldcat.org/title/protecting-the-gulf-of-aqaba-a-regional-environmental-challenge/oclc/260146370>
- Saudi Arabia: A Justice System Without Justice: End Secrecy, End Suffering*. New York, NY:  
Amnesty International USA, 2000. Print. <http://www.worldcat.org/title/saudi-arabia-a-justice-system-without-justice-end-secrecy-end-suffering/oclc/263113552>
- Silkenat, James R., Jeffrey M. Aresty, and Jacqueline Klosek. *The ABA Guide to International Business Negotiations: A Comparison of Cross-Cultural Issues and Successful Approaches*. Chicago: American Bar Association, Section of International Law, 2009.  
Print. <http://www.worldcat.org/title/aba-guide-to-international-business-negotiations-a-comparison-of-cross-cultural-issues-and-successful-approaches/oclc/313078825>
- Taher, Nahed, and Bandar Hajjar. *Energy and Environment in Saudi Arabia: Concerns & Opportunities*. Cham: Imprint: Springer, 2014. Internet resource. 12.
- Temperman, Jeroen. *State-religion Relationships and Human Rights Law: Towards a Right to Religiously Neutral Governance*. Leiden: Martinus Nijhoff Publishers, 2010. Print.  
<http://www.worldcat.org/title/state-religion-relationships-and-human-rights-law-towards-a-right-to-religiously-neutral-governance/oclc/500820583>
- The Government of Saudi Arabia. Institutional aspects of sustainable development in Saudi Arabia, Sustainable Development. April 1997.  
<http://www.un.org/esa/agenda21/natlinfo/countr/saudi/inst.htm>



## **CHAPTER 7**

### **7. Environmental challenges facing Saudi Arabia**

Chapter six described the Environmental Law of Saudi Arabia, and how the Kingdom strives to administer these environmental regulations. It is worth noting that legal structures are essential to implementing sustainable environmental policies and regulations in a country. Therefore, the success of a country in ensuring sustainable environmental conservation is anchored on the effectiveness of laws and structures available for the implementation of these regulations. For example, the Kingdom of Saudi Arabia has the Presidency of Meteorology and Environment (“PME”), an oversight body on environmental regulations and implementation. This body works in coordination with other duly mandated organizations whose aim is to fully foster viable environmental standards within the country. Other than these bodies mandated to foster proper standards and environmental regulations, the Kingdom of Saudi Arabia has established an elaborate administrative and judicial structure. Therefore, law enforcement has to pass through the competent organs before being applied to environmental or any other issues. The executive, through the King and the Council of Ministers, has responsibility for ensuring proper management of the environment. This is the fundamental platform through which environmental codes of conducts are enforced within the country.

Despite the Kingdom’s well-developed legal regime, there remain some gaps compliance and enforcement. For this reason, the legal system has not yielded much fruit in terms of achieving the rightly ambitious environmental conservation for the Saudi Arabia. Chapter Seven examines four actual environmental challenges the country has experienced and how weak law enforcement resulted in making them stumbling blocks to the sustainable development and environmental conservation efforts.

## 7.1 Fresh water

As discussed in prior chapters, Agenda 21 chapter 18 and Our Common Future both emphasize the importance of stewardship of fresh water. More fundamentally, water is also a focus of Islamic principles for environmental protection. Water resources remain likewise a persistent source of concern in Saudi Arabia, despite the fact that there are a number of laws in place, environmental initiatives by different groups, and a strong normative guide in the religion of Islam. There are still a number of environmental challenges that plague the country because they have not been adequately addressed. With the growth of the Kingdom over the last thirty years and a population forecast to reach 29.3 million by 2015, there is currently a very large demand for drinking water.<sup>355</sup> Efforts to ensure the supply of fresh water are almost uniquely important to Saudi Arabia because it is a desert country with a large agricultural and industrial base. As the largest country in the world without running surface water, Saudi Arabia has been dependent on desalinated water for much of its consumption clean water since the 1950s. Water resources in the Kingdom of Saudi Arabia can be categorized as follows: surface water, groundwater, desalinated seawater, and treated wastewater.<sup>356</sup>

Today, Saudi Arabia is the world's largest producer of desalinated water and home to the Marafiq complex in Jubail, the world's largest independent water and power project ("IWPP"). Soon Saudi Arabia will have one of the world's largest water pipelines, a more than 900-kilometer transmission system that will pump nearly 4 million cubic meters per day (m<sup>3</sup>/d) of water from Jubail Industrial City to the capital city Riyadh.<sup>357</sup>

Ironically, the process of creating fresh water pollutes seawater. The production of potable water by desalination processes is constitutes a significant source of environmental

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<sup>355</sup> Vincent, Peter. Saudi Arabia an Environmental Overview. 2008. 236.

<sup>356</sup> Al-Motairi, H. Water quality regulation and wastewater treatment and reuse in Saudi Arabia. Nd. 260

<sup>357</sup> U.S. -Saudi Arabian Business Council. The Water Sector in the Kingdom of Saudi Arabia. Nd. 8

pollution. In fact, in coastal desalination plants, water pollution is the main problem.

Desalination raises the water temperature by about nine degrees C and the salinity of the affected soil by about twelve percent. Desalination plants cause water pollution by disposing of hot brine, which has both thermal and saline impacts on the seawater into which it is released. These plants have a serious impact on marine life in the area of desalination and cause environmental damage. At the same time, an agency studied the effect of the Jiddah desalination plant and found that about seventy-six violations to the air were recorded.<sup>358</sup> So in addition to the financial costs imposed by operating desalination plants, they inflict significant costs to the marine and inner atmosphere environments.

These challenges have paved the way for the restructuring and ultimate transformation of the Kingdom's water sector through private sector participation in creating new, more efficient infrastructure. The sector's transfer advantage will come in large measure through the establishment of public-private partnerships ("PPPs"). While the global economic downturn led the Kingdom to bring a number of failing projects under government control, Saudi Arabia still recognizes that PPPs will remain helpful in developing the industry and delivering water and wastewater services to residents throughout the country. Through these PPPs, the "private sector expected to finance, design, build, and operate the project for a specified period of time, after which ownership will be transferred back to the government" through an innovative process called Build-Operate-Transfer ("BOT").<sup>359</sup> BOT offers efficiencies in this critical sector and elsewhere in the developing economy of the Kingdom.

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<sup>358</sup> Vincent, Peter. Ibid. 237.

<sup>359</sup> U.S. -Saudi Arabian Business Council. Ibid. 14

The Saudi government has concurrently implemented an inclusive water policy through its ministries, organizations and agencies in order to better manage the Kingdom's water resources. This policy includes the following measures:<sup>360</sup>

- Require authorization to dig of wells by obtaining a license from the Ministry of Agriculture and Water.
- Encourage the construction of specialized projects and plants in the main cities to pump treated water through pipeline networks to farms in villages and rural areas.
- Adopt the strategy of promoting agricultural production diversification and water-saving crops.
- Use advanced irrigation techniques such as drip and sprinkler system to improve irrigation efficiency and thus reduce water use.
- Move some of the fodder and cereals areas from high crop zones to lower water requirement areas.
- Adopt nationwide campaigns to educate and spread public awareness about water conservation.

## **7.2 Oil**

Energy was discussed in Our Common Future, but not in Agenda 21. Energy is an SDG theme that was included in the 2002 Johannesburg Plan of Implementation for Agenda 21, adopted at the World Summit on Sustainable Development. The production of oil is a focus of the Kingdom's energy law and policy. As a consequence, spills are a major danger threatening both the Red Sea and the Arabian Gulf. In fact, the Gulf has experienced a number of large oil spills over the past 20 years. Most tragically, during the Gulf War approximately 5.7 million

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<sup>360</sup> Al-Motairi, H. Ibid. 259

barrels of oil were dumped off of Kuwait.<sup>361</sup> The Saudi government is trying to develop its natural resources in an environmentally friendly manner. However, fossil fuels are inexorably harmful to the environment. While environmentalists and scientists point their fingers at fossil fuels as being harmful to the environment, Saudi Arabia has tried to balance the country's dependence on oil and gas exports for its economic growth.<sup>362</sup>

The Saudi government has been using cutting edge technologies, which have reduced the impact that oil exploration and extraction have on the environment. Still several significant risks remain. Drilling activities can affect the integrity of the coastal shelf. They can also have a negative effect on marine life.<sup>363</sup> Transporting oil to world markets whether via barge, super tanker, or pipeline carries the risk of spillage. Environmentalists have warned that a significant percentage of the oil produced by offshore oil rigs has been spilling into the sea (which is already prone to contamination due to a relatively shallow average depth of 97 feet).<sup>364</sup>

For these reasons among many, Saudis place great value on reducing the risk of leaks and other harms that might flow from the production of oil. Saudi Aramco, officially the Saudi Arabian Oil Company, is the national oil company of Saudi Arabia. Aramco is the world's most valuable company. Aramco is a founding member of a number of regional and global organizations concerned with oil spill control activities such as the UK-based Oil Spill Services Centre which provides oil spill response services globally, and the Gulf Area Oil Companies

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<sup>361</sup> Vincent, Peter. Ibid. 237.

<sup>362</sup> Taher, Nahed, and Bandar Hajjar. *Energy and Environment in Saudi Arabia: Concerns & Opportunities*. Cham: Imprint: Springer, 2014. Internet resource. 2. The vast oil resources in Saudi Arabia have for decades encouraged a generous system of oil subsidies, making the Kingdom one of the leading countries in the world with the cheapest domestic price of oil. Such subsidies have, however, encouraged inefficient utilization of oil, which is largely consumed in the power, water and transportation sectors, contributing substantially to CO2 emission in the country.

<sup>363</sup> Taher, Nahed, and Bandar Hajjar. Ibid. 4

<sup>364</sup> Al-Azab, M, S Al-Ghais, and W El-Shorbagy. *Oil Pollution and Its Environmental Impact in the Arabian Gulf Region*. Amsterdam: Elsevier, 2005. Internet resource.197.

Mutual Aid Organization (hereinafter referred to as “GAOCMAO”).<sup>365</sup> GAOCMAO was established in the Gulf countries to protect the marine environment from oil pollution from the oil production in the region.<sup>366</sup> The organization was founded on the idea that each company shares the responsibility to ensure a long-term obligation to the “Clean Gulf” concept by preventing operational oil spills, stopping tanker discharges, enhancing safety of ships leading to cleaner seas, and effecting total stoppage of industrial waste discharge to sea.<sup>367</sup>

Aramco’s Environmental Conservation Policy mandates that the company not create undue risks to the environment and that operations be carried out with concern for protection of the land, air, and water. “Aramco has developed an array of operational requirements, engineering standards, and performance guidelines to implement this policy, including sanitary codes, environmental assessments, bioremediation, air quality and emission standards, noise-control regulations, landfill standards, water recycling procedures, hazardous material disposal rules, and oil spill contingency plans.”<sup>368</sup> Saudi Aramco, which is a charter member of GAOCMAO, is also a member of several key regional and international agencies involved in oil spill response. Aramco is also a member of the International Petroleum Industry Environmental Conservation Association, the main purpose of which is to inform members of environmental developments and facilitate communications between the oil industry and relevant organizations on environmental issues.<sup>369</sup>

### **7.3 Climate Change**

Climate Change was a focus of Agenda 21 in chapter 9. Climate change is evident from

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<sup>365</sup> Ministry of Petroleum and Mineral Resources, Kingdom of Saudi Arabia. Nd.

<sup>366</sup> *The Report: Emerging Saudi Arabia 2007*. London: Oxford Business Group, 2007. Print. 129.

<sup>367</sup> The Report. Ibid. 130

<sup>368</sup> Al Bawaba. Saudi Arabia: Environmental Issues Nd. Part one.

<sup>369</sup> Al Bawaba. Ibid.

observations of increases in global average air and ocean temperatures,<sup>370</sup> widespread melting of snow and ice, and rising global sea levels. Most of the observed increases in temperatures since the mid-20th century are very likely due to the observed increase in anthropogenic Greenhouse Gas (“GHG”) concentrations. Since the beginning of the industrial revolution, concentrations of carbon dioxide and other GHGs have increasing in the atmosphere above Saudi Arabia. If current trends in fossil fuel use continue, atmospheric concentrations of carbon are projected to reach 600-700 parts per million (“ppm”) by the end of the 21<sup>st</sup> century.<sup>371</sup> Concentrations of methane, another simple but common GHG, have increased more than 150 percent from the levels in the 1750s.<sup>372</sup> Flaring of methane from oil and gas contributes to climate GHG impact. At the same time nitrous oxide and atmospheric concentrations of other GHGs are rising as well. In the twentieth century, average global temperatures increased by 0.74 C, while sea level rise resulting from thermal expansion of the ocean and melting of ice across the globe amounted to approximately 17 centimetres.<sup>373</sup> The rate of sea level rise in the last decade has been about twice the preceding average for the earlier proportional of the 20th century.<sup>374</sup> Research also confirms that the last part of the twentieth century had much warmer temperatures than any other period in the past millennium, especially in the Arabian Peninsula.<sup>375</sup> For example, a study completed in 2006 showed that eleven of the twelve years from 1995 to 2006 ranked among the twenty warmest years since 1850. The year 2005 was ranked as the warmest year in the previous century. There is strong evidence that the sea level of the coast of Saudi Arabia gradually rose in

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<sup>370</sup> National Climate Data Center. NOAA’s National Climatic Data Center (NCDC) is responsible for preserving, monitoring, assessing, and providing public access to the Nation’s treasure of climate and historical weather data and information. Nd. Website source.

<sup>371</sup> IPCC. Nd. Fifth Assessment Report (AR5).

<sup>372</sup> IPCC. Ibid. Fourth Assessment Report.

<sup>373</sup> Climate Institute. Oceans and Sea Level Rise. Consequences of Climate Change on the Oceans. Nd. Website source.

<sup>374</sup> Climate Institute. Ibid.

<sup>375</sup> Mann et al. Northern Hemisphere Temperatures during the Past Millennium: Inferences, Uncertainties, and Limitations, 26 Geophysical Research Letters.1999. 759

the 20<sup>th</sup> century and is rising currently at a similarly increased rate. Sea level is projected to continue rising at an even greater rate in this century. The three major causes of these patterns of sea level rise in Saudi Arabia are: thermal expansion of the oceans, the loss of land-based ice due to increased melting which in turn increases the volume of available liquid water, and heavier precipitation.<sup>376</sup>

Heavy rains, such as those that triggered flooding in Jeddah in 2011, might be linked to global climate change. The extreme rainfall that occurred in Jeddah was an environmental disaster that caused a lot of problems for people. Although there is no sufficient scientific evidence about the impacts of climate change on Saudi Arabia, the recent rains (90 millimetres in November 2009 and 111 mm in January 2011), however, seem to be evidence that there will be some severe consequences of climate change for Saudi Arabia.<sup>377</sup>

The main problem of climate change in Saudi Arabia involves fossil fuels. If current trends in fossil fuel use continue, the concentrations of carbon dioxide will increase. Multiple actions are needed to reduce the emissions of carbon dioxide. These measurements include: A rationing of energy, development of renewable and new energy sources, and the use of technical means to remove or at least reduce the carbon dioxide from fossil fuel use. In order to reduce the use of fossil fuels, we need to increase efficiency and reliance on renewable sources of energy such as solar, biomass, hydroelectric, wind, geothermal, and or nuclear. Alternative sources of fossil fuel are not yet very common due to state of technology keeping their costs high compared to more traditional sources of energy.

For its own part, the government of Saudi Arabia must take action on climate change. Among many good proposals, the following actions should be considered. 1) The government

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<sup>376</sup> Ministry of Water and Electricity. Nd.

<sup>377</sup> Emirates Meteorology Portal. 2011.



must start to act on implementation of environmental laws that have already been established by the government and address environmental issues.<sup>378</sup> 2) The government should review and update environmental and climate change laws frequently in order to ensure the highest possible levels of effectiveness. 3) The government should be transparent about the facts of climate change, the policies and their effects. Action should be based on good science, such as that produced by NOAA's National Climatic Data Center ("NCDC") which is "responsible for preserving, monitoring, assessing, and providing public access to [America's] treasure of climate and historical weather data and information."<sup>379</sup> In the information age, the Kingdom should rely on the best possible information to inform its responses to the reality of climate change.

#### **7.4 Alternative energy<sup>380</sup>**

Alternative energy refers to energy sources other than the conventional energy sources. Petroleum and grid energy are some of the most common sources of energy in use, and can have hazardous environmental impacts. Therefore, the search for alternative energy is necessary for ensuring environmental sustainability and thus a cleaner environment.<sup>381</sup> In this context, alternative energy offers the best solutions to sustainability and environmental conservation. Examples of sustainable energy including solar and wind, among other sources, are discussed below. Saudi Arabia's climate is rich in conditions for using solar and wind energy. The Kingdom can build these systems just as it has developed the petroleum sector.

##### **7.4.1 Solar Energy**

Saudi Arabia has ample solar resources. The sun is the biggest energy source known to man. Its energy has been exploited since the beginning of history since the earth receives about

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<sup>378</sup> General Environmental Law and Rules for Implementation, 28 Rajab 1422 H. 2001. Print.

<sup>379</sup> <http://www.ncdc.noaa.gov/>

<sup>380</sup> Kingdom of Saudi Arabia. Ministry of Petroleum and Mineral Resources. Nd.

<sup>381</sup> Kingdom of Saudi Arabia. Ibid.

1352 watts per hour in every square meter. The use of energy from the sun can be achieved with ever-greater efficiency through direct conversion of sunlight into electricity using photovoltaic cells. Benefit can also be derived from the heat of the sun by collecting and using it as a source of energy. However, a significant drawback of using energy from the sun is that there are periods in which the sun is obscured in much of the world, making it a less reliable source than burned fossil fuels. Happily, Saudi Arabia is not affected or concerned by the fluctuation in the length of the periods. Although solar energy is abundant and renewed every day, the cells used in collecting it generally are currently more expensive than the costs of using more traditional energy sources. Its impact on the environment is that solar technologies could obscure large areas of the surface of the earth and use a potentially toxic silicon material in their manufacture.

Saudi Arabia has seen some laudable efforts to develop alternatives to fossil fuels. A few years ago, the oil minister, Ali al Naimi, said the Kingdom hoped to become a leading supplier of solar energy. Ali al Barrak, the chief executive officer of the Saudi Electricity Company, also said the country was in talks with French companies to build a nuclear power plant. He said that the country could have a functioning nuclear power generation plant by 2018 if they had started then, in 2009.<sup>382</sup> More recently, Saudi Arabia has expressed interest in using solar energy to drive its growing array of desalination plants.<sup>383</sup> The Kingdom announced a partnership with IBM to pursue this goal. The facility would feature ultra-high concentrator photovoltaic technology and could provide 30,000 cubic meters of water per day, sufficient to cover the needs of over 100,000 people. To date, desalination remains heavily reliant on the energy hungry methods of thermal technology and reverse osmosis.

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<sup>382</sup> Mahdi, Wael. Saudi 'slow to act on climate change.' 2009. Website source.

<sup>383</sup> Saudi Arabian Business magazine. *ICTs and Environmental Sustainability*. 2010.

### **7.4.2 Wind Energy**

Saudi Arabia has ample wind resources. Wind power has been used since ancient time, but its use to generate electricity on a commercial level is still under study with the aim of reducing production cost which remain relatively high. The major drawback of this source of energy is the variation and direction of wind speed, which is not only seasonal but also varies even during any given day. On the other hand, the impact on the environment lies in the use of large tracts of land and noise pollution as well as dangers it poses to bird life.<sup>384</sup> In California and elsewhere, wind turbines are accused of annihilating birds. Still, it holds great potential for the Kingdom.

### **7.4.3 Biomass Energy**

Another renewable source is biomass energy, which is relatively clean. It is derived from the waste of agriculture, forests and other wastes from housing and factories known as municipal waste. It is used as a source of energy through direct combustion or conversion to liquid fuel. The reasons for its limited use include the high cost of production (especially its liquid form) and the cost of waste collection itself. Moreover, harmful effects on the environment can result from the burning of such waste, especially agricultural waste. Burning bio waste can deprive the agricultural land of natural fertilizers, which may lead to lower production of agricultural crops. Burning can also lead to the emission of carbon monoxide gas, a GHG.

### **7.4.4 Hydropower**

With extensive coastlines, Saudi Arabia has potential for ample kinetic energy from waves and tidal flows. Energy, including tidal and wave energy, can also come from

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<sup>384</sup> *Renewable Energy Desalination: An Emerging Solution to Close the Water Gap in the Middle East and North Africa*. Washington DC: World Bank, 2012. Print. 135

hydroelectric, watersheds, whether natural or artificial, including tidal and wave energy.<sup>385</sup> A limiting factor in the investment in hydroelectric energy is the high cost of establishing the necessary infrastructure, in addition to the use of large areas for the construction of these projects for energy production, which might compete with agriculture for suitable space. The energy derived from movement of the waves and tides is still being tested. Hydroelectric power is relatively clean, but has some negative effects on the environment in the area of climate change, as it increases evaporation. In addition, the construction of dams for power generation can lead to the removal of hills, construction of roads and logging which affect the lives of plants and animals.<sup>386</sup>

#### **7.4.5 Geothermal Energy**

Geothermal energy is hot water naturally stored underground with temperatures up to 150 degrees or more. It can be used to generate electricity. As a source it is relatively old. Italy is one of the first countries that have benefited from this type of energy which it has used since 1904. In the Arab countries, test results have indicated the possibility of the existence of this energy mostly in the Saudi Arabia, Algeria, Yemen and Djibouti. However, this kind of energy is still dealing with the issue of heat escaping from the surface of the earth and the erosion of the equipment used in drilling.<sup>387</sup>

#### **7.5 Environmental Management**

The Kingdom has an opportunity to use its petroleum revenues to facilitate a diversification of its energy resources. It can generate all the electricity its people will need, while minimizing the environmental impacts. The Kingdom should develop an environmental

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<sup>385</sup> Kurokawa, Kosuke, Keiichi Komoto, der V. P. Van and David Faiman. *Energy from the Desert: Practical Proposals for Very Large Scale Photovoltaic Systems*. London: Earthscan, 2006. Internet resource. 9

<sup>386</sup> Kurokawa, Kosuke, Keiichi Komoto, der V. P. Van and David Faiman. Ibid. 10

<sup>387</sup> Kurokawa, Kosuke, Keiichi Komoto, der V. P. Van and David Faiman. Ibid. 12

management system for its energy sector, and integrate that sector with its water supply sector, its urban development sector, and its environmental protection programs. This would greatly to the sustainable development of Saudi Arabia.

Saudi environmental law and policy frameworks have fostered development of the entire country. However, previous accomplishments have not addressed the current environmental problems that the Kingdom experiences. This chapter has thus espoused various policy frameworks available in Saudi Arabia and how they have contributed – or could potentially contribute –to enhancing environmentally friendly growth. In summary, the various policies adopted and implemented by the Kingdom of Saudi Arabia that are the basis for environmental protection programs in the country need to be strengthened and broadened to address the challenges discussed above. The fight for environmental conservation within the country is best handled through expanding and refining the distinct policies, laws and measures described here. They are examples of policies appropriate for further development.

Saudi Arabia's development has benefitted from its energy laws and its social laws that enhance responsive use of natural resources. These are two areas where the Kingdom of Saudi Arabia has made significant strides, and has thus operated in accordance with the policies of Agenda 21.<sup>388</sup> In the past, following the prescriptions of Agenda 21 and environmental treaties, has served to cushion Saudi Arabia from much reckless environmental degradation. In the future, more will be needed to continue this success. The next chapter describes the Kingdom of Saudi Arabia's system for securing compliance with its environmental regulation, and suggests ways to strengthen these systems. It addresses systemic weakness in the Kingdom's environmental management systems for compliance and enforcement.

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<sup>388</sup> Mahdi, Wael. Ibid.

## Works Cited for Chapter 7

- Al Bawaba, Saudi Arabia: Environmental issues (part one). Nd. <http://www.albawaba.com>
- Al-Azab, M, S Al-Ghais, and W El-Shorbagy. *Oil Pollution and Its Environmental Impact in the Arabian Gulf Region*. Amsterdam: Elsevier, 2005. Internet resource.  
<http://www.worldcat.org/title/oil-pollution-and-its-environmental-impact-in-the-arabian-gulf-region/oclc/427566293>
- Al-Motairi, H. Water quality regulation and wastewater treatment and reuse in Saudi Arabia. Nd.
- Climate Institute. Oceans & sea level rise. Consequences of Climate Change on the Oceans. Nd. Website source.
- Emirates Meteorology Portal. 2011. <http://www.meteo.ae/blog/2011/01/26/jeddah-floods-january-2011>
- General Environmental Law and Rules for Implementation, 28 Rajab 1422 H .2001.  
[http://www.pme.gov.sa/en/env\\_regul.asp](http://www.pme.gov.sa/en/env_regul.asp)
- IPCC. Fifth Assessment Report (AR5). Nd. <http://www.ipcc.ch/#>
- Kingdom of Saudi Arabia. Ministry of petroleum and mineral resources. Nd.  
[http://www.mopm.gov.sa/mopm/detail.do?content=environment\\_mining](http://www.mopm.gov.sa/mopm/detail.do?content=environment_mining)
- Kurokawa, Kosuke, Keiichi Komoto, der V. P. Van, and David Faiman. *Energy from the Desert: Practical Proposals for Very Large Scale Photovoltaic Systems*. London: Earthscan, 2006. Internet resource.
- Mahdi, Wael. Saudi ‘slow to act on climate change.’ 2009. Website source.  
<http://www.thenational.ae/news/worldwide/middle-east/saudi-slow-to-act-on-climate-change>
- Mann et al. Northern Hemisphere Temperatures during the Past Millennium: Inferences, Uncertainties, and Limitations, 26 Geophysical Research Letters.1999.
- Ministry of Petroleum and Mineral Resources, Kingdom of Saudi Arabia. Nd.  
[http://www.mopm.gov.sa/mopm/detail.do?content=environment\\_oil\\_spill\\_en](http://www.mopm.gov.sa/mopm/detail.do?content=environment_oil_spill_en)
- Ministry of Water and Electricity. Nd. <http://www.mowe.gov.sa/NewMowe/Index.aspx>
- National Climate Data Centre. Nd. Website source. <http://www.ncdc.noaa.gov/oa/ncdc.html>
- Renewable Energy Desalination: An Emerging Solution to Close the Water Gap in the Middle East and North Africa's*. Washington DC: World Bank, 2012. Print.  
<http://www.worldcat.org/title/renewable-energy-desalination-an-emerging-solution-to-close-the-water-gap-in-the-middle-east-and-north-africas/oclc/801050777>
- Saudi Arabian Business magazine. ICTs and Environmental Sustainability. 2010.  
<http://www.giswatch.org/fr/node/316>

Taher, Nahed, and Bandar Hajjar. *Energy and Environment in Saudi Arabia: Concerns & Opportunities*. Cham: Imprint: Springer, 2014. Internet resource.  
<http://www.worldcat.org/title/energy-and-environment-in-saudi-arabia-concerns-opportunities/oclc/867051941>

*The Report: Emerging Saudi Arabia 2007*. London: Oxford Business Group, 2007. Print.  
<http://www.worldcat.org/title/report-emerging-saudi-arabia-2007/oclc/782130590>

U.S.-Saudi Arabian Business Council. The Water Sector in the Kingdom of Saudi Arabia. Nd.  
[http://www.us-sabc.org/files/public/Water\\_Brochure.pdf](http://www.us-sabc.org/files/public/Water_Brochure.pdf)

Vincent, Peter. Saudi Arabia an Environmental Overview. 2008.

## CHAPTER 8

### 8. Strengthening Environmental Regulation in Saudi Arabia

Without strong environmental regulation, no country can establish sustainability along with development. The current system of enacting environmental regulations and the decision making process involved has been established mostly since the 1992 Earth Summit. Environmental regimes may seem to be well developed, but there are still many areas, such as coordination of all sectors of environmental legislation, that would benefit from restructuring. Moreover, more is known about the environment, and especially about new conditions, such as sea level rise. There is always a need to revise the environmental regulations.

There are three crucial policy and administrative aspects that can drive environmental policies in the Kingdom of Saudi Arabia. The Kingdom has experienced a longer duration for substantial enactments on environmental regulations to appear. Thus, the decisions to enact effective environmental systems have been delayed due to weak coordination of environmental legislation and specific issues where the laws do not function. This requires immediate redress and restructuring.<sup>389</sup> Despite the basic soundness of the current environmental statutory system, it still requires an overhaul with the view of addressing discrepancies in key environmental regulations, without which environmental problems grow worse. Having viable policies for sustainable development and an articulated system ensures proper environmental regulations and thus suitable sustainability. This is the bottom line in formulating a viable and effective system that responds to the Kingdom's acute environmental challenges. Regulatory frameworks are the strongest pillars towards a realization of sustainable environmental plans to a country.<sup>390</sup>

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<sup>389</sup> Taher, Nahed, and Bandar Hajjar. *Energy and Environment in Saudi Arabia: Concerns & Opportunities*. Cham: Imprint: Springer, 2014. Internet resource.<sup>11</sup>

<sup>390</sup> Shoult, Anthony. *Doing Business with Saudi Arabia*. London: Blue Ibex Ltd, 2005. Print. 180. This third edition of *Doing Business with Saudi Arabia* is the definitive English language guide to business practice and commercial



Different countries adapt distinct policies and regulatory frameworks based on their physical and geographical orientation. There is an urgent need to articulate consolidated policies for the Kingdom of Saudi Arabia.<sup>391</sup> Fortunately, there are many effective legal and management tools that the Kingdom can draw upon in order to strengthen its rules for sustainable development. These include the following examples.

**a. Implementation and enforcement of the regulations.**

The implementation and enforcement of regulations requires adoption of a complete environmental management system. Such a system would have several components. One measure involves a design of a national environmental inventory that covers basic information necessary for both the local conditions, policies and varied processes of decision-making.<sup>392</sup> This step is critically important for ensuring sustained environmental policy implementation by the government. In addition, a national environmental inventory will provide a comprehensive framework for making sustainable development decisions, especially in aligning policies to the national environmental demands.<sup>393</sup> Having this platform is especially important for preserving natural habitats that contribute to the national beauty and aesthetics of the country. In addition to having a national environmental inventory, the government should consider establishing programming levels for the environmental regulations and routinely monitor the physical environment to determine if the regulations are having the effect of actually protecting the

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opportunity in the Kingdom, the largest economy in the Middle East. This authoritative guide provides an up-to-date appraisal of the current economic and investment climate, a review of market potential in the key sectors, and unique best practice advice on all aspects of commercial engagement with Saudi Arabia.

<sup>391</sup> Shoult, Anthony. Ibid. 182

<sup>392</sup> Jabbara, Joseph G, and O P. Dwivedi. *Governmental Response to Environmental Challenges in Global Perspective*. Amsterdam: IOS Press, 1998. Print.1 & see chapter 8 and 10 of Agenda 21.

<sup>393</sup> Weerakkody, Vishanth. *Social and Organizational Developments Through Emerging E-Government Applications: New Principles and Concepts*. Hershey, PA: Information Science Reference, 2010. Print. 184. This book offers reflective accounts of the key research themes that have emerged in the last few years as electronic government services have become commonplace in the world"--Provided by publisher

environment and ensure that policies are followed throughout the country.<sup>394</sup> Monitoring is essential because what is not measured is routinely ignored and not valued appropriately.

The Kingdom could draw valuable insights about protecting the environment from the American experience. Over the past half century, the U.S. has made great advances in environmental protection through regulation and effective implementation. The Kingdom can study how the U.S. federal and the state governments craft and implement their environmental laws.<sup>395</sup> The federal government of the USA provides diverse environmental activities such as: protection of water resources, key environmental reviews, control of storage to the hazardous materials in the underground tanks, or enacting laws that shield workers from extensive exposure to environmental hazards.<sup>396</sup> In addition, the federal government has a significant mandate for the enforcement and implementation of environmental regulations by controlling the use, marketing and manufacturing of pesticides and other poisonous products. In the USA, the federal laws are directly correlated to state laws, as in California on environmental regulation. Both federal and state governments are the pillars of compliance and enforcement on environmental conservation and protection. While the U.S. system is far from perfect, it does have a logic and a fairly compelling record of success. Many countries around the world understand that it merits further study.

The federal government has several approaches to environmental regulation, and as such undertakes these initiatives in line with distinct measures stipulated by the state.<sup>397</sup> Federal environmental statutes and programs provide a framework necessary for developing,

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<sup>394</sup> Weerakkody, Vishanth. Ibid. 186

<sup>395</sup> Lovei, Magda, and Charles Weiss. *Environmental Management and Institutions in OECD Countries: Lessons from Experience*. Washington, D.C: World Bank, 1998. Print.23.

<sup>396</sup> Kelemen, R. D. *The Rules of Federalism: Institutions and Regulatory Politics in the EU and Beyond*. Cambridge: Harvard University Press, 2004. Internet resource. 59.

<sup>397</sup> Paddock, LeRoy. *Compliance and Enforcement in Environmental Law: Toward More Effective Implementation*. Cheltenham, UK: Edward Elgar, 2011. Internet resource. 131.

interpreting, and enforcing both federal regulations and state environmental protection laws.

Based on this understanding, it is worth having the general understanding of federal environmental protection laws and how they relate to state laws on environmental regulations.<sup>398</sup>

The USA has developed many administrative tools to achieve compliance with environmental laws.

One of the distinct regulatory agencies in the USA is the federal Environmental Protection Agency (U.S. EPA). This agency holds the primary mandate for the nation's environmental protection, as delegated by Congress, and as such the federal government draws much reference to its establishment and portfolio towards environmental protection and regulations.<sup>399</sup> Other agencies of the federal government that aid in environmental protection include: Department of Transportation, Department of Interior which includes the National Park Service and the Fish and Wildlife Service), the Food and Drug Administration, the Department of Agriculture, and the Occupational Safety and Health Administration among others.<sup>400</sup> These agencies have sector-wide authority over the environment, and work in connection with the U.S. EPA, which is the central body in environmental regulation.<sup>401</sup> This body is one of the highly decentralized agencies in the federal government, with 10 regional offices. The headquarters is located in Washington, DC. Its mandate involves setting policies as well as promulgating rules, while the regional offices implement its programs. A similar pattern exists in states, such as the Department of Environmental Conservation ("DEC") of the State of New York.

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<sup>398</sup> Paddock, LeRoy. Ibid. 132

<sup>399</sup> Gerrard, Michael and Sheila R. Foster. *Law of Environmental Justice: Theories and Procedures to Address Disproportionate Risks*. Chicago, Ill: American Bar Association, Section of Environment, Energy, and Resources, 2008. Print. 204.

<sup>400</sup> *Code of Federal Regulations, Title 40, Protection of Environment, Part 63 (sections 63.600-63.1199), Revised As of July 1, 2011*. United States Government Printing Office, 2011. Print. 515.

<sup>401</sup> *The United States Government Manual, 2012*. Washington, DC: Office of the Federal Register, National Archives and Records Service Administration, 2012. Print. 239.

## **b. Availability of environmental data from local research findings**

Gaining access to timely, reliable and comprehensive environmental data is one significant step towards enhancing the effectiveness sustainable regulations throughout the Kingdom.<sup>402</sup> Therefore, the government of Saudi Arabia should establish more robust systems for collecting data to implement sustainable regulations. Such efforts imply increased funding and support to academic institutions and other basic research organizations in aid of further research work. Enhancing funding to these institutions would help overcome the information barriers by offering stability in environmental research and the creation of rigorous academic mechanisms for undertaking the most advanced environmental research.<sup>403</sup> Like most countries, Saudi Arabia faces distinct challenges that are best addressed by applying specific solutions appropriate to the country rather than relying on “off the shelf” information. Today, the Kingdom’s government supports numerous but fragmented research activities.<sup>404</sup> While individual people and institutions are doing good work, it is often underfunded, uncoordinated or lacking in the breadth of perspective necessary to link such diverse and complex issues as economic development and environmental science. Environmental laws for sustainability require up-to-date knowledge about ambient environmental conditions, and science-based recommendations for resolving environmental problems.

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<sup>402</sup> Meho, Lokman I. and Mona A. Nsouli. *Libraries and Information in the Arab World: An Annotated Bibliography*. Westport, CT: Greenwood Press, 1999. Print. 253.

<sup>403</sup> Alberton, Mariachiara and Francesco Palermo. *Environmental Protection in Multi-Layered Systems: Comparative Lessons from the Water Sector*. Leiden: M. Nijhoff Publishers, 2012. Print. 506. & see chapter 31 of Agenda 21 “scientific and technological community.”

<sup>404</sup> Alberton, Mariachiara and Francesco Palermo. *Ibid.* 508

### **c. Public concern and participation**

Principle 10 and 17 of the 1992 Rio Declaration recognize that without public education and participation in the management of the environment, there cannot be effective sustainable development. In the Kingdom, the general public has limited capacity in initiating meaningful environmental policies, and this has obviated a very small but important part that public participation plays in forming good laws that function well within society.<sup>405</sup> With little or no role in the formulation of environmental laws, there has been measured pressure on the government to involve the general public in this important process.

The capacity of the public in coming up with worthy environmental policies is limited, perhaps more than it should be. Indeed, widespread public participation is deemed as a strategic means by which various concerns can be addressed before moving forward to enact laws or rules or implement other policy initiatives. Sensing a need, some people have resorted to staging demonstrations on the government as one means of calling for meaningful environmental concerns to be factored into the law making.<sup>406</sup>

The PME is one institution which might benefit from adjustments to its rule-making process. By including a more formal opportunity for public participation as envisioned by the US National Environmental Policy Act of 1970 (“NEPA”) or the UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (the “Aarhus Convention”), the PME could gain the benefit of timely and valuable insights from the affected public. In this regard, the Royal Commission for Environmental

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<sup>405</sup> Bryner, Gary C. *Gaia's Wager: Environmental Movements and the Challenge of Sustainability*. Lanham, MD: Rowman & Littlefield, 2000. Print. 28. *Can environmentalism evolve into a powerful social movement that transforms human practices in ways that are ecologically sustainable? This work contends that it is in our self-interest as a species to ensure that environmental movements coalesce in the service of sustainability.*

<sup>406</sup> Metz, Helen C. *Saudi Arabia: A Country Study*. Washington, DC: US Gov. Print. Office, 1992. Print 89 and see Rio Principle 10 and section 3 of Agenda 21.

Protection, the body designated to replace PME, should have the scope of its powers shaped so that can exercise authority more limited to advisory and supervisory capacities that would encourage wider participation in the rule-making stages.

Adjustment to the Kingdom's EIA procedures offer another opportunity for increasing public participation in ways that should alleviate concerns before they are instantiated. The Kingdom's EIA system under the General Law should consider how other countries use EIA. A set of best management practices for EIA exists world-wide, but the Kingdom does not yet employ them. Public participation is a primary mechanism for engaging the citizens in EIA – at a stage in the development of a policy where it can be helpful.<sup>407</sup> Having public participation in environmental policy formulation is of utmost interest to the federal authority because it offers many significant opportunities to yield environmental, economic or cultural benefits.<sup>408</sup> Therefore, in the USA at the federal and state levels, the EIA procedures benefit from direct engagement of citizens, through involving the public in all environmental, economic and cultural deliberations affecting them before the government acts. The federal government has enhanced public participation through NEPA, which is considered the most comprehensive environmental legislation.<sup>409</sup> States like California and New York have similar EIA laws that operate in all cities and local governments. According to these laws, government is under the mandate to generate detailed assessments of the potential environmental, economic and socio-cultural impacts of proposed actions being considered by the government. Notably UNEP has policies recommending use of EIA in developing countries. These procedures should be very helpful if adapted thoughtfully for use in Saudi Arabia.

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<sup>407</sup> *The Environmental Forum*. Washington, DC: Environmental Law Institute, 1982. Print. 56.

<sup>408</sup> Morella Erica. *Public Comment Periods and Federal Environmental Impact Statements: Potentials and Pitfalls from the American Experience*. 2013. Michigan Journal of Sustainability.

<sup>409</sup> Morella Erica. *Ibid*.

## 8.1 Legal Practices and Their Impact to the Environment

Based on this and other analyses of public and private institutions in Saudi Arabia, it appears that legal compliance and enforcement of environmental standards and the effectiveness of the environmental protection system overall are not yet optimal.<sup>410</sup> In Saudi Arabia, most relevant institutions play subsidiary roles regarding the whole agenda of observing and enforcing environmental regulations. They are too often passive participants, superficial following the extant regulations.<sup>411</sup> Because public institutions lack of participatory frameworks in their decision- making or project activity — let alone in the agenda formation — there is no common understanding about how to observe regulations and legal instruments. People lack capacity and incentive to buy into the processes or their intended outcomes. Well-intentioned and diligent officials, therefore, lack the information necessary to shape agendas to best achieve sustainable development. Some lack understanding of the complex realities of economics or the environment. For others, the limited opportunity for public participation in the formulation of key environmental regulation deprives them of information about the impact on the ground of a proposed action.<sup>412</sup> This may lead to laws going unheeded, leaving employees make environmental decisions solely with regard to local informal or customary practices rather than duly constituted laws that reflect the best information possible. As a result, environmental protection relies the views of individuals rather than what the Kingdom's laws and guidelines may require. This outcome can lead to imperfect weighing of the nation's twin objectives, economic development and environmental sustainability.

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<sup>410</sup> Fauchald, Ole K., David Hunter, and Wang Xi. *Yearbook of International Environmental Law: Volume 19*. New York: Oxford University Press, n.d.. Print. 242.

<sup>411</sup> *A Study on the Evaluation of Environmental Impact Assessment in Selected ESCWA Countries*. New York: UN, 2002. Print. 10.

<sup>412</sup> Fauchald, Ole K, David Hunter, and Wang Xi. *Ibid*. 243

### **a. Monitoring observance of environmental rules**

In Saudi Arabia, PME and AMENA are the two bodies that are legally mandated to enforce and monitor legislation, and as such have a jurisdiction to ensure that credible environmental laws are formulated and enforced within the country.<sup>413</sup> However, the reality is that these bodies are not yet fully achieving their mandates, and their regulations do not meet the expected environmental demands. No monitoring data is collected nationally and shared across the government. This trend extends to the entire country, “despite special attention paid on the enforcement of environmental laws, which is considered pivotal, especially at the application stage of the permit.”<sup>414</sup> On the very occasion when would one expect the enforcement of credible laws, enforcement only it happens upon demands by stakeholders of PME or AMENA or other public institutions. One such laxity is attributed to lack of statistical frameworks that would describe the non-compliance by individuals under these regulations.<sup>415</sup> This represents a distinct opportunity to improve outcomes.

In contrast to the Kingdom of Saudi Arabia, the US EPA undertakes extensive monitoring and protects the environment to the extent of its legal mandate.<sup>416</sup> This body was specially created with the mandate of protecting human health and the environment. The EPA has a mandate in statutes for enforcing environmental regulations, as passed by the US Congress.<sup>417</sup> This represents a significant step towards ensuring environmental sustainability because the agency often designs its regulations, with oversight by Congress, and with required

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<sup>413</sup> Donnelly, Annie, Barry Dalal-Clayton, and Ross Hughes. *A directory of Impact Assessment Guidelines*. London: International Institute for Environment and Development, 1998. Print. 90.

<sup>414</sup> *101 Checklists for Successful Business in the Gulf: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, UAE*. Geneva, Switzerland: Business International, 1988. Print. 64.

<sup>415</sup> Donnelly, Annie, Barry Dalal-Clayton, and Ross Hughes. *Ibid.* 93

<sup>416</sup> Miller, G T, and Scott Spoolman. *Living in the Environment: Concepts, Connections, and Solutions*. Belmont, CA: Thomson Brooks/Cole, 2009. Print. 638

<sup>417</sup> Artiola, Janick, Ian L. Pepper, and Mark L. Brusseau. *Environmental Monitoring and Characterization*. Burlington: Elsevier, 2004. Internet resource. 172.



public notice and public participation. The EPA's authority is recognized by every part of government. It has broad powers and discretion to initiate legal proceedings, provided it is relevant to environmental protection.<sup>418</sup> The EPA's mandate is broad, and the courts have given the EPA broad discretion in determining its mandate. The independent agency is staffed with diligent administrators, expert scientists and zealous lawyers, giving it great effectiveness in enforcing environmental regulations. For instance, all federal agencies, including the military, must do EIA with public participation, to ensure that environmental quality is upheld. All agencies must use research and education and participatory rule making before the enactment of any regulatory standard, or as appropriate before enforcement measures are taken. Courts frequently rule with the EPA, further strengthening its capacity to protect the environment.

#### **b. Enforcement Cases and Standards**

Efforts to instigate legal action to enforce environmental standards have yet to find much success in the Kingdom of Saudi Arabia. None of the legal enforcement cases have been published. These cases are not, therefore, well known and do not guide society about how to follow environmental laws. This challenge is attributed to the fact that the Kingdom has not embraced systemized dissemination and registration of these environmental enforcement cases. One reason is that the law prohibits free dissemination and publication of these cases. This practice impedes the Kingdom's implementation of Rio Principle 10. Key civil organs, which could help apply environmental rules, are denied the information necessary to ensure uniform application and interpretation of laws. Such bodies, including NGO's, academic institutions, and even the government have limited access to information that would be necessary to enact critical

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<sup>418</sup> Artiola, Janick, Ian L. Pepper, and Mark L. Brusseau. Ibid. 173.

environmental legislation or properly enforce it.<sup>419</sup> Due to this limited access to vital knowledge, there have been diminished roles by all who could helpfully be involved in administrative decisions. This is especially unfortunate when it impedes resolutions to conflicts about environmental problems. Indeed, Saudi Arabia would seem to benefit greatly from a system in which all environmental practices follow strict requirements before any legal enforcement. This would ease the way for the government to legislate valuable environmental regulations.<sup>420</sup>

### **c. Interpretation and application of local rules**

Knowledge deficiency towards implementing local environmental rules and regulations does not end with the higher organs and private organizations, but extends to staffs at the agencies that enforce local environmental rules. They need more continuous and consistent training and the guidance necessary to make the best judgments, particularly when it comes to interpreting laws and rules.<sup>421</sup> To avoid errors, they deserve more training on how to best interpret laws and regulations.<sup>422</sup> For example, these staff members often have not been exposed to the environmental context, and thus they lack the right foundation on which to base decisions. As bureaucrats do, most officers defend their decisions, despite lacking the transparency required for making them fairly (instead of on such irrelevant factors as the position of the parties or in ways measured to coerce compliance). This exposes them to derision when the public sees

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<sup>419</sup> Halbert, Terry, and Elaine Ingulli. *Law & Ethics in the Business Environment*. Mason, OH: South-Western Cengage Learning, 2012. Print. 2.

<sup>420</sup> Khan, Nuzrat Y, Mohiuddin Munawar, and Andrew R. G. Price. *The Gulf Ecosystem: Health and Sustainability*. Leiden: Backhuys, 2002. Print. 410.

<sup>421</sup> Althunayan, Turki. *Dealing with the Fragmented International Legal Environment: Wto, International Tax and Internal Tax Regulations*. Berlin: Springer, 2010. Print.59. There is a need for maintaining a balance between local needs and international commitments with respect to taxation. This book explores directions in which legal order can be preserved as much as possible from within each country, yet not imposed upon them.

<sup>422</sup> Althunayan, Turki. Ibid. 60

environmental problems emerge or get worse.<sup>423</sup> It can breed disrespect for environmental norms and even the rule of law more generally.<sup>424</sup>

More robust rule-making and regular enforcement offers the Kingdom many opportunities to strengthen its rule of law, particularly in respect to the environment. Currently stakeholders might view interactions with public officers and the bodies that administer environmental regulations as hyper-technical and excessively strict.<sup>425</sup> While this perception misunderstands what environmental laws actually require, it comes from not knowing the true source of compliance and enforcement decisions. In the most notorious cases, open and direct contradictions have emerged and are made visible to all, showing that decisions depend on the parties' positions not the law.<sup>426</sup> Absent the establishment of a more robust environmental rule of environmental law system, this appearance of arbitrary or capricious application can only be corrected by adding an extra level of review. The next section will assess this situation in light of a committee of performance evaluation and its roles in the enforcement and implementation of environmental regulation.

## **8.2 Proposal For A Committee of Performance Evaluation**

Within the Saudi system, there are gaps in the delegation of responsibilities and overseeing performance due to lack of uniform and centralized efforts on the part of enforcement management and legislation. To correct this situation, the government should consider forming a Committee of Performance Evaluation to review the allocation and performance of duties related

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<sup>423</sup> Sands, Philippe. *Principles of International Environmental Law*. Cambridge: Cambridge Univ. Press, 2003. Print.893.

<sup>424</sup> Kaebnick, Gregory E, and Lori P. Knowles. *Reprogenetics: Law, Policy, and Ethical Issues*. Baltimore, Md: Johns Hopkins University Press, 2007. Internet resource.

<sup>425</sup> Clements, Frank. *Saudi Arabia*. Oxford, England: Clio Press, 1988. Print.170.

<sup>426</sup> Sands, Philippe. Ibid. 895

to the management of environmental enforcement activities.<sup>427</sup> Other than this function, the Committee could be expected to undertake regular outreach programs and other distinct functions. Unlike the other institutions, this Committee would have personnel with the mandate to ensure enforcement and compliance of various institutions and systems. The personnel attached to this Committee should be drawn from a team of environmental experts constituting engineers, environmental specialists, lawyers and economists, each of whom would have the technical knowledge necessary to provide meaningful oversight.<sup>428</sup>

Prior to constituting such a Committee, it is worth engaging all institutions that have a stake in environmental issues.<sup>429</sup> Promoting public participation in advocating for a fair chance in the selection process is a move that will help to create a platform in which competence is recognized and encouraged. In addition, the Committee must adopt clear and transparent operating rules and regulations, to ensure that all the regulated parties know what is expected from the start. Publishing these regulations will equip the Committee members with their responsibilities as members of this organization. Fundamental responsibilities of this committee include, creating of rules on cooperation and coordination at the local, regional and national level.<sup>430</sup> These rules should provide the framework for unifying acts of environmental management, which would be acceptable to all the enforcement committee members.

Setting up the Committee of Performance and Evaluation is one way that Saudi Arabia can undertake to enhance enforcement and establishment of critical enforcement management

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<sup>427</sup> Mintz, Joel A. *Enforcement at the EPA: High Stakes and Hard Choices*. Austin: University of Texas Press, 1996. Print. 4

<sup>428</sup> Mintz, Joel A. Ibid. 6

<sup>429</sup> Croci, Edoardo. *The Handbook of Environmental Voluntary Agreements: Design, Implementation and Evaluation Issues*. Dordrecht: Springer, 2005. Internet resource. 5.

<sup>430</sup> Collin, Robert W. *The Environmental Protection Agency: Cleaning Up America's Act*. Westport, CT: Greenwood, 2006. Print. 165.

and legislation environmental practices.<sup>431</sup> One mandate of this committee would be to engage actively in the work of the International Network for Environmental Compliance and Enforcement (“INECE”) and introduce INECE capacity-building in the Kingdom. Establishment of this Committee is one way to steer towards improving and clarifying duties of the enforcement management. In addition, the Committee can be involved in the evaluation of regulations as one of its main objectives.<sup>432</sup> Under appropriate structural procedures, the Committee should have relations with all ministers responsible for managing environmental issues, and they should report regularly to the Committee of Performance Evaluation.

This new Committee of Performance and Evaluation should be delegated adequate authority. It is imperative to note that the previous ministerial enforcement of environmental regulations lacked cohesive jurisdiction, and was impaired by overlapping ministerial enforcement. This contributed to the failure of past enforcement; ministers in all agencies need clear guidelines. It is essential to replace these old systems with comprehensive new mandates and have their roles in the enforcement of rules and responsibilities defined.<sup>433</sup> This could be done to strengthen the PME, which is newly formed and as the lead environmental agency has the mandate of ensuring absolute enforcement of key legislations at the national level.<sup>434</sup> There are various ministries at the state level whose mandates include overseeing the management of environmental entities and environmental legislation. These ministries include the Ministries of Municipal and Rural Affairs and Economy and Planning.<sup>435</sup> However, these ministries experience a common problem that makes them ineffective in environmental enforcement. This

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<sup>431</sup> Collin, Robert W. Ibid. 167

<sup>432</sup> *Environmental Cleanup at Navy Facilities: Adaptive Site Management*. Washington, DC: National Academies Press, 2003. Print. 315.

<sup>433</sup> Johany, Ali D, Michel Berne, and J W. Mixon. *The Saudi Arabian Economy*. Baltimore: Johns Hopkins University Press, 1986. Print. 101.

<sup>434</sup> Johany, Ali D, Michel Berne, and J W. Mixon. I. Ibid. 102

<sup>435</sup> *World Economic Outlook*. Washington: IMF, 1999. Print. 135.

is attributed to overlapping jurisdiction and multiple jurisdictions in their areas of engagement.

Other problems experienced by each ministry are the lack of proper guidance on the management of inter-agency coordination of inter-related activities and on how to share responsibilities.

There is a clear need for a legal assessment point, with institutional backing and auditing roles, in order to ensure the strengthening of the enforcement management by supporting compliance of the enforcement strategy. Each authority must regularly report to the Committee of their recommendations and suggestions of how to improve the enforcement management. The benefits of establishing the Committee of Performance Evaluation would be a significant strengthening of the enforcement efforts.

In the USA, and particularly under the federal system of administration, the federal agencies have an independent mandate to conduct their respective activities (such as protecting the environment, collecting taxes or engaging in intelligence activities) pursuant to express authorizing legislation.<sup>436</sup> This framework gives agencies such as the EPA a clear mandate and the autonomy needed to carry out its highly technical work with minimal interference from the more political institutions.<sup>437</sup> The EPA is tasked with various mandates including: implementing various environmental policies, assisting in improving energy efficiency and reducing greenhouse gas emissions. The EPA's authority is commensurate to the proposed committee of performance evaluation.<sup>438</sup> The next section describes distinct procedures of enforcing environmental rules in Saudi Arabia.

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<sup>436</sup> *The Measure of Star: Review of the U.S. Environmental Protection Agency's Science to Achieve Results (star) Research Grants Program*. Washington, D.C: National Academies Press, 2003. Print. 18.

<sup>437</sup> Collin, Robert W. *The Environmental Protection Agency: Cleaning Up America's Act*. Westport, Conn: Greenwood, 2006. Print. 165.

<sup>438</sup> Collin, Robert W. Ibid. 167

### 8.3 Procedures for Enforcing Environmental Rules

There is a systematic challenge in the administration of environmental protection in Saudi Arabia caused by the dearth of standardized procedures for the execution of environmental laws and lack of guidance on how to enforce them.<sup>439</sup> These relatively thin systems typically result usually in *ad hoc* enforcement. In order to prevent arbitrary or capricious outcomes, the Saudi government should formulate uniform administrative procedures both for compliance and enforcement.<sup>440</sup> Once these procedures have been established, the government must then ensure that all the relevant departments have complied with them and also conduct their administrative obligations in a very transparent manner, so that everyone understands what is expected.

#### 8.3.1 Impacts of the Current Enforcement Strategies

The current system suffers many setbacks due to lack of consistent enforcement procedures.<sup>441</sup> The results are significant.

- a) There is no comprehensive evaluation of the environmental regulations based on the standardized goals.
- b) Assessments that are done do not reveal the potential areas for improvement.
- c) There is public perception that legislation is ineffective.

These results add up to an environmental regulatory frameworks which is less credible and effective than the Kingdom deserves.<sup>442</sup> Previous sections have extensively cited the on-going environmental challenges facing Saudi Arabia, focusing on uneven enforcement of environmental regulations and laws respectively. The overall impact of tackling them too slowly

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<sup>439</sup> Taher, Nahed, and Bandar Hajjar. Ibid. 19

<sup>440</sup> Tortora, Marco. *Sustainable Systems and Energy Management at the Regional Level: Comparative Approaches*. Hershey, PA: Information Science Reference, 2012. Print. 153.

<sup>441</sup> *Environment & Planning: A*. London: Pion Ltd., 1974. Print. 757.

<sup>442</sup> Miller, G T, and Scott Spoolman. *Living in the Environment*. Pacific Grove, Calif.?: Brooks/Cole Cengage Learning, 2012. Print.

is heavy and costly to the sustainability of economic development in every sector and every region of the country.<sup>443</sup> This militates for striving harder to increase enforcement management strategies.<sup>444</sup>

The PME conducts repeat actions at ensuring full compliance, however, the ministers must also contribute in the control of environmental issues.<sup>445</sup> To bring about greater compliance by companies, the Kingdom's rules should be amended to:

- a) require credible and continuous monitoring of environmental issues in all provinces;
- b) facilitate rules designed to minimize disruption of business activities while promoting environmentally sustainable practices;<sup>446</sup>
- c) be composed of clear and simple rules that are easy to understand, comply with and enforce;
- d) give preference to rules that are self-enforcing, such as by requiring all stakeholders to use certified equipment and self-monitoring;
- e) make use of outreach programs to create awareness and incorporate the public as one of the monitors; and
- f) disclose publicly the status of environmental progress and management.

In a comparative perspective, there many examples of best practices for environmental compliance and legislation, in the USA or elsewhere, which the Kingdom should adopt as initiatives for optimal compliance and enforcement.<sup>447</sup> The General Environmental Law lacks the initiatives needed to rationalize the laws and optimize compliance. Principally, the best way to ensure that the Kingdom's environmental enforcement agencies are effective is by clarifying

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<sup>443</sup> *Environment & Planning*. Ibid. 758.

<sup>444</sup> Miller, G T, and Scott Spoolman. Ibid.

<sup>445</sup> Mostyn, Trevor. *Saudi Arabia*. London: Middle East Economic Digest, 1983. Print. 21.

<sup>446</sup> Mostyn, Trevor. Ibid. 25

<sup>447</sup> Tortora, Marco. Ibid. 156



their duties and by giving them more powers, subject to the review of a Committee on Performance and Evaluation, with the view of fostering compliance and enforcement of environmental legislation.

### **8.3.2 Facilitators of Best Practice**

It is essential to put in place relevant and important best practice facilitators when designing environmental rules.<sup>448</sup> The rules, which are derived from best practice facilitators, must ensure compliance and quality while practising some standards in comparison to the international environmental legislation and best practices. Facilitators of Best Practice are not just important factors of consideration when designing effective environmental rules.<sup>449</sup> These facilitative methods include tools equally used as checklists for the relevant authority, while doing evaluation and tests on the monitoring and compliance of set regulations.<sup>450</sup> The checklists facilitate regular performance audits. In addition, the checklist serves a central role, especially when it including the obligations of the authority during the audits. The audit imposes responsibilities on ministers, who are obliged to perform self-monitoring of their respective management and operations. Adhering to audit guidelines ensures continuity of quality enforcement and best practices. Using a checklist in the aforementioned procedure ensures that it functions as an enforcement tool applicable to the regulated authorities with duties in environmental enforcement.<sup>451</sup> Indeed, the checklist can sometimes be used as a tool in all areas of enforcement as it requires uniform enforcement procedures of the authorities. Finally, the

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<sup>448</sup> Sam, Peter A. *International Environmental Consulting Practice: How and Where to Take Advantage of Global Opportunities*. New York: Wiley, 1999. Print. 115.

<sup>449</sup> Sam, Peter A. *Ibid.* 117

<sup>450</sup> Evans, James. *Environmental Governance*. Milton Park Abingdon: Routledge, 2012. Print.

<sup>451</sup> *Environmental Impact Assessment, Nepa National Environmental Policy Act and Related Requirements: ALI-ABA Course of Study Materials*. Philadelphia: American Law Institute, 1997. Print. 396.

facilitators can also be useful when gauging the effectiveness of legislation at the national level against what is recommended by the international standards.<sup>452</sup>

The facilitators and, in particular six of them, are very important. Several components reflect environmental law, and they all have a well-defined legal framework. The following are examples of six essential aspects of the facilitators for environmental law. The best practice facilitator is the first component that constitutes an effective and efficient environmental legislation. The best practice facilitators are the basic rules for enforcement of laws.<sup>453</sup> This component is significant as it helps in realizing sustainable practices where clear and sound laws are passed. In addition, these practices help in setting the precedence of the best path where environmental conservation is guaranteed and sustained. Other such best practice facilitators have been used widely in the Kingdom of Saudi Arabia as a checklist, based upon which authorities are decreed and enforced. Therefore, Best Practices facilitators are the cornerstones towards realizing the best environmental policies through a clearly defined audit.<sup>454</sup>

The second element for environmental law compliance refers to enforceable and manageable goals or objectives that are easily monitored. In order to formulate effective environmental standards, the nature of the objective sought for is a matter of essence.<sup>455</sup> In this regard, the objectives set to be achieved must be capable of being enforced and managed by simple and straightforward procedures. Indeed, a manageable and enforceable objective takes recognition of the prevailing facts about the environment and its problems. The goals of the legal environmental frameworks in Saudi Arabia are very clear and in place, but it is too general and

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<sup>452</sup> Sam, Peter A. Ibid. 117

<sup>453</sup> Iacono, Max. *Human Resources Management, Corporate Citizenship and Small Business Development: Technical Report for Discussion*. Geneva: ILO, 1999. Print. 86

<sup>454</sup> *Leadership Resources: A Guide to Training and Development Tools*. Greensboro, N.C: Center for Creative Leadership, 1998. Print. 27.

<sup>455</sup> Sands, Philippe, Jacqueline Peel, Aguilar A. Fabra, and Ruth Mackenzie. *Principles of International Environmental Law*. Cambridge: Cambridge University Press, 2012. Print. 539.

does not define any forms of monitoring, compliance and enforcement.<sup>456</sup> Adopting a clearly defined goal requires it to have enforceable and manageable objectives that can easily be monitored.

The third essential component of environmental law is that it must have regulations that are clearly accessible and enforceable.<sup>457</sup> Just like the goals, regulations must have high degree clarity and must be accessible for any usage at any time. The overall framework of environmental legislation requires being enforceable by the authority, and this should extend to the public. In the Kingdom of Saudi Arabia, environmental legislation is in place and has a comprehensive framework, although it lacks clear, accessible, enforceable, and transparent regulations.<sup>458</sup> This is yet another challenge attributed to the environmental regulations in Saudi Arabia.

The fourth critical element to an environmental law is that it requires the establishment of an institution that would ensure compliance and provide an elaboration of all relevant agencies' responsibilities and roles.<sup>459</sup> This is the best way that any possible issue and complaints can be handled by the agency. Setting such institutions is breakthrough to minimizing complaints, and also enhances integration of ideas from multiple stakeholders, who would have the platform to give their suggestions, or discredit any legislation deemed unrealistic.<sup>460</sup> Saudi Arabia has such institutions, though there is a lack of coordination and cooperation in the inter-agency relationships, thus rendering environmental coordination of these institutions dysfunctional.

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<sup>456</sup> Sands, Philippe, Jacqueline Peel, Aguilar A. Fabra, and Ruth Mackenzie. Ibid. 540

<sup>457</sup> Macrory, Richard. *Regulation, Enforcement and Governance of Environmental Law*. London: Cameron May, 2008. Print. 261

<sup>458</sup> Bell, Stuart, Donald McGillivray, and Ole W. Pedersen. *Environmental Law*. , 2013. Print. 269.

<sup>459</sup> Macrory, Richard. Ibid. 262

<sup>460</sup> Bell, Stuart, Donald McGillivray, and Ole W. Pedersen. Ibid. 271

Without inter-agency cooperation, the roles of authority are confused and undefined, and compliance or enforcement fails.

The fifth component for environmental legislations is effective monitoring methods and procedures for documenting and keeping.<sup>461</sup> An effective system must have records to permit analysis and enable corrections to be made. Therefore, valid environmental legislation has very comprehensive and effective monitoring methods and procedures for documenting and keeping records.<sup>462</sup> In the Kingdom of Saudi Arabia, there are no clear monitoring methods and procedures for documenting and record keeping.

The sixth and last element of environmental legislation refers to punitive compliance and regulation. Punitive mechanisms are ideal in any system that has guided structures of control. Under this step, formulation and enforcement of environmental legislation must be regulated by the law of compliance, thus leading to standardized operations.<sup>463</sup> In Saudi Arabia, there is a punitive mechanism that defines violations and penalties; however it lacks a pro-active enforcement. Without an environmental management system, criminal sanctions have no effect since the environment trends continue despite occasional fines or penalties. Occasional fines do not reform harmful conduct and do not deter misconduct. A system for compliance is needed. The next section discusses strategies for enforcement management

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<sup>461</sup> *Environmental Management Framework for Ports and Related Industries*. Brussels, Belgium: PIANC General Secretariat, 1999. Print. 32.

<sup>462</sup> *Environmental Management Framework for Ports and Related Industries*. Ibid. 34

<sup>463</sup> Artiola, Janick, Ian L. Pepper, and Mark L. Brusseau. *Environmental Monitoring and Characterization*. Burlington: Elsevier, 2004. Internet resource. 358.

### 8.3.3 Strategies for Enforcement Management

Full implementation and realization of the above stated initiatives require that the PME develop enforcement strategies that outline both long and short-term actions and activities.<sup>464</sup> Its success calls for collaboration with ministries. For instance AMARAs and AMANAs have ministries with responsibilities over environmental issues.

### 8.3.4 Overall Contents of an Enforcement Strategy

The Kingdom would be well served to adopt an environmental enforcement strategy based (as appropriate) on best available practices already in use elsewhere, as is explained by INECE. The following principles could sensibly be given preference in developing this strategy:

- a) Legal administrative practice and procedures should be applicable to all authorities and jurisdictions involved in environmental regulations.<sup>465</sup>
- b) Facilitators of Best Practice should be employed using each of the five key components.
- c) A legal basis for promotions involved in the enforcement and compliance structures.
- d) Pro-active approaches to enforcement management should be given priority.<sup>466</sup>
- e) Monitoring, documenting and recordkeeping of all environment cases should be established.
- f) Transparent strategies, regulations, and policies should be ensured to ensure public support and voluntary compliance.<sup>467</sup>

The next section discusses environmental auditing standards, which are in the ISO 14000 standards. The Kingdom should consider adopting these standards.

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<sup>464</sup> Paddock, LeRoy. *Compliance and Enforcement in Environmental Law: Toward More Effective Implementation*. Cheltenham, UK: Edward Elgar, 2011. Internet resource. 393.

<sup>465</sup> Martin, Paul V, and Miriam Verbeek. *Sustainability Strategies*. Annandale, N.S.W: Federation Press, 2005. Print. 176.

<sup>466</sup> Paddock, LeRoy. Ibid. 395

<sup>467</sup> Martin, Paul V, and Miriam Verbeek. Ibid. 178

### 8.3.5 ISO standards

The International Standards Organization (the “ISO”) based in Geneva, Switzerland, is comprised of 160 members consisting of national institutions from diverse countries. The member countries hail from all over the world, irrespective of whether they are in transition, developed or industrialized. The standards that the ISO generates provide specifications for goods, services, and other products with an aim of making industry most effective and efficient. The body was developed through a global consensus as a way to enhance international trade.<sup>468</sup> ISO standard number 14000 represents a series of environmental management standards developed and published by ISO for various organizations. This section of ISO provides a framework for organizations that require systematization and improvement of their environmental management efforts.<sup>469</sup> The ISO 14000 series is comprised of the 14001 environmental management system (“EMS”) standards that involve environmental auditing, labelling, performance evaluation, and life-cycle assessment.

#### a. The ISO 14000 standards and ISO 14001:2004

The standards comprise an almost universal consensus on efficient business and environmental practices. Such standards address various environmental aspects with an aim of providing practical tools for both organizations and companies interested in conserving the environment.<sup>470</sup> And they support companies in controlling and implementing their activities for sustainable development. The ISO in itself provides a globally recognized framework that gives

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<sup>468</sup> Burhenne-Guilmin, Françoise. *Environmental Law in Developing Countries: Selected Issues*. Gland, Switzerland: IUCN, 2001. Print. 22.

<sup>469</sup> Burhenne-Guilmin, Françoise. Ibid. 23

<sup>470</sup> Teuteberg, Frank, and Jorge M. Gomez. *Corporate Environmental Management Information Systems: Advancements and Trends*. Hershey: Business Science Reference, 2010. Print. 219.  
<http://www.worldcat.org/title/corporate-environmental-management-information-systems-advancements-and-trends/oclc/468978043>

attention to environmental management systems. Other standards within the level focus on other aspects such as communication, auditing, and life-cycle analysis.<sup>471</sup> The body also sets the criteria under which environmental management systems can be certified. Such set standards remain applicable to any firm or organization regardless of their activities and sector. They facilitate organizations in managing effects of their activities on the environment and demonstrate environment friendly behaviour.<sup>472</sup> The benefits of adopting ISO 14001:2004 include low consumption of materials and energy, low distribution costs, effective waste management and ultimately enhanced corporate image among customers, regulators, and the public.<sup>473</sup>

As noted above, ISO 14001 provides a framework for environmental management best practice to help organizations, especially in minimizing their environmental footprint.<sup>474</sup> EMS encourages companies to perpetually enhance their environmental performance so the system resembles a continuous cycle of events. At first, the company engages an environmental policy, uses it in establishing a plan, and then sets objectives channelled towards improving environmental performance.<sup>475</sup> The next move is implementation followed by the company's evaluation of performance in relation to the environment and gauges whether it has met its aims.

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<sup>471</sup> Brandon, Elizabeth. *Global Approaches to Site Contamination Law*. Dordrecht: Springer, 2013. Internet resource. 75. The book describes the complex and variable laws addressing site contamination, reviewing existing international, regional and national laws of relevance to site contamination. It also offers detailed case studies of national approaches to the issue, and goes on to explore avenues for promoting the development of comprehensive domestic laws on site contamination, with a focus on the role of international law and actors. A detailed discussion analyzes such variations as a binding international legal instrument, "a non-binding instrument, and a model framework for site contamination management.

<sup>472</sup> Teuteberg, Frank, and Jorge M. Gomez. *Corporate Environmental Management Information Systems: Advancements and Trends*. Hershey: Business Science Reference, 2010. Print. 219. This book summarizes the state of the art in the emergent field of Corporate Environmental Management Information Systems, showing researchers, managers, engineers and information technology specialists how to develop and implement effective CEMIS"-- Provided by publisher.

<sup>473</sup> Teuteberg, Frank, and Jorge M. Gomez. Ibid. 220

<sup>474</sup> Edwards, A J. *Iso 14001 Environmental Certification Step by Step*. Oxford: Elsevier Butterworth-Heinemann, 2004. Internet resource.25.

<sup>475</sup> Edwards, A J.Ibid. 27

If it fails to meet its goals, the company takes corrective actions. Evaluation outcomes undergo review by the top management to determine whether EMS is effective or not.<sup>476</sup> Upon failure, the management revisits the policy and sets new goals in a revised plan and format. After all these, the company then implements the revision and evaluates the goals and the cycle continues until they record improvement. Taking the example of Saudi Aramco EMS, its Environmental Protection Department has introduced an EMS for operating its systems and facilities. The company stands in the forefront of meeting the goals of ISO 14001.

Saudi Aramco's EMS aims at fostering continuous environmental improvement and facilitates the transfer of its operating systems from environmental compliance to environmental performance.<sup>477</sup> The EMS provides grounds and systematic programs to boost its aim of achieving superior environmental performance. It also aims at substantially enhancing its abilities to identify, anticipate, and manage interactions with the environment through reduction, avoidance, and control of adverse environmental impacts. Accomplishment of the EMS model proves only possible through the practice of planning, checking, acting, and enforcing. The next chapter tackles environmental management systems and their significance to the enforcement of legislation.

## **b. Environmental Management Systems**

From the foregoing discussion, it is stated that EMS is strategic to companies as it helps them achieve their environmental goals through persistent and consistent control of their operations. The key assumption behind the operation of the EMS system to the company is that enhanced

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<sup>476</sup> Jackson, Suzan L. *The Iso 14001 Implementation Guide: Creating an Integrated Management System*. New York: J. Wiley, 1997. Print. 123

<sup>477</sup> Jackson, Suzan L. *Ibid.* 124



control has significant capacity to environmental performance to a company.<sup>478</sup> However, EMS has control over the performance of the companies as every company sticks to its respective objectives. The following are some primary elements of EMS.

- EMS undertakes a review of environmental goals of a company.<sup>479</sup>
- Analyzes legal requirements and environmental impacts.
- Sets objectives with the view of reducing environmental impact.<sup>480</sup>
- Establishes relevant programs that will facilitate attainment of various goals.
- Helps in monitoring progress towards objectives.
- Aids in promoting environmental competence and awareness.
- Reviews the progress and makes improvements to the EMS.

In the international environmental context, a common model, referred as “Stages of Environmental Awareness” is used among NGOs.<sup>481</sup> This model was first used in Costa Rica in 1999, during a consultative convention of the Earth Charter by the Earth Council. The analysis of this model suggest that environmental legal procedures should address the following issues in order to become effective:

- I. Enhance the means of nurturing and sustaining scientific research with the view of identifying problems in stage one, when environmental problem are emerging but not yet perceived.

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<sup>478</sup> *Environmental Management Systems: A Tool to Help Water Utilities Manage More Effectively*. Denver, Colo: Awwa Research Foundation, 2006. Print.

<sup>479</sup> Banerjee, B. *Corporate Environmental Management: A Study with Reference to India*. New Delhi: PHI Learning Pvt Ltd, 2009. Print.57.

<sup>480</sup> Weiß, Philipp, and Jörg Bentlage. *Environmental Management Systems and Certification*. Uppsala: Baltic University Press, 2006. Print. 86

<sup>481</sup> Thomas, Ian G. *Environmental Management: Processes and Practices for Australia*. , 2005. Print.

- II. Formulate scientific analysis and strategic measures so as to promote education and awareness to help solve problems arising in stage 2, when problems are perceived but not yet being solved.
- III. Address societal problems in stage three by integrating scientific knowledge into critical discussions, so that competent measures of compliance and enforcement are resolving the problems.
- IV. Must undertake measures aimed at institutionalizing agreed solutions and on the means of periodically assessing their effectiveness. This technique prevents reoccurrence of problems in the society.<sup>482</sup> This level four is a sustainable system to prevent environmental problems from recurring.
- V. Applying Practices Endorsed by INECE, to ensure compliance.

There are 3000 organizations both governmental and non-governmental within the International Network for Environmental Compliance and Enforcement.<sup>483</sup> This institution has compliance practitioners in over 150 countries. The main objective of INECE is to steer the development of networks for cooperation and enforcement as well as raising awareness of compliance and enforcement. This institution is equally charged with the mandate of promoting the use of both regulatory and non-regulatory concepts with the view of increasing compliance with the environmental regulations and laws.<sup>484</sup> These regulations generate huge impact at all levels of administration national, and global as they promote protection of the ecosystem's integrity. To advance its work, INECE published its Principles of Environmental Compliance Directory in

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<sup>482</sup> Weiß, Philipp, and Jörg Bentlage. Ibid.88

<sup>483</sup> Jackson, Suzan L. *The Iso 14001 Implementation Guide: Creating an Integrated Management System*. New York: J. Wiley, 1997. Print.

<sup>484</sup> Massey, Stephen. *Best Practices for Environmental Project Teams*. Amsterdam: Elsevier, 2011. Internet resource. 36.

2009, which is critical in providing guidance on key issues of environmental concerns.<sup>485</sup> The main issues integrated in this book include: setting priorities, design of effective requirements, monitoring compliance, and undertaking various enforcement responses to the set regulations.

Other than the concerns described above, this book was intended to present some principles crucial to environmental compliance as a five-step cycle. Under the five cycles a number of issues were presented including: goals and strategies, shared responsibilities, good governance by the use of rules of law, evaluation and improvement, and structures and resources. These five cycles are uniquely valuable for successful implementation of sustainable environmental regulations and policies. In its book INECE examines the concepts behind successful compliance and enforcement strategies. In a nutshell, this book explains significant types of compliance and enforcement programs and their associated theories, and its benefits to the general regulatory mandate.

Principally, this book describes 12 principles that are essential for effective compliance and enforcement of environmental regulations. The twelve principles can be grouped into five major headings. These groups are equally important in synthesizing environmental regulation frameworks. The five groups are:

- i. Responsibility, structure, and resources.
- ii. Vision, goals, and strategies.
- iii. Improvement and continuous evaluation.
- iv. Rule of the law and governance.
- v. Commitment to the environment.

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<sup>485</sup> *Environmental Performance Reviews: <czech>*. Paris: OECD, 2005. Print. 2002.

These five groups provide an overview of typical environmental compliance incentive programs. These concepts include market-based, voluntary and mandatory management concepts. As this summary shows, INECE provides captivating ideas on environmental enforcement for the conservation of the entire environment. This approach is invaluable for the enforcement of regulations, as cited in the previous chapters.

Saudi Arabia needs an enforcement strategy that can, on an ambitious time-table ensure that initiatives and activities are implemented in a manner that strengthens the current management system in Saudi Arabia.<sup>486</sup> This mandate is critical to ensuring that all regulatory and enforcement bodies are enjoined in the formulation of environmental policies to meet the pressing demands. In addition, the goals are firmly held to reforming an old system that has hampered the progress of environmental regulation through enforcing better policies. In order to realize these goals, establishing a Committee of Performance Evaluation is a gateway to providing substantial strengthening and improvement of management of environmental resources.<sup>487</sup> This Committee would be charged with the mandate of overseeing the enforcement and development of uniform administrative procedures that will help unveil monitoring guidelines. The Committee can be empowered and given the necessary tools aimed at generating changes and incorporating effective practices, within the shortest time feasible. By empowering this Committee, a lot of opportunities will be created that will enhance the realization of shared goals in environmental regulation, through enforcing viable guidelines and standards. The promise of this Committee will be to ensure that current ineffective systems are either reformed enhanced or eliminated from the enforcement systems.<sup>488</sup> With this mandate bestowed on the

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<sup>486</sup> Kannan, A. *Global Environmental Governance and Desertification: A Study of Gulf Cooperation Council Countries*. New Delhi: Concept Pub. Co, 2012. Print. 151.

<sup>487</sup> Gallagher, Kevin P. *Handbook on Trade and the Environment*. Cheltenham [etc.: Edward Elgar, 2009. Print. 316.

<sup>488</sup> Gallagher, Kevin P. *Ibid.* 218

Committee, Saudi Arabia can expect transformation within the environmental portfolio. The next section is about developments arising from this new enforcement strategy. The following are the phases proposed as components of the enforcement strategy.

### **c. Developments of an Enforcement Strategy**

In *Implementing Strategic Environmental Assessment*, Michael Schmidt, Elsa Joao, Eike Albrecht and their colleagues argue that an effective enforcement strategy requires several distinct elements: awareness planning, implementation, changing behaviors, assessing effects and responsible authority. This section explains the necessity for each and what it offers planners in a country like Saudi Arabia.

The first component refers to awareness planning, which is an offshoot of setting objectives and strategic planning.<sup>489</sup> This stage is purposely designed to overcome the shortcomings in the Kingdom's enforcement management system. This component is vital towards ensuring a proper and a working enforcement management system.<sup>490</sup> Actions through reinforcement management are ideal in providing the best guidelines that will determine the enforcement procedure.

Implementation is the second and basic platform of environmental enforcement. Delivering a successful implementation of strategy, objectives, and its actions needs a strict emphasis on the available requirements.<sup>491</sup> However, the means to get requirements compliance depends on the compliance indicators. Implementation of set objectives must be in line with the

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<sup>489</sup> *Environmental Performance Reviews: Second Review*. New York: United Nations, 2007. Print. 27.

<sup>490</sup> *Environmental Performance Reviews*. Ibid. 32

<sup>491</sup> Paddock, Ibid. 162.

regulatory frameworks under the enforcement policy.<sup>492</sup> It creates a firm foundation on which basic procedures of environmental regulation can be observed and enhanced.

Behavioral change is yet another significant component. Important changes should be noted upon successful implementation of the enforcement strategy.<sup>493</sup> The changes are evident in both the citizens and the government upon the implementation stage, which must be noted keenly as part of behavioral change. With viable avenue in noting behavioral change, people get a clear understanding of what enforcement and compliance entails.<sup>494</sup> Therefore, full compliance with enforcement process must integrate a vivid behavioral change model. This process will supplement the implantation stage towards a realization of firm and effective enforcement and regulation policies.

The effects stage is fundamental for strategies that provide the authorities with the essential performance indicators necessary for carrying out monitoring and thus enhancing effective compliance.<sup>495</sup> Therefore, the effects are a platform on which compliance guidelines are set and administered by the relevant environmental regulatory authorities. In addition, this platform entails how effective a measure becomes upon implementation.

With time, the PME should be charged with the responsibility of delegating roles to the authority in charge of enforcing environmental strategies. Responsible authority is thus the last component under this category. With the appointment of this authority, it will have the responsibility of keeping the compliance in line with best practices.<sup>496</sup> With these clarified

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<sup>492</sup> Schmidt, Michael, Elsa M. João, and Eike Albrecht. *Implementing Strategic Environmental Assessment*. Berlin: Springer, 2005. Internet resource. 228.

<sup>493</sup> Ahmed, Kulsum, and Triana E. Sánchez. *Strategic Environmental Assessment for Policies: An Instrument for Good Governance*. Washington, DC: World Bank, 2008. Print.197.

<sup>494</sup> Ahmed, Kulsum, and Triana E. Sánchez. Ibid. 198

<sup>495</sup> Faure, M, and N Niessen. *Environmental Law in Development: Lessons from the Indonesian Experience*. Cheltenham: Edward Elgar Pub, 2006. Internet resource. 177.

<sup>496</sup> Liebenthal, Andrés. *Promoting Environmental Sustainability in Development: An Evaluation of the World Bank's Performance*. Washington, DC: World Bank, 2002. Print.26.

responsibilities, the PME would achieve its long-term objectives by ensuring management of the compliance actions. PME would be tasked with the mandate of ensuring that every strategy adopted in environmental regulations remains aligned with other policy changes, legislative amendments and enforcement initiatives. In addition, it would develop evaluation procedures and a five-year plan to ensure total and real-time quality assurance.<sup>497</sup> With such a system in place, the PME will establish the grounds upon which enduring improvements can be realized.

Close coordination between the PME and other ministries is key to realizing these objectives. Joint efforts between PME and other stakeholders with authority over environmental management and Committee of Performance Evaluation would foster sustainable enforcement on environmental regulations.<sup>498</sup> This cooperation is crucial, as it contributes towards the realization of the set goals and objectives. PME must be ready to welcome ideas from other bodies, even though it commands the primary enforcement authority. In a nutshell, efforts carried out jointly by all government entities with a stake in environmental regulation and enforcement is critical to ensuring long lasting solutions to environmental control in Saudi Arabia.

The previous sections have discussed some of the best aspects of compliance and enforcement found to work elsewhere and argued for applying them in Saudi Arabia. The first part reiterated the three constructs of environmental regulations in Saudi Arabia. The Kingdom lags behind the international best management standards in this field. For example, the U.S. federal system has more elaborate mechanisms for reviewing and enforcing regulations.<sup>499</sup> This system confers the advantages that come with having more complete information. Most notably

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<sup>497</sup> Liebenthal, Andrés. Ibid. 28

<sup>498</sup> Marsden, Simon. *Strategic Environmental Assessment in International and European Law: A Practitioner's Guide*. London: EARTHSCAN, 2008. Internet resource. 159

<sup>499</sup> *Enforcement of Environmental Regulations: Hearings Before the Subcommittee on Environmental Pollution of the Committee on Environment and Public Works, United States Senate, Ninety-Sixth Congress, First Session, May 23 and 24, 1979*. Washington: U.S. Govt. Print. Off, 1979. Print. 242.

among these are strategies designed to tackle situations as they actually exist, without creating undue burdens on the government or the people.

Public concern and participation is another fundamental element of ensuring proper enforcement of environmental regulations in a country. The people, who are perceived to hold the ultimate place in the implementation hierarchy, must be involved in the enforcement of these regulations. The Saudi system still falls short in this regard as it lacks robust systemic opportunities to involve the public in environmental regulation.<sup>500</sup> Wise enforcement models integrate various social aspects as well as legal practices. Efficient and effective legal frameworks are necessary for creating public awareness to support enforcement. On the other hand, poor legal frameworks inhibit free and transparent enforcement process.<sup>501</sup> Other issues discussed in this chapter that could considerably improve implementation include the creation of a Committee of Performance Evaluation, adopting facilitators of the best practices, and outlining ISO standards and integrating them to the enforcement plan.

Finally, the environmental integration plan requires strong pillars for an Environmental Management System, which prescribes procedures on the conduct of individuals and corporate bodies. The Kingdom has taken some important steps to realize full enforcement of environmental regulations.<sup>502</sup> This chapter offers concrete suggestions about how to build on these efforts. Saudi Arabia can adapt and adopt best practices. By doing so, the Kingdom will soon match the effectiveness of the widely lauded enforcement and implementation programs of the U.S. EPA. No doubt the Kingdom deserves and can achieve this level of excellence. The sustainable development of the Kingdom depends on its building up the strength of its

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<sup>500</sup> *Enforcement of Environmental Regulations*:. Ibid. 243

<sup>501</sup> Oberthür, Sebastian, and Thomas Gehring. *Institutional Interaction in Global Environmental Governance: Synergy and Conflict Among International and EU Policies*. Cambridge, Mass: MIT Press, 2006. Internet resource. 177.

<sup>502</sup> Oberthür, Sebastian, and Thomas Gehring. Ibid. 178



environmental protection pillar. Fortunately, the legal tools exist to accomplish this. It is time for the Kingdom to select appropriate tools to use to ensure its future sustainable development. The next chapter explores some of these measures available to Saudi Arabia.

## Works Cited for Chapter 8

- 101 Checklists for Successful Business in the Gulf: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, UAE*. Geneva, Switzerland: Business International, 1988. Print.  
<http://www.worldcat.org/title/101-checklists-for-successful-business-in-the-gulf-bahrain-kuwait-oman-qatar-saudi-arabia-uae/oclc/24102386>
- A Study on the Evaluation of Environmental Impact Assessment in Selected ESCWA Countries*. New York: UN, 2002. Print. <http://www.worldcat.org/title/study-on-the-evaluation-of-environmental-impact-assessment-in-selected-escwa-countries/oclc/123415224>
- Ahmed, Kulsum, and Triana E. Sánchez. *Strategic Environmental Assessment for Policies: An Instrument for Good Governance*. Washington, DC: World Bank, 2008. Print.  
<http://www.worldcat.org/title/strategic-environmental-assessment-for-policies-an-instrument-for-good-governance/oclc/191024008>
- Alberton, Mariachiara, and Francesco Palermo. *Environmental Protection in Multi-Layered Systems: Comparative Lessons from the Water Sector*. Leiden: M. Nijhoff Publishers, 2012. Print. <http://www.worldcat.org/title/environmental-protection-in-multi-layered-systems-comparative-lessons-from-the-water-sector/oclc/80105186>
- Althunayan, Turki. *Dealing with the Fragmented International Legal Environment: Wto, International Tax and Internal Tax Regulations*. Berlin: Springer, 2010. Print.  
<http://www.worldcat.org/title/dealing-with-the-fragmented-international-legal-environment-wto-international-tax-and-internal-tax-regulations/oclc/449851705>
- Artiola, Janick, Ian L. Pepper and Mark L. Brusseau. *Environmental Monitoring and Characterization*. Burlington: Elsevier, 2004. Internet resource.  
<http://www.worldcat.org/title/environmental-monitoring-and-characterization/oclc/225441896>
- Banerjee, B. *Corporate Environmental Management: A Study with Reference to India*. New Delhi: PHI Learning Pvt Ltd, 2009. Print. <http://www.worldcat.org/title/corporate-environmental-management-a-study-with-reference-to-india/oclc/704513121>
- Brandon, Elizabeth. *Global Approaches to Site Contamination Law*. Dordrecht: Springer, 2013. Internet resource. <http://www.worldcat.org/title/global-approaches-to-site-contamination-law/oclc/820358853>
- Bryner, Gary C. *Gaia's Wager: Environmental Movements and the Challenge of Sustainability*. Lanham, MD: Rowman & Littlefield, 2000. Print. <http://www.worldcat.org/title/gaias-wager-environmental-movements-and-the-challenge-of-sustainability/oclc/248111787>
- Burhenne-Guilmin, Françoise. *Environmental Law in Developing Countries: Selected Issues*. Gland: IUCN, 2001. Print. <http://www.worldcat.org/title/environmental-law-in-developing-countries-selected-issues/oclc/319215584>
- Clements, Frank. *Saudi Arabia*. Oxford: Clio Press, 1988. Print.  
<http://www.worldcat.org/title/saudi-arabia/oclc/20635670>
- Code of Federal Regulations, Title 40, Protection of Environment, Part 63 (sections 63.600-63.1199), Revised As of July 1, 2011*. United States Government Printing Office, 2011.

- Print. <http://www.worldcat.org/title/code-of-federal-regulations-title-40-protection-of-environment-part-63-sections-63600-631199-revised-as-of-july-1-2011/oclc/759173306>
- Collin, Robert W. *The Environmental Protection Agency: Cleaning Up America's Act*. Westport, CT: Greenwood, 2006. Print. <http://www.worldcat.org/title/environmental-protection-agency-cleaning-up-americas-act/oclc/427538982>
- Croci, Edoardo. *The Handbook of Environmental Voluntary Agreements: Design, Implementation and Evaluation Issues*. Dordrecht: Springer, 2005. Internet resource. <http://www.worldcat.org/title/handbook-of-environmental-voluntary-agreements-design-implementation-and-evaluation-issues/oclc/209845365>
- Donnelly, Annie, Barry Dalal-Clayton, and Ross Hughes. *A Directory of Impact Assessment Guidelines*. London: International Institute for Environment and Development, 1998. Print. <http://www.worldcat.org/title/a-directory-of-impact-assessment-guidelines/oclc/246091477>
- Edwards, A J. *Iso 14001 Environmental Certification Step by Step*. Oxford: Elsevier Butterworth-Heinemann, 2004. Internet resource. <http://www.worldcat.org/title/iso-14001-environmental-certification-step-by-step/oclc/162591130>
- Enforcement of Environmental Regulations: Hearings Before the Subcommittee on Environmental Pollution of the Committee on Environment and Public Works, United States Senate, Ninety-Sixth Congress, First Session, May 23 and 24, 1979*. Washington: U.S. Government. Print. Office 1979. Print. <http://www.worldcat.org/title/enforcement-of-environmental-regulations-hearings-before-the-subcommittee-on-environmental-pollution-of-the-committee-on-environment-and-public-works-united-states-senate-ninety-sixth-congress-first-session-may-23-and-24-1979/oclc/5901955>
- Environment & Planning*. London: Pion Ltd., 1974. Print. <http://www.worldcat.org/title/environment-planning-a/oclc/1945034>
- Environmental Cleanup at Navy Facilities: Adaptive Site Management*. Washington, DC: National Academies Press, 2003. Print. <http://www.worldcat.org/title/environmental-cleanup-at-navy-facilities-adaptive-site-management/oclc/839925019>
- Environmental Impact Assessment, NEPA National Environmental Policy Act and Related Requirements: ALI-ABA Course of Study Materials*. Philadelphia: American Law Institute, 1997. Print. <http://www.worldcat.org/title/environmental-impact-assessment-nepa-national-environmental-policy-act-and-related-requirements-ali-aba-course-of-study-materials/oclc/38826515>
- Environmental Management Framework for Ports and Related Industries*. Brussels, Belgium: PIANC General Secretariat, 1999. Print. <http://www.worldcat.org/title/environmental-management-framework-for-ports-and-related-industries/oclc/43479509>
- Environmental Management Systems: A Tool to Help Water Utilities Manage More Effectively*. Denver, CO: Awwa Research Foundation, 2006. Print. <http://www.worldcat.org/title/environmental-management-systems-a-tool-to-help-water-utilities-manage-more-effectively/oclc/70870639>
- Environmental Performance Reviews: <Czech>*. Paris: OECD, 2005. Print. 2002.

- Environmental Performance Reviews: Second Review*. New York: United Nations, 2007. Print.  
<http://www.worldcat.org/title/environmental-performance-reviews-republic-of-montenegro-second-review/oclc/173205961>
- Evans, James. *Environmental Governance*. Milton Park Abingdon, Oxford: Routledge, 2012. Print. <http://www.worldcat.org/title/environmental-governance/oclc/701015746>
- Fauchald, Ole K., David Hunter, and Wang Xi. *Yearbook of International Environmental Law: Volume 19*. New York: Oxford University Press, n.d.. Print.  
<http://www.worldcat.org/title/yearbook-of-international-environmental-law-volume-19-2008/oclc/800567357>
- Faure, M., and N. Niessen. *Environmental Law in Development: Lessons from the Indonesian Experience*. Cheltenham: Edward Elgar Pub, 2006. Internet resource.  
<http://www.worldcat.org/title/environmental-law-in-development-lessons-from-the-indonesian-experience/oclc/476020532>
- Gallagher, Kevin P. *Handbook on Trade and the Environment*. Cheltenham: Edward Elgar, 2009. Print.
- Gerrard, Michael, and Sheila R. Foster. *Law of Environmental Justice: Theories and Procedures to Address Disproportionate Risks*. Chicago, Ill: American Bar Association, Section of Environment, Energy, and Resources, 2008. Print. <http://www.worldcat.org/title/law-of-environmental-justice-theories-and-procedures-to-address-disproportionate-risks/oclc/212021683>
- Halbert, Terry, and Elaine Ingulli. *Law & Ethics in the Business Environment*. Mason, OH: South-Western Cengage Learning, 2012. Print. <http://www.worldcat.org/title/law-ethics-in-the-business-environment/oclc/700312277>
- Iacono, Max. *Human Resources Management, Corporate Citizenship and Small Business Development: Technical Report for Discussion*. Geneva: ILO, 1999. Print.  
<http://www.worldcat.org/title/human-resources-management-corporate-citizenship-and-small-business-development-technical-report-for-discussion/oclc/45345458>
- Jabbara, Joseph G, and O P. Dwivedi. *Governmental Response to Environmental Challenges in Global Perspective*. Amsterdam: IOS Press, 1998. Print.  
<http://www.worldcat.org/title/governmental-response-to-environmental-challenges-in-global-perspective/oclc/300261679>
- Jackson, Suzan L. *The ISO 14001 Implementation Guide: Creating an Integrated Management System*. New York: J. Wiley, 1997. Print. <http://www.worldcat.org/title/iso-14001-implementation-guide-creating-an-integrated-management-system/oclc/300170030>
- Johany, Ali D., Michel Berne, and J.W. Mixon. *The Saudi Arabian Economy*. Baltimore: Johns Hopkins University Press, 1986. Print. <http://www.worldcat.org/title/saudi-arabian-economy/oclc/13003489>
- Kaebnick, Gregory E, and Lori P. Knowles. *Reprogenetics: Law, Policy, and Ethical Issues*. Baltimore, MD: Johns Hopkins University Press, 2007. Internet resource.  
<http://www.worldcat.org/title/reprogenetics-law-policy-and-ethical-issues/oclc/794701445>

- Kannan, A. *Global Environmental Governance and Desertification: A Study of Gulf Cooperation Council Countries*. New Delhi: Concept Pub. Co., 2012. Print.
- Kelemen, R.D. *The Rules of Federalism: Institutions and Regulatory Politics in the Eu and Beyond*. Cambridge, MA: Harvard University Press, 2004. Internet resource.  
<http://www.worldcat.org/title/rules-of-federalism-institutions-and-regulatory-politics-in-the-eu-and-beyond/oclc/648548427>
- Khan, Nuzrat Y, Mohiuddin Munawar and Andrew R. G. Price. *The Gulf Ecosystem: Health and Sustainability*. Leiden: Backhuys, 2002. Print. <http://www.worldcat.org/title/gulf-ecosystem-health-and-sustainability/oclc/248660893>
- Leadership Resources: A Guide to Training and Development Tools*. Greensboro, NC: Center for Creative Leadership, 1998. Print. <http://www.worldcat.org/title/leadership-resources-a-guide-to-training-and-development-tools/oclc/40183350>
- Liebenthal, Andrés. *Promoting Environmental Sustainability in Development: An Evaluation of the World Bank's Performance*. Washington, DC: World Bank, 2002. Print.  
<http://www.worldcat.org/title/promoting-environmental-sustainability-in-development-an-evaluation-of-the-world-banks-performance/oclc/248567410>
- Lovei, Magda, and Charles Weiss. *Environmental Management and Institutions in OECD Countries: Lessons from Experience*. Washington, DC: World Bank, 1998. Print.  
<http://www.worldcat.org/title/environmental-management-and-institutions-in-oecd-countries-lessons-from-experience/oclc/231789013>
- Macrory, Richard. *Regulation, Enforcement and Governance of Environmental Law*. London: Cameron May, 2008. Print. 261 <http://www.worldcat.org/title/regulation-enforcement-and-governance-of-environmental-law/oclc/213436022>
- Marsden, Simon. *Strategic Environmental Assessment in International and European Law: A Practitioner's Guide*. London: EARTHSCAN, 2008. Internet resource.  
<http://www.worldcat.org/title/strategic-environmental-assessment-in-international-and-european-law-a-practitioners-guide/oclc/300456149>
- Martin, Paul V, and Miriam Verbeek. *Sustainability Strategies*. Annandale, N.S.W: Federation Press, 2005. Print. <http://www.worldcat.org/title/sustainability-strategies/oclc/156748567>
- Massey, Stephen. *Best Practices for Environmental Project Teams*. Amsterdam: Elsevier, 2011. Internet resource. <http://www.worldcat.org/title/best-practices-for-environmental-project-teams/oclc/746769535>
- Meho, Lokman I. and Mona A. Nsouli. *Libraries and Information in the Arab World: An Annotated Bibliography*. Westport, CT: Greenwood Press, 1999. Print. 253.  
<http://www.worldcat.org/title/libraries-and-information-in-the-arab-world-an-annotated-bibliography/oclc/246031033>
- Metz, Helen C. *Saudi Arabia: A Country Study*. Washington, DC: Supt. of Docs., US Government Print. Office, 1992. Print. <http://www.worldcat.org/title/saudi-arabia-a-country-study/oclc/165153278>

- Miller, G.T. and Scott Spoolman. *Living in the Environment*. Pacific Grove, CA: Brooks/Cole Cengage Learning, 2012. Print. <http://www.worldcat.org/title/living-in-the-environment/oclc/728840318>
- Miller, G T, and Scott Spoolman. *Living in the Environment: Concepts, Connections, and Solutions*. Belmont, CA: Thomson Brooks/Cole, 2009. Print. <http://www.worldcat.org/title/living-in-the-environment-concepts-connections-and-solutions/oclc/226358126>
- Mintz, Joel A. *Enforcement at the EPA: High Stakes and Hard Choices*. Austin: University of Texas Press, 1996. Print. <http://www.worldcat.org/title/enforcement-at-the-epa-high-stakes-and-hard-choices/oclc/123257382>
- Morella Erica. Public Comment Periods and Federal Environmental Impact Statements: Potentials and Pitfalls from the American Experience. 2013. *Michigan Journal of Sustainability*. <http://quod.lib.umich.edu/m/mjs/12333712.0001.008/--public-comment-periods-and-federal-environmental-impact?rgn=main;view=fulltex>
- Mostyn, Trevor. *Saudi Arabia*. London: Middle East Economic Digest, 1983. Print. 21. <http://www.worldcat.org/title/saudi-arabia/oclc/10509666>
- Oberthür, Sebastian and Thomas Gehring. *Institutional Interaction in Global Environmental Governance: Synergy and Conflict Among International and EU Policies*. Cambridge, Mass: MIT Press, 2006. Internet resource. <http://www.worldcat.org/title/institutional-interaction-in-global-environmental-governance-synergy-and-conflict-among-international-and-eu-policies/oclc/191935456>
- Paddock, LeRoy. *Compliance and Enforcement in Environmental Law: Toward More Effective Implementation*. Cheltenham, UK: Edward Elgar, 2011. Internet resource. <http://www.worldcat.org/title/compliance-and-enforcement-in-environmental-law-toward-more-effective-implementation/oclc/753966336>
- Research Grants Program*. Washington, DC: National Academies Press, 2003. Print. <http://www.worldcat.org/title/measure-of-star-review-of-the-us-environmental-protection-agencys-science-to-achieve-results-star-research-grants-program/oclc/839924964>
- Sam, Peter A. *International Environmental Consulting Practice: How and Where to Take Advantage of Global Opportunities*. New York: Wiley, 1999. Print. <http://www.worldcat.org/title/international-environmental-consulting-practice-how-and-where-to-take-advantage-of-global-opportunities/oclc/39299389>
- Sands, Philippe, Jacqueline Peel, Aguilar A. Fabra and Ruth Mackenzie. *Principles of International Environmental Law*. Cambridge: Cambridge University Press, 2012. Print. 539. <http://www.worldcat.org/title/principles-of-international-environmental-law/oclc/760904889>
- Sands, Philippe. *Principles of International Environmental Law*. Cambridge: Cambridge Univ. Press, 2003. Print. <http://www.worldcat.org/title/principles-of-international-environmental-law/oclc/237827003>

- Schmidt, Michael, Elsa M. João, and Eike Albrecht. *Implementing Strategic Environmental Assessment*. Berlin: Springer, 2005. <http://www.worldcat.org/title/implementing-strategic-environmental-assessment/oclc/209856330>
- Shoult, Anthony. *Doing Business with Saudi Arabia*. London: Blue Ibex Ltd, 2005. Print. <http://www.worldcat.org/title/doing-business-with-saudi-arabia/oclc/475965639>
- Taher, Nahed, and Bandar Hajjar. *Energy and Environment in Saudi Arabia: Concerns & Opportunities*. Cham: Imprint: Springer, 2014. Internet resource. <http://www.worldcat.org/title/energy-and-environment-in-saudi-arabia-concerns-opportunities/oclc/867051941>
- Teuteberg, Frank, and Jorge M. Gomez. *Corporate Environmental Management Information Systems: Advancements and Trends*. Hershey, PA: Business Science Reference, 2010. Print. <http://www.worldcat.org/title/corporate-environmental-management-information-systems-advancements-and-trends/oclc/468978043>
- The Environmental Forum*. Washington, DC: Environmental Law Institute, 1982. Print. <http://www.worldcat.org/title/environmental-forum/oclc/8227987>
- The United States Government Manual, 2012*. Washington, DC: Office of the Federal Register, National Archives and Records Service Administration, 2012. Print. <http://www.worldcat.org/title/united-states-government-manual-2012/oclc/824167727>
- Thomas, Ian G. *Environmental Management: Processes and Practices for Australia*. 2005. Print. <http://www.worldcat.org/title/environmental-management-processes-and-practices-for-australia/oclc/255370553>
- Tortora, Marco. *Sustainable Systems and Energy Management at the Regional Level: Comparative Approaches*. Hershey, PA: Information Science Reference, 2012. Print. <http://www.worldcat.org/title/sustainable-systems-and-energy-management-at-the-regional-level-comparative-approaches/oclc/720025595>
- Weerakkody, Vishanth. *Social and Organizational Developments Through Emerging E-Government Applications: New Principles and Concepts*. Hershey, PA: Information Science Reference, 2010. Print. <http://www.worldcat.org/title/social-and-organizational-developments-through-emerging-e-government-applications-new-principles-and-concepts/oclc/406133211>
- Weiß, Philipp, and Jörg Bentlage. *Environmental Management Systems and Certification*. Uppsala: Baltic University Press, 2006. Print. <http://www.worldcat.org/title/environmental-management-systems-and-certification/oclc/243922227>
- World Economic Outlook*. Washington: IMF, 1999. Print. <http://www.worldcat.org/title/world-economic-outlook/oclc/813359643>

## **CHAPTER 9**

### **9. The Kingdom's sustainable future**

#### **9.1 Best practices for the Kingdom.**

The geography and economy of the Saudi Arabia exposes it to many sources of environmental degradation. Drawing on the previous chapters, this chapter points the way to a more sustainable future for the Kingdom. In doing so, it addresses more of the major sources of degradation and proposes adoption of best practices to harmonize the demands of the economy with the needs of the environment. As it has done in throughout this work, it will focus on the key issues of fresh water, energy, air, waste and the region's embattled maritime environment.

Due to its expansive coastlines on the Red Sea and the Gulf as well as the nature of its principle source of wealth (the oil industry), effluents can and frequently do lead to destructive pollution of the region's maritime environment. The Kingdom has important assets in place to protect the environment. The Kingdom has legal rules and agencies to enable such enforcement. PME and AMANA are such organizations that are mandated by the King to provide for proper environmental conduct through policy enactments and regulations. In addition, the country has a supportive religious group, which offers assistance towards environmental conservation. The role of Muslims in environmental conservation remains key to the country's sustainable agenda.

More remains to be done. The government should make concerted efforts by outlining standards to be followed by citizens, local governments and enterprises. Industrial production should be guided by the ISO 14000 standards and the EMS policies. Since the Kingdom endorses Agenda 21 and various outcomes and declarations in the key U.N. conferences on the environment and sustainable development, internationally embraced principles should also be enacted as laws.



The international agreements have created through consensus a binding set of obligations on environmental issues. Notably, the US and the EU have put them in place as guidelines and best practices that help in conserving their environments. These are collectively known as best management practices. These best practices result in laws, derived from the key agreements. In the USA, environmental laws define national standards, which the government administers with the view to managing its natural resources and enhancing environmental quality in ways designed to promote sustainable economic development. These standards fall under the best practices and are policy measures that the USA has made in order to advance its sustainable development. The European Union (along with its members) has adopted a similar approach. Its continued socio-economic growth also relies on strong environmental protection standards.

In the USA, the federal, state and local authorities take environmental laws seriously. In this regard, the United States has long-since enacted comprehensive legal policies to maintain its environment. These include the U.S. Clean Water Act of 1972, the Clean Air Act of 1970 and the National Environmental Policy Act of 1970 (“NEPA”), the Endangered Species Act of 1973, and solid and hazardous waste laws (most notably the Resource Conservation and Recovery Act of 1976). The Clean Water Act and Clean Air Act are used to regulate polluting activities by the private enterprises as well as by all governmental agencies. Through comprehensive legislation like this, the USA and later the EU set environmental standards that can apply to any private parties or any government agency. NEPA ensures that all agencies of the federal government, including the Army, Navy and Air Force, undertake a comprehensive environmental impacts assessment (EIA) before actually commencing various projects that may harm the environment. Moreover, these laws set benchmarks that mandate installation of pollutant-reducing technology and that limit the levels of pollution for power plants and factories.

The Kingdom of Saudi Arabia can only meet its expectations towards attaining sustainable development if it adopts best practices for environmental compliance. In this first case, the country should emulate the US and EU systems, which provide sound guidelines on both national and international environmental laws. Here, the country should strictly adhere to the national standards on environmental regulations to contain pollutants affecting the atmosphere and the seas. Air and water pollution are some of the greatest challenges to environmental sustainability in the Kingdom of Saudi Arabia, and as such the country must adopt firm national standards that would control industrial emission and discharge into the environment. Deploying best practices from this framework will enhance environmental conservation in Saudi Arabia and invigorate its government.

## **9.2 Next Steps for Environment and Sustainable Development in Saudi Arabia**

There are various environmental challenges that pose threats to the public health and ecosystems of Saudi Arabia, related to pollution. For instance, air in the Saudi Arabia's urban areas is highly polluted mostly on account of by high demands of energy and the means of producing it being fairly dirty.<sup>503</sup> Since most of the Saudi Arabian population is migrating into towns, the country is experiencing growth in demands on its municipal facilities. Relocating populations is affecting the present facilities in those urban that are not able to meet the new demands. In addition to affecting air quality, urbanization increases demand for scarce drinking water, expands need for safe disposal of the solid wastes, and exacerbates the pollution along the coastline, affecting the marine life.<sup>504</sup>

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<sup>503</sup> *Review of Sustainable Development and Productivity Activities: Issue No. 1*. New York: UN, 2003. Print. 25

<sup>504</sup> Brauch, Hans G. *Globalization and Environmental Challenges: Reconceptualizing Security in the 21st Century*. Berlin: Springer, 2008. 850. "Globalization and Environmental Challenges poses new security dangers and concerns. In this reference book on global security thinking, 92 authors from five continents and many disciplines, from science and practice, assess the global reconceptualization of security triggered by the end of the Cold War, globalization and manifold impacts of global environmental change in the early 21st century."

These sorts of problems have been well known since identified in Our Common Future and in Agenda 21. This chapter discusses how sustainable development reforms may enable to meet the environmental concerns that the people of Saudi Arabia are now facing. The Kingdom's challenges are not unlike those experienced widely around the world. The chapter addresses the challenges and the opportunities presented by the Kingdom's use of natural resources in its quest for economic development and social equity. In doing so, the chapter addresses the responsibilities incumbent upon government, business, industry, and individuals as they make decisions affecting the environment and the economy.

Since at least the United Nations Conference on the Human Environment held in Stockholm in 1972, humanity has recognized the close relationship between how an economy grows and the environment in which it grows.<sup>505</sup> Of course, Shari'ah has recognized this relationship far longer. In many regions around the globe, there is close correlation between levels of environment degradation and poverty. However, economic growth cannot be stopped due to the above concerns. Economic growth strategies need to be redefined in a way that considers the welfare of our environment. In order to ensure that every stakeholder benefits from the economic growth, there must be an integration of the three pillars of economy, environment and society concerns. This involves every country establishing policies that will ensure national economic growth strategies are sustainable by harmonizing their economic, social and environmental policies.<sup>506</sup>

Over the past generation, Saudi Arabia has made tremendous progress in developing its socio-economic conditions, its equality in terms of gender, living conditions, health, education and even in the field of environmental legislation. This dissertation points out ways the

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<sup>505</sup> Gunther Handl. Declaration of the United Nations Conference on the Human Environment Stockholm, 16 June 1972. 2013. United Nations Websites.

<sup>506</sup> WHO. World Summit on Sustainable Development. Nd. Website source

Kingdom could build on these successes and take them to the next level by enacting additional measures. New laws, policies and institutions could ensure that there is effective integration of all these aspects of the country's path to more sustainable development. Consequently, to ensure effective integration of sustainable development in the national development plan,<sup>507</sup> the government should consider how best to examine the following aspects of its environment that are of concern as discussed in Chapters 2,4 and 7 of this thesis. Sustainable development in the Kingdom depends on its laws and policies for five key environmental sectors: (a) energy, (b) water, (c) air quality, (d) water management, and (e) the marine environment. For all these five issues and more, the Kingdom needs an integrated planning system, EMS and other environmental compliance procedures.

### **9.2.1 Energy**

Famously, Saudi Arabia has abundant sources of fossil fuels. Indeed, no nation has a closer relationship to its fossil fuels. They represent its principle source of wealth and the greatest threat to its environment. The Kingdom depends on natural gas for production of 98 percent of the energy it consume, while two percent derives from oil.<sup>508</sup> There is a direct relationship between the burning of fossil fuels and climate change. During energy production, there is emission of waste that leads to pollution and GHG that contribute to climate change.<sup>509</sup> In recognition of these relationships, the producers in the kingdom are subject to strong requirements to save the environment. And in many instances, compliance is innovative,

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<sup>507</sup> Chopra, Kanchan R. *Ecosystems and Human Well-Being: Policy Responses: Findings of the Responses Working Group*. Washington: Island Press, 2005. Print. 436. This is the third volume in the MA series, which analyzes the track record of past policies and the potential of new ones. The challenge of reversing the degradation of ecosystems while meeting increasing demands can be met only with significant policy and institutional changes.

<sup>508</sup> Arab News. "Aramco to cut domestic consumption of oil." Published on Saturday 13 October 2012. Website source.

<sup>509</sup> Boden, T.A., G. Marland, and R.J. Andres, *Carbon Dioxide Information Analysis Centre, Saudi Arabia Fossil-Fuel CO2 Emissions*. 2011. Oak Ridge National Laboratory.

consistent, and sustainable, for instance, see Saudi Aramco and the Royal Commission for Jubail and Yanbu and Sabic.<sup>510</sup>

Power generation systems in Saudi Arabia are highly stressed due to the impressive rates of industrialization, urbanization, and economic and population growth.<sup>511</sup> Demand for power has been increasing fast, creating in turn demand for more power generation. The short supply for electricity has pushed firms and industries to switch to use of petroleum products, especially use of natural gas and crude oil as a substitute source of power.<sup>512</sup> Diesel and heavy oil are other types of sources of power from the alternative sources of power. While plentiful, these alternative sources exacerbate the environment impact of the burgeoning economy.

The current situation in Saudi Arabia stipulates a very high demand for electricity and crude oil. Consequently, the exportation plan has to be altered to create enough quantity as required by the country. Due to high demands for fossil fuels to generate power, the Kingdom reduced the supply to external firms and countries, as a solution to enable the country meet its fuel demands. The high demand calls for efficiency and effectiveness in the use of power and establishment of a sustainable power system. The power generating firms and industries will call for high management skills to ensure control and planning.

Sustainable development principles illuminate ways to meet growing demand and while protecting the environment. Proper utilization of power ensures saving on money spent on fuel, an argument for deploying more efficient technology. Use of renewable sources of power can

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<sup>510</sup> Arab News. "KSA following strict environmental standards." 29 November 2013. Website source.

<sup>511</sup> Ayesha Daya and Dana El Baltaji. "Saudi Arabia May Become Oil Importer by 2030, Citigroup Says," Bloomberg Sustainability. Nd.

<sup>512</sup> Alyousef, Y. and Abu-ebid. M. Energy Efficiency Initiatives for Saudi Arabia on Supply and Demand Sides, Energy Efficiency - A Bridge to Low Carbon Economy. 2012. Print. 280

soften the impact rising demand by providing energy with lower impact on the natural environment.<sup>513</sup>

Blessed with a rich geographic endowment, the country can develop wind and solar power as very reliable sources of renewable energy.<sup>514</sup> The two sources are widely available throughout the country and especially near Riyadh.<sup>515</sup> Having reliable sources near the capital city is particularly felicitous as it reduces the costs of transmission (a particular concern for renewables). Research carried out in the city in 1998 revealed possibilities of creating high power voltage. However, initial stages of case studies used in the city's locations showed insufficiency of solar energy. But, more recent studies have raised the power index to a viable level. The most recent study concludes that Saudi Arabia is guaranteed success in having renewable energy as a source of power. The uses of the energy have not been classified for heavy usage but can be used for light purposes such as lighting and heating.

Wind in Saudi Arabia has a high average speed of 15km/h and can be tapped and used for powering various economic activities.<sup>516</sup> The landscape provides a suitable environment for harvesting the wind energy. The Gulf sea grounds have been listed as among the areas with the strongest wind. Further research has identified the Red Sea area as another zone with vast surfaces and fast winds that can be harvested and be counted upon a reliable source of power.<sup>517</sup>

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<sup>513</sup> Shaahid, S.M. and Elhadidy, M.A. Wind and Solar Energy at Dhahran, Saudi Arabia. Renewable Energy. 1994. Print. 441-445

<sup>514</sup> Gechev, Rumen. *Sustainable Development: Economic Aspects*. Indianapolis, IN: University of Indianapolis Press, 2005. Print. 92

<sup>515</sup> Latham. S. Our Planet, harnessing the Power of the Sun: Saudi Arabia Builds Massive Solar Farm. 2013. Website source.

<sup>516</sup> *Sustainable Practices: Concepts, Methodologies, Tools, and Applications*. 2014. Internet resource. 227. This book explores some of the most recent developments in sustainability, delving into topics beyond environmental science to cover issues of sustainable economic, political, and social development"

<sup>517</sup> Golusin, Mirjana, Stevan Popov, and Sinisa Dodic. *Sustainable Energy Management*. Burlington: Elsevier Science, 2013. Internet resource. 3. According to this book, the burgeoning fields of renewable, efficient and sustainable energy have moved past experimentation toward realization, necessitating the transition to more sustainable energy management practices. Energy Management is a collective term for all the systematic practices to minimize and control both the quantity and cost of energy used in providing a service.

The reliability, cost and environmental impact of generating energy has great impact on the economic state of a nation, her social and political wellbeing as well.<sup>518</sup> Energy management is a complex task and especially at the control stage. This is because the energy sustainability calls for responsibility in maintaining the environment safe and comfortable for every habitat. The system calls for perfection in operating the energy programs so as to ensure smooth running of the economy and society more generally. Factual matters should to be incorporated in the strategy covering areas relating to the economy, industrial growth, the population and also the level of GDP. All the involved parties need to focus to pool the renewable resources together to facilitate effectiveness in energy usage.<sup>519</sup> The system ought to incorporate government support to ensure continued support from various departments.

### **9.2.2 Water**

Saudi Arabia would benefit greatly from the creation of one highly integrated National Sustainable Water Source Plan incorporating the latest information services, advanced water generation and recycling systems, and centralized decision making. Water covers more than 70 percent of the planet's surface. However, its uneven distribution causes flooding and draughts to be experienced at different times and different places on the earth's surface. Most of earth's water is located on the seas, and due to its salinity are of limited utility to mankind. Fresh water is the most sought after commodity in the world as it affects the life of every organism.<sup>520</sup> Even fresh water may be unsafe for human consumption because it contains disease-causing

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<sup>518</sup> Golusin, Mirjana, Stevan Popov, and Sinisa Dodic. Ibid. 5

<sup>519</sup> Taher, Nahed and Bandar Hajjar. *Energy and Environment in Saudi Arabia: Concerns & Opportunities*. Cham: Imprint: Springer, 2014. Internet resource. 102. The vast oil resources in Saudi Arabia have for decades encouraged a generous system of oil subsidies, making the Kingdom one of the leading countries in the world with the cheapest domestic price of oil. Such subsidies have, however, encouraged inefficient utilization of oil, which is largely consumed in the power, water and transportation sectors, contributing substantially to CO2 emission in the country.

<sup>520</sup> Bristow, Colin M, and Peter W. Scott. *Industrial Minerals and Extractive Industry Geology: Based on Papers Presented at the Combined 36th Forum on the Geology of Industrial Minerals and 11th Extractive Industry Geology Conference, Bath, England, 7th - 12th May, 2000*. London: Geological Society, 2002. Print. 134.

organisms. And fresh water requires careful protection as it is subject to contamination by foreign bodies such as sewage, sediment and industry effluents. The water pollution sources in Saudi Arabia principally involves the waste from homes and industries.<sup>521</sup> Factories release acid water which is filled with traces of metals. Motor engines leak petroleum products. Agricultural chemicals are washed into water sources by the rain. And mining's by-products can easily seep into aquifers thus rendering them dangerous. People get sick after consuming polluted water. That is, after consuming water infected by diseases such as cholera, and typhoid, people get sick.<sup>522</sup> At times, these diseases terminate lives. Water pollution also causes new strains of diseases to emerge. Finally, it brings life hazards such as trapping birds and injuring some creatures in the water. To avoid health risks, people need to obtain and carefully preserve sustainable water sources.<sup>523</sup>

Saudi's sources of fresh water are extremely tight. Existing surface and underground water are insufficient to meet the demand of the country's population and because what does exist requires transportation to the residential areas and other areas of high demand.<sup>524</sup> This has forced the country turn to desalination of the ocean water.

Currently, the Kingdom struggles to meet the needs of its population for water and the situation is growing more challenging. At the same time, the country's economic development are still going on and the population is growing. As result, in the near future, the country will be faced by a dire demand for water. In fact, water shortages are already a fairly common phenomenon. According to at least one study, Saudi Arabia ranks second in the world list of the

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<sup>521</sup> Shawly, Hassan H. *Urban Water: Integrated Resource Planning to Meet Future Demand in Jeddah - Saudi Arabia*. München: Oldenbourg Industrieverl, 2008. Print. 9.

<sup>522</sup> *Global Environment Outlook*. London: Earthscan, 2002. Print. 174

<sup>523</sup> Harper, Robert A., Aswin Subanthore, and Charles F. Gritzner. Ibid. 46

<sup>524</sup> Harper, Robert A, Aswin Subanthore, and Charles F. Gritzner. *Saudi Arabia*. New York: Chelsea House, 2007. Internet resource. 44.



countries that experience water shortages per capita. Moreover, the country over utilises (2.5-1.5) times its non-renewable underground water sources through agriculture, domestic and industrial uses.<sup>525</sup> Recently, government and other stakeholders have started campaigns to sensitize the citizens to the need of managing the available water responsibly.

From the current Saudi Arabian water plan, it is noted that government and water suppliers concentrate on digging more water from underground sources and desalinating the seawater. For instance, in the recent past more than 20 desalination plants have been established on the Red Sea and four in the coast of the Gulf.<sup>526</sup> As a result, the stakeholders only concentrate on increasing the volume of water under supply through coming up with new potable and fresh water sources. Nonetheless, water supplied to the population is not guaranteed to be fresh and most of the times not adequate water.<sup>527</sup>

The sustainable water source plan involves development of a program that will see to it that Saudi Arabia's water resources are protected against pollution and the country's citizens have a constant supply of clean water.<sup>528</sup> This requires involvement of society, environment and techniques to identify the sources of water, relating the quality of water and the demand with changes in population, setting objectives, finding the expected uncertainties from calculations and building on models to use for various objectives, tools of optimization and probabilities. As a result, the program will bring together specialists in the fields of engineering, technology,

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<sup>525</sup> Zuhur, Sherifa. *Saudi Arabia*. Santa Barbara: ABC-CLIO, 2011. Print. 9. This book describes all aspects of Saudi Arabia, including its government, economy, society, and culture, as well as its role in the Middle East and its position internationally.

<sup>526</sup> Harper, Robert A, Aswin Subanthore, and Charles F. Gritzner. *Saudi Arabia*. New York: Chelsea House, 2007. Internet resource. 43.

<sup>527</sup> Shuval, Hillel I., and Hassan Dwiek. *Water Resources in the Middle East: The Israeli-Palestinian Water Issues: from Conflict to Cooperation*. Berlin: Springer, 2007. Internet resource. 172. This book presents various approaches to the resolution of the severe water resources shortages and issues of the Middle East, with a focus on the Israeli-Palestinian water conflicts. This book considers the various geopolitical, environmental, legal, economic and water resources management approaches to improve cooperation and solve the problems.

<sup>528</sup> Harper, Robert A, Aswin Subanthore, and Charles F. Gritzner. Ibid. 44

economics and social studies in order to facilitate effective communication and awareness programs. This program can be effective in the areas being exploited for fresh water for the first time to meet the water constraints.<sup>529</sup> Wisely, it draws lessons from what other countries are doing to meet water needs. Many countries are finding secondary sources of water to minimize the stresses imposed on the water such as provision of desalinated transportable water as a way of facilitating irrigation, and aquifer recharging with the water that could have been left to waste.<sup>530</sup>

Moreover, the National Sustainable Water Source Plan will facilitate understanding the country's hydrological cycle leading to permanent solutions to some of the water problems.<sup>531</sup> The whole world is feeling the effects of the climate change. And changes in hydrological cycles have very serious consequences. Therefore, the National Sustainable Water Source Plan sustainability is described as being a tool for making environmental sound choices in a cost effective way.<sup>532</sup> It incorporates other stakeholder's ideas and involves various academic disciplines to bring up a practical measure. It is also well-matched with other societal goals such as enhancing thriving of biodiversity, making better use of water through agriculture, and protecting against floods. For all this, it should be applauded.

The current methodology of water supply in Saudi Arabia is likely to cause competition and ultimately conflicts among those who rely on it. The proposed scheme will minimize the dependence on the finite supply of water thereby reducing the sources of tension. Moreover this scheme will encourage more public participation and also create jobs. The regulatory agencies

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<sup>529</sup> Shuval, Hillel I, and Hassan Dwiek. Ibid. 172

<sup>530</sup> Brebbia, C A, and V Popov. *Water Resources Management VI*. Southampton, U.K: WIT Press, 2011. Print. 88. This book discusses water Management and Planning; River Basin Management; Urban Water Management; Hydrological Modelling; Hydraulic Engineering; Water Quality; Pollution Control; Irrigation Issues; Special Session on Sharing our Water Resources; Flood Risk; Waste Water Treatment and Management; Waste Water Treatment and Re-use; Water Resources and Economics.

<sup>531</sup> *Water Scarcity in the Arab World*. New York: United Nations, 2003. Print. 15.

<sup>532</sup> Pepper, D. W., and C. A. Brebbia. *Water and Society*. Southampton: WIT Press, 2012. Print.160

will know their roles and consumers will understand their responsibilities more. It will also provide several additional sources of water.<sup>533</sup> People will have diversified their source of water as they can recycle the water they have already used. This scheme would establish a national water plan sustainable water sources with water supplying industries, customers who consume water and power producing firms. This will help to control floods and create forms of water storage that will reshape agriculture.<sup>534</sup> As a result, it becomes easy to predict health influences, technology advances and economic implications.

Lastly, this sustainable plan will establish a decision model as a way of implementing the proposed plan. This decision model is integrated in the plan to interconnect all the players in the process of making decisions especially when the decision involves sustainable water procurement.<sup>535</sup> This model offers a useful instrument for making well-informed decisions as it can be interlinked with software and databases. Lastly, when the model is used for a long time, it addresses the long term influence the climate has on the water areas. This affects the growth of crops, the terrestrial ecosystem, which demands conservation through reusing the wastewater to recharge the aquifers.

### **9.2.3 Air Quality**

Much as it would from a consolidated water plan, the Kingdom would benefit great from the establishment of a Sustainable Control Program to regulate air quality. The quality of air inhaled by human being, animals, and plants significantly directly affects the health of the

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<sup>533</sup> Brebbia, C. A., and V. Popov. Ibid. 89

<sup>534</sup> Colombo, Silvia. *Bridging the Gulf: EU-GCC Relations at a Crossroads*. Roma: Nuova cultura, 2014. Print. 205.

<sup>535</sup> *Water and Sanitation in the World's Cities: Local Action for Global Goals*. London: Earthscan Publications, 2003. Print. 12. "Water and Sanitation in the World's Cities is a comprehensive and authoritative assessment of the problems and how they can be addressed. This influential publication by the United Nations Human Settlements Programme (UN-Habitat) sets out in detail the scale of inadequate provision of water and sanitation

animal, plant or the person inhaling it.<sup>536</sup> For instance, humans after breathing polluted air face increased threats of such conditions as respiratory tract infections and weakening of the pulmonary system and of the heart functioning, allergies and lung cancers.<sup>537</sup> Respiratory related diseases kill more than four million children aged below five years every year in developing nations. Most of these pollutants come are either in the form of minute particles that are suspended in the air or harmful gases. Once inhaled, they have a direct effect on the respiratory cells and functioning of the cardiac tissues. It is worth noting that most of respiratory tract and cardiac complications emerging from polluted air are more apparent in cities than the rural areas.<sup>538</sup> This is mostly because of the high number of people occupying a small area and industries emitting gaseous particles. Use of fuel-based engines in towns is higher than in villages, and the development in these towns is unsustainable.

According to survey in Saudi Arabia in the major cities of Jeddah, Dhahran and Riyadh, the levels of nitrogen oxides in the air are increasing, the ozone layer is highly depleted, and the volume of minute particles in the air in Saudi Arabia is on the rise. Among the worrying air borne particles sources, the major source is volatile organic compounds.<sup>539</sup> According to the survey, firms operating in the petroleum sector that sell the petroleum products are reckless when transporting petroleum products, leading to its being spilled and vaporising to the air. The terminals of gases such as sulphur dioxide and nitrogen dioxide and gas oil separations operate in

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<sup>536</sup> Legge, Allan H, and David Karnosky. *Air Quality and Ecological Impacts: Relating Sources to Effects*. Amsterdam: Elsevier Science, 2009. Internet resource.1. As global industrial expansions continue, air quality is no longer governed by isolated point sources (e.g., a single coal-fired power plant), but by source clusters or complexes. Although air quality regulations are designed to protect the environment against possible adverse effects, any mitigative measures through emission control must account for the specific source(s) of concern.

<sup>537</sup> Ellis, Michael E. *Infectious Diseases of the Respiratory Tract*. Cambridge: Cambridge University Press, 1998. Print. 558.

<sup>538</sup> Šādiq, Muḥammad, and John C. MacCain. *The Gulf War Aftermath: An Environmental Tragedy*. Dordrecht: Kluwer, 1993. Print. 110

<sup>539</sup> Benarie, M M. *Atmospheric Pollution 1982: International Colloquium Proceedings*. Burlington: Elsevier, 1982. Internet resource. 41

unsustainable way.<sup>540</sup> This has led to increases in the levels of poisonous gases in the air. Bearing in mind the high levels of fossil fuels they use to produce energy and the voluminous sulphur and nitrogen oxides they release in the environment every day, the firms operating power and desalination plants significantly contribute to air pollution.

As the major cities continue accumulating nitrogen and sulphur compounds, it is expected that the level of ozone in the country is being depleted significantly every year. In order to minimize the levels and effects of the sulphur and nitrogen oxides, it is essential to plan about how to contain air pollution strategically.<sup>541</sup> Moreover, due to depletion of ozone, the sun intensity is noted to have increased. When coupled with the increase in sulphur and nitrogen oxides, it proves why the levels of Ozone or O<sub>3</sub> in the air are increasing. The O<sub>3</sub> contributes to smog formation, reducing visibility and causing respiratory tract diseases. As a result, there is a team need to strategize on how to curb the rising volumes of poisonous gases.

Previously, the air-monitoring department existed in Saudi Arabia. Currently it is expanding to place air monitoring facilities in the major cities and towns.<sup>542</sup> The government has involved meteorological specialists in determining the weather under Saudi Aramco's Air Quality Monitoring & Metrology Network ("AMMNET"). However, other departments dealing with the quality of air are set aside. For example, Royal Commission for Jubail and Yanbul ("RCJY") operating in the cities of Jubail and Yanbul and The King Abdulaziz City which provides the technological knowhow for air quality assessment.<sup>543</sup>

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<sup>540</sup> Legge, Allan H. and David Karnosky. Ibid. 5

<sup>541</sup> Longhurst, James W. S, and C A. Brebbia. *Air Pollution XX*. Southampton: WIT Press, 2012. Print. 352. The goal of this conference was to bring together researchers who are active in the study of air contaminants and to exchange information through the presentation and discussion of papers dealing with the wide variety of topics listed.

<sup>542</sup> Brebbia, C A. *Environmental Health Risk: Vii*. Southampton: WIT Press, 2013. Internet resource. 132. The book covers such topics as: Risk Prevention and Monitoring; Occupational Health; Air Pollution; Social, Economic and Planning Issues; Food Safety; Environmental Education and Risk Abatement; Waste and Wastewater Issues

<sup>543</sup> Jeffreys, Andrew. *The Report*. London: Oxford Business Group, 2011. Print. 123

The role of the Sustainable Control Program will be to assess and control the quality of the air. The program's roles will include monitoring the gases, modelling their trends, and storing the obtained data in secure databases. This means the program will be comprised of the society, researchers, organizations and government inclusive undertakings on air sustainability measures. It will also involve appropriate communication between the involved stakeholders: the monitors, assessors and implementers.<sup>544</sup> The tools used for assessing should be portable.

To achieve the above, the program will assimilate cost effective technologies especially in the monitoring department. This is where the researchers will test the health implications of the current environment for citizens as a way of assessing the risk the citizens are facing.<sup>545</sup> The managers may also use a multi-criteria decision making tools to make the best use of the information gathered. Using the current model of purifying air, the data derived from metrological and air purifying centre need to be analysed together, and the three organisations should work as a team.<sup>546</sup> The data need to be stored in a national centre for easy retrieval when assessing the national respiratory records. In the centre, it will become easier to assess, interpret and model the results obtained from all cites. Moreover, it will become easier to install the latest technologies in centralised institutions.

Moreover, to ensure there are real supportable fresh air supply at all citizens, it is important to establish a balance between the economic growth and protecting the surroundings

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<sup>544</sup> Jeffreys, Andrew. Ibid. 125

<sup>545</sup> Taher, Nahed, and Bandar Hajjar. *Energy and Environment in Saudi Arabia: Concerns & Opportunities*. Cham: Imprint: Springer, 2014. Internet resource. 117

<sup>546</sup> Landon, Megan. *Environment, Health and Sustainable Development*. Maidenhead: Open University Press, 2006. Internet resource. 115. One of the great challenges for public health practitioners is to understand and try to modify the relationship between the environment and health in the face of development. This book examines the underlying concepts, the history of environmental health, and the key factors that affect public health including: air pollution; water contamination; industrial hazards; and, agricultural hazards. The increasing impact of global environmental issues is explored as they affect countries throughout the world

and the lives of plants, animals and humans against respiratory diseases.<sup>547</sup> To achieve this all stakeholders need to be involved, especially during the process of building the scheme. This will ensure that the stakeholders do not resist changes. They participate in training the society and building professionals to deal with fresh air supply sustainability as nation continues to grow and develop.<sup>548</sup> As in other sectors, the principles of public participation, comprehensive data gathering, sophisticated analysis and science-driven decision making will each play key roles in improving policy and the environmental outcomes.

#### **9.2.4 Waste Management**

Waste management is another important sector in need of modernization in promote to ensure sustainable development. Waste materials mainly arise from the growing economic activities, urbanization, industrialization and growth of the general population of the Kingdom. Whether in power generation, extractive industry or in manufacturing, Saudi industry has mostly managed to externalize the environmental and health costs of their by-products. Recklessly dumped waste materials pose significant health threats to those living in the affected region.<sup>549</sup> While the kinds of waste range widely the most dangerous and voluminous tend to be those generated from power production and power related industries. Saudi Arabia has yet to develop effective strategies for safely disposing of this sort of waste. The main wastage material being ash, the most common disposal method is the use of dry disposal method.<sup>550</sup> This method is notably problematic because it constitutes further spoilage in the transportation process.

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<sup>547</sup> *Journal of the Air Pollution Control Association*. Pittsburgh, PA: 1955. Print. 1346.

<sup>548</sup> Landon, Megan. Ibid. 117

<sup>549</sup> Brebbia, C. A., G. Passerini, and H. Itoh. *Waste Management and the Environment VII*. Southampton: WIT Press, 2014. Internet resource. 284. Topics covered include: Industrial Waste Management; Waste Management; Direct and Indirect Pre-treatment of MSW; Waste Water; Remote Sensing; Reduce, Reuse, Recycle and Recovery (4Rs); Environmental Impact; Environmental Remediation; Disposal of High-level Radioactive Waste in a New Perspective; Agricultural Waste; Energy from Waste.

<sup>550</sup> Brebbia, C. A., G. Passerini, and H. Itoh. Ibid. 285

Currently, industry in Saudi Arabia is concentrating on producing without paying sufficient attention to by-products or caring much on where they deposit their waste and the impact it will have on the surrounding community. For instance, a fertilizer producer and an aluminum mine on the Gulf coast might dump their waste products nearby without adequate processing or safety procedures. This waste could be particularly harmful to surroundings if it contains radioactive materials or traces of heavy metals.

Most companies need to join efforts with fertilizer producing companies to effectively and profitably utilize their waste materials. This aspect has come in conjunction with innovation and creativity in relation to wastage management.<sup>551</sup> Various parties need to recycle the waste materials into new products, which are more environmentally friendly. Increasingly companies are blending the waste materials to create value in the human and economic environment. There is a great need to establish a system that takes responsibility for the oversight of waste management. Such systems support merging of firms to control the handling of the waste products.<sup>552</sup> Resulting products include such useful items as cement, chalk and metal cleaning products. Development needs to be undertaken to give incentives to those who develop effective environment-friendly safe applications.<sup>553</sup> For instance, the development use of HOFA, an adsorbent, to eradicate waste compounds in water. HOFA, when blended with cement, is used to stabilize the soil's pH and other properties to make it more suitable for sustainability. In sum, waste management handled in an enlightened way can lead to win-win situations. While

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<sup>551</sup> Sillitoe, Paul. *Sustainable Development: An Appraisal of the Gulf Region*. New York: Berghahn Books, 2014. Internet resource. 369.

<sup>552</sup> Haggag, Salah. *Sustainable Industrial Design and Waste Management: Cradle-to-cradle for Sustainable Development*. Amsterdam: Elsevier Academic Press, 2007. Internet resource. 17. Sustainable Industrial Design and Waste Management was inspired by the need to have a text that enveloped awareness and solutions to the ongoing issues and concerns of waste generated from industry. The development of science and technology has increased human capacity to extract resources from nature and it is only recently that industries are being held accountable for the detrimental effects the waste they produce has on the environment.

<sup>553</sup> Sillitoe, Paul. Ibid. 370



reducing wastage, environmental degradation and ill health, more efficient waste management systems can produce useful new products and greater profitability.

#### **9.2.5 Marine environment:**

A country almost entirely surrounded by its 2,640 kilometers of coastline, Saudi Arabia needs to carefully manage its marine environment. Cities in the coastal regions directly impact the marine environments and the well-being of the inhabitants of the adjacent lands.

Because of its prominence in the Kingdom's economy, the most important sector for the marine environment is oil and gas. All the fuel related activities need control to mitigate their environmental effects on the life style of the inhabitants. Oil mining activities have adverse effect on the landscape and also the soil. Burning of fuel releases gaseous materials can be poisonous to the inhabitants on the land and also the environment, particularly to the ozone layer.<sup>554</sup> Spillage also poses significant dangers to the marine environment. The impact on the ecological system in the critical areas cuts across social and economic aspects of the country. Destruction of the beautiful flora and fauna creates unattractive zones for tourists or others seeking to make use of the region's natural wonders. Over time, spillage and other forms of spoliation due to industrial waste reduces the value of the land. Increased population can also take its toll, for instance with pollutants such as untreated industrial water are discharged into the sea. With greater population comes increased demand for energy, and traditional forms of power generation add to the temperature pollution of the coastal areas. Raising such temperature affects performance of the natural flora and fauna, and the impact is transferred to the whole nation.<sup>555</sup>

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<sup>554</sup> Craik, Neil. *The International Law of Environmental Impact Assessment: Process, Substance and Integration*. Cambridge: Cambridge University Press, 2010. Print. 97

<sup>555</sup> Abu-Zinada, A. H. *Protecting the Gulf's Marine Ecosystems from Pollution*. Basel: Birkhauser, 2008. Internet resource. 117. "This volume reviews present sources and levels of pollution in the Gulf, assesses their causes and effects on biota and ecosystems, and identifies gaps and obstacles currently preventing an effective integrated transboundary management of the marine and coastal resources."

The coast of Arabia includes the Gulf of Arabia and the Red Sea, which hosts several towns. The coastal ecosystem and marine- to- land interaction facilitates the living conditions of the coastal towns.<sup>556</sup> For a long time, these coastal lands have experienced disturbances through oil exploration, production and transportation. Consequently, the region is losing its biodiversity, the soil is degrading and the nutrients are being leached out of the soil. Since the region is in the desert and farmers there graze their animals, there is an increased challenge of soil erosion and nutrient loss. All this, coupled with the effects of climate change, makes it harder to hold back the desert.

The coast of Arabia provides the source of food materials from the land and the sea. Its natural resources, especially oil and gas, anchor the nation's economy. However, with exploitation of these resources, the health of public is held at stake as food borne of the sea and land are increasingly polluted.<sup>557</sup> Where the marine ecosystem is significantly degraded, tourist activities cease. So while oil and gas provide the economy's life blood, those industries must be managed with greater and greater attention to the environmental harms, or the health of the economy, society and its people will be degraded to intolerable levels.

Scientific management of the marine environment requires establishment of a methodology to assess the risks posed to the marine ecosystem by the growing population and exploitation of natural resources along the coasts.<sup>558</sup> Establishment of scientific procedures will be significant to study and recommend the best way to intermarry the economic growth along the Arabian coasts with preservation of the environment. This involves formation of bodies assessing economic developments, another reviewing marine life and that of human and other

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<sup>556</sup> McClanahan, T. R., Charles Sheppard, and David O. Obura. *Coral Reefs of the Indian Ocean: Their Ecology and Conservation*. New York: Oxford University Press, 2000. Internet resource. 247

<sup>557</sup> McClanahan, T R, Charles Sheppard, and David O. Obura. Ibid. 248

<sup>558</sup> Hassan, Daud. Ibid. 139

coastal organisms. And each of these bodies must regularly come together to determine effective and sustainable economic development strategies.<sup>559</sup>

In order to maintain safety and maintenance, the environment system of Saudi Arabia needs to focus on policy formulation. Proper studies ought to be carried out to ensure use of scientific methods to control of pollution. Establishment of control strategies ought to be implemented. Such strategies involve control over oil spoilage in the coastal and sea coastal areas.<sup>560</sup> The risk in the subjected areas ought to be well assessed to avoid mistakes borne of negligence or ignorance. Human activity needs human efforts to ensure there is a degree of responsibility. With the increase in human activity and the concomitant demand for fuel and power, care ought to be observed to minimize the ecological effects of human activities.

#### **9.2.6 Integrate Planning and Environmental Law Compliance:**

Integrating planning involves harmonizing diverse interests. This implies that all factors that directly or indirectly contribute to environmental conservation be brought together and all policies formulated for a well-balanced application. Agenda 21 argues for sustainable social and environmental progress in a country. At least as much as any other country, Saudi Arabia would benefit from following these guidelines. Within the environmental conservation and regulations context, the Kingdom faces many challenges that it must strive hard to overcome as fast as possible. For example, Agenda 21 holds that sustainable social and economic development can only be achieved if a country improves in the following operations: poverty reduction, reducing the incidences of climatic change, providing a clean water supply, and enhancing production of renewable sources of energy. These are all factors that are critical for achieving the objectives of

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<sup>559</sup> Franckx, Erik. *Vessel-source Pollution and Coastal State Jurisdiction: The Work of the ILA Committee on Coastal State Jurisdiction Relating to Marine Pollution (1991-2000)*. Boston: Kluwer Law International, 2001. Print. 262

<sup>560</sup> Franckx, Erik. Ibid. 263

Agenda 21 around the world, and they are critical for the Kingdom too. Accordingly Saudi Arabia should coordinate decisions for all elements under Agenda 21 and also the UN Sustainable Development Goals (“SDGs”).

Integral planning entails synchronizing all factors highlighted above and those requiring the intervention of international communities. The US and EU have very effective environmental policies, and this results in their improved progress in environmental conservation and policy enforcement. Saudi Arabia can achieve similar results by addressing coordination of all factors covered in Agenda 21 and the SDGs, through adopting the internationally accepted best practices, and strengthening its environmental laws and their enforcement systems.

From the previous chapter, it is worth noting that many nations having excellent records of sustainable development have achieved this due to strategic efforts to create and implement first-class environmental policies. The United States has an elaborate structure and several governmental bodies that implement these standards. The most important point here is that such countries have created or adopted internationally accepted best practices, and implemented them accordingly. For example, integral planning involves adoption of policy frameworks that can best match the current environmental situation in Saudi Arabia. Mechanisms such as the PME must seek knowledge from counterpart bodies like those of US EPA. An exchange programme start these two countries in sharing their insights, programs and plans for environmental conservation. In addition, the two countries can reach a mutual agreement allowing bilateral exchanges of knowledge and environmental technologies, where environmental experts from the Saudi Arabia can benefit from education and practice from the USA and vice versa. Such a program will expand their respective knowledge and help implement crucial policies and standards.

In addition to bilateral cooperation, the government should facilitate involvement of environmental professionals from the USA and Europe with their counterparts in the Kingdom. Just as the USA and the EU have advanced their policies, Saudi Arabia can build the capacity of its courts. Environmental remedies need to be available in courts where fraudulent or criminal environmental behaviour is punished. The implementation of environmental policies and standards should not be the concern of only one agency, but must involve every interested group in the country. Citizen enforcement of environmental laws is authorized in the US, EU, The People's Republic China, Australia and elsewhere. Establishing sustainable environmental conservation requires these countries to collaborate with each other and to faithfully apply relevant policies within their countries.

Saudi Arabia has established good policies that, if put more fully into practice, will improve environmental quality throughout the Kingdom. Production of renewable energy is one sector where new regulatory measures might enhance sustainable development by reducing dangerous emissions to the atmosphere. In addition, the Kingdom undertakes research to enhance production of cleaner water and proper sewage disposal, in line with the country's development goals. Integrating processes to better reach these standards and policies requires the country to adopt the advanced methods used in the USA and EU. In addition, the principle of integrated planning would encourage the country to invest heavily in environmental conservation and actively involve the executive and the judiciary in environmental protection.

The sustainability plans of the Kingdom support the Sustainable Development Goals, which in turn elaborated on Our Common Future. Key elements under the Kingdom's future plans include clean air production, renewable energy production, a clean water supply, and proper waste disposal and management. The government has impressive plans and projects in

each of these areas within its environmental conservation portfolio. In addition, these plans can be implemented by through world-class best management standards. The most important point is the fact that the country can and should adopt new policies and regulations supportive of environmental sustainability. It is recommended that the Kingdom give priority to the five environmental issues described above.

Chapter ten synthesizes many of the themes examined throughout this dissertation. These themes are grounded on the environmental conservation laws and regulations of Saudi Arabia. The adequacy of these laws must be measured by how useful the practices have been in protecting its environment. Various best practices on environmental practices have been proposed to cushion Saudi Arabia against further environmental degradation. This dissertation envisions a concept of sustainable development, which is an integration of all themes in all its chapters. If the best practices and techniques are implemented, sustainable environmental within the Saudi Arabia can become a reality.

## Works Cited for Chapter 9

- Abu-Zinada, A. H. *Protecting the Gulf's Marine Ecosystems from Pollution*. Basel: Birkhauser, 2008. Internet resource. <http://www.worldcat.org/title/protecting-the-gulfs-marine-ecosystems-from-pollution/oclc/261324613>
- Alyousef, Y. and Abu-ebid. M. *Energy Efficiency Initiatives for Saudi Arabia on Supply and Demand Sides, Energy Efficiency - A Bridge to Low Carbon Economy*. 2012. Print : <http://www.intechopen.com/books/energy-efficiency-a-bridge-to-low-carboneconomy/energy-efficiency-initiatives-for-saudi-arabia-on-supply-and-demand-sides>
- Arab News. Aramco to cut domestic consumption of oil. Published on Saturday 13 October 2012. Website source. <http://www.arabnews.com/aramco-cut-domestic-consumption-oil>
- Arab News. KSA following strict environmental standards. 29 November 2013. Website source. <http://www.arabnews.com/news/484761>
- Ayesha Daya and Dana El Baltaji. *Saudi Arabia May Become Oil Importer by 2030*, Citigroup Says, Bloomberg Sustainability. Nd. <http://www.bloomberg.com/news/2012-09-04/saudi-arabia-may-become-oil-importer-by-2030-citigroup-says-1-.html>
- Benarie, M M. *Atmospheric Pollution 1982: International Colloquium Proceedings*. Burlington: Elsevier, 1982. Internet resource. <http://www.worldcat.org/title/atmospheric-pollution-1982-international-colloquium-proceedings/oclc/476216236>
- Boden, T.A., G. Marland and R.J. Andres. Carbon Dioxide Information Analysis Center, Saudi Arabia Fossil-Fuel CO<sub>2</sub> Emissions . 2011. Oak Ridge National Laboratory. [http://cdiac.ornl.gov/trends/emis/tre\\_sau.html](http://cdiac.ornl.gov/trends/emis/tre_sau.html)
- Brauch, Hans G. *Globalization and Environmental Challenges: Reconceptualizing Security in the 21st Century*. Berlin: Springer, 2008. Internet resource.
- Brebbia, C A, and V Popov. *Water Resources Management VI*. Southampton, U.K: WIT Press, 2011. Print. <http://www.worldcat.org/title/water-resources-management-vi/oclc/681502940>
- Brebbia, C.A., G. Passerini, and H. Itoh. *Waste Management and the Environment VII*. Southampton: WIT Press, 2014. Internet resource. <http://www.worldcat.org/title/waste-management-and-the-environment-vii/oclc/878109177>
- Brebbia, C A. *Environmental Health Risk: VII*. Southampton: WIT Press, 2013. Internet resource. <http://www.worldcat.org/title/environmental-health-risk-vii-ca-brebbia-and-r-kiss/oclc/842841171>
- Bristow, Colin M, and Peter W. Scott. *Industrial Minerals and Extractive Industry Geology: Based on Papers Presented at the Combined 36th Forum on the Geology of Industrial Minerals and 11th Extractive Industry Geology Conference, Bath, England, 7th - 12th May, 2000*. London: Geological Society, 2002. Print. <http://www.worldcat.org/title/industrial-minerals-and-extractive-industry-geology-based-on-papers-presented-at-the-combined-36th-forum-on-the-geology-of-industrial-minerals-and-11th-extractive-industry-geology-conference-bath-england-7th-12th-may-2000/oclc/249232454>

- Chopra, Kanchan R. *Ecosystems and Human Well-Being: Policy Responses: Findings of the Responses Working Group*. Washington: Island Press, 2005. Print.  
<http://www.worldcat.org/title/ecosystems-and-human-well-being-policy-responses-findings-of-the-responses-working-group/oclc/179772347>
- Colombo, Silvia. *Bridging the Gulf: EU-GCC Relations at a Crossroads*. Roma: Nuova cultura, 2014. Print. 205.
- Craik, Neil. *The International Law of Environmental Impact Assessment: Process, Substance and Integration*. Cambridge: Cambridge University Press, 2010. Print.  
<http://www.worldcat.org/title/international-law-of-environmental-impact-assessment-process-substance-and-integration/oclc/848634661>
- Ellis, Michael E. *Infectious Diseases of the Respiratory Tract*. Cambridge: Cambridge University Press, 1998. Print. <http://www.worldcat.org/title/infectious-diseases-of-the-respiratory-tract/oclc/36511555>
- Franckx, Erik. *Vessel-source Pollution and Coastal State Jurisdiction: The Work of the ILA Committee on Coastal State Jurisdiction Relating to Marine Pollution (1991-2000)*. Boston: Kluwer Law International, 2001. Print. 262. <http://www.worldcat.org/title/vessel-source-pollution-and-coastal-state-jurisdiction-the-work-of-the-ila-committee-on-coastal-state-jurisdiction-relating-to-marine-pollution-1991-2000/oclc/248653269>
- Gechev, Rumen. *Sustainable Development: Economic Aspects*. Indianapolis, IN: University of Indianapolis Press, 2005. Print. <http://www.worldcat.org/title/sustainable-development-economic-aspects/oclc/148646874>
- Global Environment Outlook*. London: Earthscan, 2002. Print.  
<http://www.worldcat.org/title/global-environment-outlook/oclc/223318784>
- Golusin, Mirjana, Stevan Popov, and Sinisa Dodic. *Sustainable Energy Management*. Burlington: Elsevier Science, 2013. Internet resource
- Gunther Handl. Declaration of the United Nations Conference on the Human Environment Stockholm, 16 June 1972. 2013. United Nations Website.  
<http://legal.un.org/avl/ha/dunche/dunche.html>
- Haggar, Salah. *Sustainable Industrial Design and Waste Management: Cradle-to-cradle for Sustainable Development*. Amsterdam: Elsevier Academic Press, 2007. Internet resource.  
<http://www.worldcat.org/title/sustainable-industrial-design-and-waste-management-cradle-to-cradle-for-sustainable-development/oclc/173649226>
- Harper, Robert A., Aswin Subanthore and Charles F. Gritzner. *Saudi Arabia*. New York: Chelsea House, 2007. Internet resource. <http://www.worldcat.org/title/saudi-arabia/oclc/228428841>
- Hassan, Daud. *Protecting the Marine Environment from Land-Based Sources of Pollution: Towards Effective International Cooperation*. Aldershot, England: Ashgate, 2005. Print.  
<http://www.worldcat.org/title/protecting-the-marine-environment-from-land-based-sources-of-pollution-towards-effective-international-cooperation/oclc/156238405>
- Jeffreys, Andrew. *The Report*. London: Oxford Business Group, 2011. Print.  
<http://www.worldcat.org/title/report-saudi-arabia-2010/oclc/808412613>



- Journal of the Air Pollution Control Association*. Pittsburgh, PA: 1955. Print. 1346.  
<http://www.worldcat.org/title/journal-of-the-air-pollution-control-association/oclc/1478631>
- Landon, Megan. *Environment, Health and Sustainable Development*. Maidenhead: Open University Press, 2006. Internet resource. <http://www.worldcat.org/title/environment-health-and-sustainable-development/oclc/244010554>
- Latham, S. *Our planet, harnessing the Power of the Sun: Saudi Arabia Builds Massive Solar Farm*. 2013. Website source. <http://ourplanet.infocentral.state.gov/tag/solar-power/>
- Legge, Allan H, and David Karnosky. *Air Quality and Ecological Impacts: Relating Sources to Effects*. Amsterdam: Elsevier Science, 2009. Internet resource.  
<http://www.worldcat.org/title/air-quality-and-ecological-impacts-relating-sources-to-effects/oclc/370435721>
- Longhurst, James W. S., and C A. Brebbia. *Air Pollution XX*. Southampton: WIT Press, 2012. Print. <http://www.worldcat.org/title/air-pollution-xx/oclc/769546915>
- McClanahan, T.R., Charles Sheppard, and David O. Obura. *Coral Reefs of the Indian Ocean: Their Ecology and Conservation*. New York: Oxford University Press, 2000. Internet resource. <http://www.worldcat.org/title/coral-reefs-of-the-indian-ocean-their-ecology-and-conservation/oclc/71361155>
- Pepper, D W, and C. A. Brebbia. *Water and Society*. Southampton: WIT Press, 2012. Print.160  
<http://www.worldcat.org/title/water-and-society/oclc/773025518>
- Review of Sustainable Development and Productivity Activities: Issue No. 1*. New York: UN, 2003. Print. <http://www.worldcat.org/title/review-of-sustainable-development-and-productivity-activities-issue-no-1/oclc/81427482>
- Shuval Šādiq, Muḥammad, and John C. MacCain. *The Gulf War Aftermath: An Environmental Tragedy*. Dordrecht: Kluwer, 1993. Print. <http://www.worldcat.org/title/gulf-war-aftermath-an-environmental-tragedy/oclc/26015124>
- Shaahid. S.M. and Elhadidy, M.A. Wind and solar energy at Dhahran, Saudi Arabia. *Renewable Energy*. 1994. Print.  
<http://www.sciencedirect.com/science/article/pii/0960148194900523>
- Shawly, Hassan H. *Urban Water: Integrated Resource Planning to Meet Future Demand in Jeddah - Saudi Arabia*. München: Oldenbourg Industrieverl, 2008. Print.
- Shuval, Hillel I., and Hassan Dwiek. *Water Resources in the Middle East: The Israeli-Palestinian Water Issues: from Conflict to Cooperation*. Berlin: Springer, 2007. Internet resource. <http://www.worldcat.org/title/water-resources-in-the-middle-east-the-israeli-palestinian-water-issues-from-conflict-to-cooperation/oclc/191467624>.
- Sillitoe, Paul. *Sustainable Development: An Appraisal of the Gulf Region*. New York: Berghahn Books, 2014. Internet resource. <http://www.worldcat.org/title/sustainable-development-an-appraisal-of-the-gulf-region/oclc/884645694>
- Sustainable Practices: Concepts, Methodologies, Tools, and Applications*, 2014. Internet resource. <http://www.worldcat.org/title/sustainable-practices-concepts-methodologies-tools-and-applications/oclc/864415003>

- Taher, Nahed, and Bandar Hajjar. *Energy and Environment in Saudi Arabia: Concerns & Opportunities*. Cham: Imprint: Springer, 2014. Internet resource.  
<http://www.worldcat.org/title/energy-and-environment-in-saudi-arabia-concerns-opportunities/oclc/867051941>
- Water and Sanitation in the World's Cities: Local Action for Global Goals*. London: Earthscan Publications, 2003. Print. <http://www.worldcat.org/title/water-and-sanitation-in-the-worlds-cities-local-action-for-global-goals/oclc/153316525>
- Water Scarcity in the Arab World*. New York: United Nations, 2003. Print.  
<http://www.worldcat.org/title/water-scarcity-in-the-arab-world/oclc/254850470>
- World Health Organization. World Summit on Sustainable Development. Nd. Website source.  
<http://www.who.int/wssd/en/>
- Zuhur, Sherifa. *Saudi Arabia*. Santa Barbara: ABC-CLIO, 2011. Print. 9.

## **CHAPTER 10**

### **10. Conclusions**

The Kingdom of Saudi Arabia is obliged to protect its environment. To do so, it deploys modern technology. It should also adopt and employ modern standards and environmental regulations to manage the use of its technology. Today, the Kingdom has embraced various techniques, although they are not sufficient to solve its key environmental problems. Ensuring proper enforcement of environmental regulations should be made a high national priority. This country faces unique challenges, including effects of climate change, lack of a sustainable water supply and food production, pollution due to oil spills, and air pollution due to the emission of toxic gases. On the other hand, the country has made significant strides in medical services, public health and the hospitality industry, which benefit from the use of the world standards and facilitators of best practices.

In view of this analysis, Saudi Arabia must broaden its perspective of environmental conservation by fostering adoption of best practices that suit the country's environmental enforcement interests. For example, improvement of environmental management can be sustained if the country makes use of experience drawn from countries with strong records of environmental regulations and policy making. International cooperation is also important since all countries have a shared concern for protection of earth's natural systems and should share together best knowledge in environmental issues. The Kingdom needs to translate and adapt this information for the good of everyone. Expert cooperation is essential since the country needs an all-inclusive environmental integration program that benefits from the best learning in places such as the United States and Europe, where transformative environmental management practices have been successfully applied over the past half century.

The Kingdom needs to build its environmental protection through inclusion of its citizens in enforcement and even in policy making. The citizens have the best understanding and knowledge of their own environment. They also have invaluable information about how proposed policies would affect their behaviour or interests. By collecting that information in a systemic way, regulators can optimize the contours of rules. The people also have a duty to protect their environment and must to learn how to do so. Then they can adequately implement the practices needed to safeguard their own environment. Therefore, regulators drawing from their own experience or that of foreign governments should propose rules in public and transparent ways to enable the public to share their perspectives in a timely focused way that will reveal the most likely impact of the rules as proposed. In addition to gaining these critical insights, public participation would foster public awareness and support for – and presumably voluntary compliance with – the resulting rules. In this way, public participation empowers the government to effect needed change.

### **10.1 Synthesis of the Themes**

The nine chapters of this dissertation build the case for sustainable development in Saudi Arabia. They examine very specific themes, which are components of the overall theme. This chapter reviews these various themes before drawing conclusions from their synthesis.

In the first chapter, the history of the environment of the Kingdom of Saudi Arabia sets the basis for understanding the country's progressive development toward achieving its socio-economic developmental plans. The Saudi Arabia has a thriving culture based on Islamic religion and laws, and as such its over 28 million residents are faithful to this dominant religion. This country's development outlook depends on its country's location, and the significant efforts it has made in international matters. For example, the Kingdom is a member of various

international organizations, which have cumulatively contributed to its growth and economic stability. In addition, Saudi Arabia enjoys a geographically strategic location. This country has a vast coastline of some 2,640 kilometres, including 1,800 kilometres running from the Gulf of Aqaba to the Red Sea. The environment of Saudi Arabia constrains what sustainable development can achieve.

Moreover, the Kingdom of Saudi Arabia enjoys robust economic development, and this contributes to its immense fortune derived from its oil and natural gas reserves. It controls approximately 18% of the world's proven reserves in petroleum products, while the country sustains its 75% of national revenue directly from these resources. In a nutshell, this country owes its social and economic growth to the vast reserves of oil and gas.

The country also has an extensive education system that has contributed to the high level of its civilization. Education about the environment and sustainable development is, however, lacking. There remain many social challenges in the country, such as an inadequate supply of fresh water. This problem merges into further problems, such as leading to poor sewage and waste disposal. The country lacks nation-wide environmental programs, thus subjecting it to an acute shortage of waste disposal and recycling programs. Happily initiatives such as those launched by the Jeddah Sewage and National Water Company will ultimately be expanded to allow proper waste disposal throughout the country. Such sustainability practices must be expanded and applied nationally.

Considering the critical themes examined in Chapter One, the following recommendations are necessary for successfully overcoming the challenges that the Kingdom faces. The country should improve its national water supply and sewage disposal by supporting world-class plants. This obligation will eliminate perennial shortages of clean fresh water. In

addition, this country is well positioned to cope with water pollution and sewage disposal with the proper investments. Considering the country's closer proximity to the Gulf and the Red Sea, it is recommended that stronger environmental legislation should be enacted and enforced against companies polluting the marine environment. The problem of poor waste disposal and discharge of crude oil to the seas could be reduced to much more manageable levels if companies knew that they would have to internalize the costs of their waste.

Agricultural productivity is another advantage conferred upon this great country. A warm climate is necessary for certain plants species; therefore, this country should adopt modern water irrigation and harvesting techniques to ensure that it has enough food for its population. Finally, the Ministry of Fisheries should encourage modern fishing techniques so as to diversify the economy and the sources of nutrition. There is a great potential in fishing, and it will generate substantial revenues, providing a long-term hedge on excessive reliance on revenues from finite (albeit abundant) supplies of oil and gas.

Many related themes set out in Chapter Three offer a detailed discussion of the sustainable policies in Saudi Arabia. In this regard, the concept of sustainable development is best comprehended by elaborating on various policies originally proposed in "Caring For the Earth" by adopting sustainable development goals and strengthening environment law. These measures principally to allow people to care for nature. Effective care for the Earth encompasses all socio-economic sectors, including adopting suitable land use systems. Echoing the passages of the mandate of caring for the earth was advanced and adopted in Agenda 21, and then in 2014 embodied in the Sustainable Development Goals. The SDGs' elaborate responsibilities seek to ensure that the earth is adequately cared for in all circumstances.

Unfortunately the governmental agencies with duties for sustainable development lack some capacity to care for the earth. For example, in the Kingdom as elsewhere the objective of ensuring that land use system is regulated in a sustainable manner is not being attained. Consequently, various conferences like the UN Rio+20 conference in 2012 promote and reaffirm sustainable environmental practices. The SDGs cover full range of issues affecting Saudi Arabia. How should the Kingdom act to become sustainable?

Today there is a common agreement about protection of plants and animal species, encouraging the use of renewable and eco-friendly sources of energy, and servicing the growing needs of an urbanizing population. The issues discussed in Chapter Three pertain to sustainable development in Saudi Arabia need urgently to be implemented. The following recommendations suggest how the Kingdom could ensure proper establishment and enforcement of sustainable policies. In the first instance, the country must uphold the implementation of policies that global environmental bodies have recommended. Highly operational legal formworks offer the best platform for successful implementation of these policies. As a means for upholding these policies, the Kingdom should create independent bodies to oversee the implementation of environmental policies. A Committee on Performance Evaluation has been proposed. This body would include participatory frameworks for both the civilian and the government agencies. Finally, the government should implement structures that lead and educate the public on proper environmental conservation and explain their limitations.

Chapter Four illustrates how Agenda 21 can guide development in the Kingdom to make wise decisions about sustainability. The first concern discussed under Agenda 21 and in the SDGs is poverty and sustainable development. Adopting sustainable social and economic practices is one way of eliminating poverty in the country. Therefore, poverty reduction is best

pursued within environmentally sound social welfare. Other than poverty reduction programs, cultivating sustainable consumption and production patterns is another key incentive to ensuring that human needs are met. In this context, adoption of controlled food consumption is a fundamental requirement for eliminating acute shortages. In addition, food shortages can also be eliminated by applying scientific methods of food production, storage and distribution. These are some techniques in which sustainable food production can be instituted in the Kingdom.

The third element of Agenda 21 relates to the protection of human and public health and environmental sustainability. Human health is essential for robust economic growth. To achieve this, the environment must be used in accordance with the stipulations under Agenda 21. This measure is thus essential for facilitating growth that is sustainable through improved health. Other elements that featured under Agenda 21 and relevant to Saudi Arabia include protection of the atmosphere by reducing air pollution and allowing clean air circulation. This can be enhanced more systematic measuring of industrial emissions. Other incentives that contribute sustainable development are promoting an integrated approach to the planning and management of land resources. Management by controlling emissions and discharge of water on the land is considered the best practice for ensuring pollution reduction. The Kingdom should develop an updated land use system, which includes formulating supportive land policies and laws. Agenda 21 also articulates the need for a reliable supply of fresh water and ensuring proper water conservation and management through flood control. These are issues that the Kingdom's new environmental agencies should address head on. The proposals in Chapter Four need to be superimposed on the existing sustainable development and environment agendas.

The following are some recommendations to implement guidelines and policies entailed in the Agenda 21. In the first instance, the poverty reduction programs should be all-inclusive



and must integrate both the rural and urban populations. This is a sure way of promoting sustainable poverty reduction plans within the country. The second recommendation relates to balanced production and consumption patterns in the country. Here, the Kingdom must evaluate the country's consumption patterns against the population demands before settling on given production limits. Therefore, development of a clear consumption and production plans is an important first step to ensure sustainable development and poverty reduction. Other than these recommendations, a roll-out of comprehensive health care program should be intensified. Efforts that are currently evidenced in the public health sectors should be sustained by expanding health facilities and educating more health care professionals. Last, but not least, the Kingdom should invest heavily in the construction of dams and other systems that control flooding, while at the same time assuring residents of continuous supply of water during dry spells.

Chapter Five discusses how Islam provides norms of conduct regarding the environment. The key norms are inscribed under the Islamic Principles of conserving the natural environment. The Qur'an and the teachings of Prophet Mohammed support underlying elements to these principles. Islamic teachings are largely drawn from the Holy Qur'an and are supportive of nature conservation and environmental protection. The attitude of the faith towards the environment is true, informative and constructive. Thus, Muslims value the environment as compliance with the God's requirement as evinced in the Qur'an, and by extension the teaching of Prophet Mohammed. Shari'ah demands taking action as a punitive measure against offenders against nature. Islam upholds the idea of environmental protection and requires strong punishment of the offenders against it. Environmental laws should be followed as inscribed in the Islamic doctrines and the holy book, and are the foundation for establishing a strong system of environmental laws in the Kingdom of Saudi Arabia.

Based on the themes of Chapter Five, it is recommended that the Kingdom strengthen governmental agencies that protect the environment and offer financial assistance to religious groups and to environmental groups supporting conservation. The country should initiate education and empowerment programs to promote activities of the Islamic religion, especially in their struggle to ensure that everyone adheres to the environmental codes of conducts. Other than offering assistance of this sort, the Kingdom of Saudi Arabia must roll-out programs that help religious groups better protect the country's environment. This should come in the form of empowerment programs to the Muslim community. This is valuable form of public participation in the Kingdom that needs to encourage.

Chapter Six set forth the environmental laws in the Kingdom. The legal system needs to be strengthened as both the Qur'an and Agenda 21 explain. Fundamental legal constructs here are based on Islamic Sharia laws. The legal system is a monarchy and based on Islamic laws. The King holds comprehensive powers and is the apex of leadership. Another important aspect of this chapter relates to the basic law of governance and how various organs are constituted. The King is the overall head of government and has responsibilities throughout the entire Kingdom. The Council of Ministers are part of this administrative system of authority. Council ministers are at the forefront to executing executive duties since their positions are mandated and acknowledged in the country's legal doctrines.

This chapter gives detailed coverage of the Kingdom's legal and administrative structures and shows how various laws are enacted and implemented in daily governance. In addition, the Kingdom has a well-established Shura Council or legislature that assists the King in making and enacting laws where necessary. Examples of such laws include the laws of the Council of

Ministers, which outline the executive duties of the 22 specially appointed ministers. Here, a minister may come up with regulation, which has to be scrutinized by the legislature.

Where any adjudication is needed, the judiciary comes in. This is the basic structure of authority in Saudi Arabia. The judicial system takes its legitimacy from the Islamic Sharia laws. It is headed by the Supreme Court which oversees inferior courts. The chain of authority in the judicial system enables referral of cases from the lower level to the topmost hierarchy. Notwithstanding its strengths and integrity, the capacity of the courts to enforce environmental laws could be enhanced to bring its power more in line with that of other systems.

While referring to the environmental laws, the Kingdom of Saudi Arabia is controlled by the National General Environmental Law and represented by the Presidency of Meteorology and Environment (PME). There are several agencies charged with monitoring of the environment. These bodies initiate relevant laws and pass to the subsequent authority for a possible implementation. The Kingdom's environmental governance system could be strengthened by adopting sustainable development recommendations. The public should be consulted by governmental agencies. Establishing a Committee on Performance Evaluation could integrate compliance systems and provide more substantial administrative oversight.

The following recommendations should be adopted in order to ensure meaningful structures for initiating and enforcing the most enlightened environmental rules. In this first instance, the PME's president should strengthen environmental laws and champion reforms in the Ministry of Energy and Petroleum, as these two sectors contribute significantly to pollution. In addition, the PME should be restructured so that its objective conforms to the world standards with regards to enforcement policies and regulations. Finally, the Council of Ministers must initiate sustainability policy formworks that are consistent with the Kingdom's environmental

protection agenda. These recommendations are bound to generate more effective policy reforms and management, as they have done in other countries.

There is some urgency in enacting reforms in the Kingdom. Chapter Seven describes the main environmental challenges facing Saudi Arabia, such as increasingly inadequate supply of fresh water. Desalinated water accounts for the most of the supply. The processing of salt water leads to large-scale pollution thus posing a great challenge, particularly to the marine environment and the air. Oil spills are another problem, as they contaminate oceans menacing aquatic life. The large petroleum extraction sites also pose a serious challenge to the country because they contribute to a higher degree of oil spillage into the land and the sea. The Kingdom relies on these seas for fish to eat. And all this activity contributes to climate change the impact of which threatens the Kingdom's environment in myriad ways. Finally, finding the most appropriate balance of energy systems presents yet another as the Kingdom works to find its sustainable future.

As stated earlier, environmental challenges can only be addressed if effective structures are established for instance in the areas of water and energy. There are useful reforms for the challenges facing the Kingdom of Saudi Arabia. Water shortages can be alleviated by harvesting enough water during the floods if enough water reservoirs and sluiceways are sited in the right places. In addition, the Ministry of Water and Sanitation should adopt new piping and sewer systems to help maintain these facilities. Having adequate water supply system is ideal for ensuring adequate fresh water. The Saudi Arabia must initiate new energy laws that facilitate the production of renewable energy. This can be achieved through government subsidies in the production of sustainable energy resources. Finally, the government must sponsor various

research institutions that would come up with sustainable measures of production. These institutions should be established and monitored by the government.

There are many best practices that the Kingdom can adopt to strengthen the administration of environmental laws throughout all sectors. Implementation and enforcement of environmental regulations is urgently required. In this regard, the Kingdom still grapples with the implementation and enforcement in part because it is not employing internationally accepted best practices. Establishing a National Environmental Inventory is an important first step; however its efforts have not proven adequate for overcoming the myriad challenges. Procedures such as those outlined in Chapter 8 are essential to sustainable development in the Kingdom.

Comparison between the US and the Kingdom in the implementation and enforcement of environmental regulations reveals much of what could be added to the Kingdom's approach. The EPA has made exemplary progress over the past half century enforcing critical laws. The next point of concern in this chapter refers to the availability of comprehensive and reliable environmental data. Good data has been essential for the EPA's successes. Widespread public awareness and concern has not yet arisen in the Kingdom, and consequently a lot of information has not yet been shared with the public. Public education campaigns could inform the people about how to care for the environment – and why. Also, monitoring of the environment is a mandate of the Presidency of Meteorology and Environment. However, the country lacks the some of the methodologies and standards necessary to fulfil this important mandate. Other than these themes, this chapter describes the roles of the proposed new Committee of Performance Evaluation, with a mandate to enforcing environmental standard and regulations. However, the procedures for enforcing these policies need to be promulgated.

In the US, all federal agencies have environmental compliance personnel and programs. In the Kingdom, there are none in most agencies. In order to implement and enforce sustainable development rules, it is important to adopt Facilitators of Best Practice, along with checklists and enforceable and manageable frameworks. Environmental protection is equally supported by using the International Organization for Standardization (ISO) standards, whose audits uphold laws governing discharge and emissions by industries. Both the ISO 14000 and 14001 feature as key standards to the overall environmental law implementation agenda. These standards set forth the consensus best practices for business and government agencies alike. Finally, the Kingdom needs an Environmental Management System, which provides a system and guidelines to companies and to governmental bodies for achieving their environmental goals.

The logic of conforming with the world-class environmental standards suggests that the Kingdom should adopt the following recommendations. First, the government should come up with clear guidelines that define the operations of the National Environmental Inventory. This institute should be given powers to monitor and punish citizens who violate environmental standards. In addition, the government should constitute a new civilian body that integrates public views to best inform enforcement of environmental regulations. This linkage is important since it bridges gaps between the public and the government agencies. The government should also establish or reform critical laws and standards to give AMENA and PME a more resolute approach. Finally, the government should create a new environmental standards and regulations body to companies that violate ISO standards. This institute will be tasked with ensuring that the companies understand and comply with these standards. Adopting these proposals should better enable the country to assure a sustainable future.

Chapter Nine describes the environmental challenges facing the Kingdom and proposes priority topics for action. Sustainability can best be with the adoption of sustainable development best practices and rules. For example, it is important to better monitor and regulate the production and use of fresh water. An adequate supply of fresh water is essential for robust industrial and human activities. Other elements include production of adequate, reliable and efficient sources of energy. The use of alternative energy systems will be useful in meeting the growing demand. Similarly, quality air must be maintained in order to protect the public health in urban centers, as well as slowing global warming and depletion of the ozone layer. Proper waste management and reducing instances of marine pollution are some means to ensure viable plans. These are some of key proposals for sustainability.

At the same time, the country should clarify its sustainable development goals and aspirations. Every strategy requires clearly defined goals. In the first case, this country should publish its environmental blueprint and remain vigilant that steps have been implemented within a stipulated timeframe. This will no doubt require quality monitoring of ambient environmental conditions, on the theory that you cannot improve what you do not measure. Moreover, evaluation of quality performance should be done every five years, and such assessments should be made on key environmental goals and projects.

## **10.2 Strengthening the Compliance Systems**

Despite numerous efforts by the government to gain compliance with environmental standards and regulations, the country still suffers from weaknesses that have unnecessarily impeded its efforts. Apparently some of the systems put in place to run environmental affairs are not as robust as necessary. For instance and as noted above, the government is unable to collect reliable data because the network of data centers is insufficient. Despite efforts to gather more

resources and information from international bodies and several global conferences, data collection and storage is still thin thereby compromising compliance. Fragmented research activities hinder collecting the data necessary for benchmarking. Vigorous government support for data collection and benchmarking might invigorate the entire compliance and enforcement regime.

The system for sustainable development is weaker than it should owe to lack of public participation or concern on environmental matters. The PME might be more successful if it sought out more information from the public. Without meaningful public participation, environmental regulations are unpopular with people who do not understand what the rules intend to accomplish. Principle 10 of the UN Declaration of Rio de Janeiro on Environment and Development illuminates the many empowering benefits of public participation. Instead, the Saudi public often feel remote from – or even hostile to – environment norms as something foisted on them. Compare this to the US experience in which the public is invited to study and comment on Environmental Impacts Statements. In a nutshell, the Kingdom should reform its current system establishing with a new, robust institution that will engage the public before making any significant policy change.

Compliance systems also require well-informed and highly diligent officials. Regulation is also notably impeded when officials lack knowledge of the laws and how to enforce them. These gaps make coordination and synergy among public institutions harder to achieve. Both the public and private institutions also lack a common platform of undertaking their activities, which results in problems in addressing critical environmental impacts. Lack of cohesion in implementing environmental agenda between private and public institution is yet another weakness of the enforcement systems. For instance, most institutions only meet minimal



compliance demands with in accordance already set regulations. There is no understanding about how to improve compliance with any standards. Critical system weakness also results because the majority of public institutions have limited scope in formulating critical environmental regulations and standards. In turn, they do not know how to improve compliance on rules of which they are unaware.

Finally, enforcement of environmental laws could be enhanced if key agencies (such as PME and AMENA) adopted more proactive postures. These are two critical bodies charged with making necessary guidelines and regulatory frameworks. They could train officials more fully on such instruments as international best practices and learn to reach out to more stakeholders earlier in the process in order to develop the best possible mechanisms. But mostly, they could improve outcomes by thinking in terms of sustainable development rather than merely prohibiting environmental harms. Great opportunities abound for strengthening environmental enforcement systems.

### **10.3 Modern Environmental Management System: ISO 14000 and INECE Systems**

There are several ways that the Kingdom can reform its environmental compliance and enforcement regimes. The international best practices that are in use through the ISO 14000 or INECE, should be implemented for establishing a sustainable environment. The first mode of application is by adopting worldwide best environmental practices, just as the country has sought to do in its public health and medical sectors. The Kingdom should thus adopt both the regulatory and non-regulatory policy frameworks used for managing the environment in modern economies such as the US and Europe. In addition to learning to use ISO 14000 or INECE systems, the country should enhance conformity with international environmental standards. This would generate huge advances in protecting the environment within the country. In addition,

adopting a better system to integrate regulatory and non-regulatory frameworks will aid the country in complete its flagship projects. For example, adopting firm standards as pronounced by INECs' system promotes production of sustainable energy, food, fresh water and allowing for better management of waste and sewage.

Considering the importance of environmental conservation and improvements, in 2009 INECE published its important book, *The Principles of Environmental Compliance Directory*. The government should aim to adhere to the principles outlined in this book. Setting priorities, designing effective requirements, monitoring compliance, and undertaking various enforcement responses to the set regulations are key mandates that the country can adopt in order to be comply. The Kingdom should adopt worldwide environmental standards including, market-based strategies for combatting environmental perils while encouraging cleaner industrial production methods.

In addition, the country must set a clear commitment to the environment by establishing the precedence of the legal thresholds for actions affecting the environmental. These laws with strong standards are critical in offering guidelines to the public and officers so that the share a common environmental platform. For example, prohibiting use of persistent organic pollutants is such an absolute rule. In addition, the Kingdom can better meet worldwide environmental standard by promoting equality before the law. Every person must be held liable for environmental harms she or he inflicts. There should be strict guidelines to both the public and the government in the management of the environment, and the enforcement of these rules must be monitored for equity. Indeed, this is the key element for ensuring proper conservation and management of the environment. Therefore, complying with elaborate standards in the

environmental management, just as the country does with the management in the health sectors, is considered one means of ensuring full compliance with better standards.

Complying with the ISO 14000 standards offers the Kingdom of Saudi Arabia ways to ensure it meets the worldwide environmental standards. In adhering to the ISO 14000 standards, the country will learn to adopt an environmental management system. EMS best practices are essential to integrating all the Kingdom's efforts, including any problems attributed to climate change. Climate change is best handled through an EMS framework in which coordination all environment rules and allow for safer industrial emission and discharge. By embracing EMS, the country will coordinate and upgrade its environmental compliance. In addition, taking cognizance of these standards will guarantee the country's compliance with the worldwide standards. In summary, complying by both INECE and ISO 14000 standards is one platform allows the Kingdom to adhere to modern sustainable environmental management systems.

Saudi Arabia has adopted such modern practices in other sectors. The uses the best techniques in its hospitality industry and has a modern petroleum sector as well as expansive and robust public health care services. This growth in health care is attributed to the country's commitment in providing key incentives required in the medical sector. There are sufficient hospitals; staffing level in most in hospitals is up to date. Principally, it is because the Kingdom incorporates modern systems in its hospitality and health industries, that is has achieved such laudable progress in these sectors. The use of state of art equipment and highly skilled medical practitioners contributes immeasurably to high quality of public health. Besides, the government makes it a mandate to ensure that every citizen is covered under comprehensive medical care. Such efforts thus translate into good health care. With functional system, a team of dedicated, well-motivated and qualified practitioners, the sector has performed incredibly well. These

efforts are the best ever made, and the progress is strategic. The same approach is required for the protection of the ambient public health and natural environment.

Saudi Arabia is much more likely to enjoy a clean and healthy environmental if it implements practices used by INECE and ISO 14000 to promote Sustainable Development. These best practices will streamline environmental and production levels and lead to a vibrant economy that is not only cleaner but also longer lived. In addition to these standards and regulations, the country will benefit from extensive growth in its environmental sectors. Proper monitoring and adoption of relevant regulations, coupled with government support, is the surest way of assuring this country a greater future e environmental sustainability.

#### **10.4 Relevance of the Principles of Qur'an to Environmental Clean-up and Sustainability**

The principles of Qur'an are central to environmental conservation and stability. There are several means that reflecting these principles will lead to a clean up of the environment and sustainable development. Environmental duties are included in the Qur'an. Fully observing these guidelines will lead to far greater conservation of the natural environment. The Qur'an states that God created the universe, and everything was given distinct roles, so everyone has a responsibility to protect the environment. This guideline should help promote precaution about and utmost respect for God's given environment. In addition, this principle highlights the environment as a God-given gift and, therefore, it is the mandate of human beings to protect it. Protection of the environment as commanded by God means keeping the environment clean, conserving plants and animals and participating in eco-friendly activities. This is the high baseline that the Qur'an sets for preserving the environment.

Other than the first principle, the second principle of conservation of the environment is fully captured through God's orders, as pronounced by Prophet Muhammad, that "He who has a

palm shoot in hand, should plant it.” According to this principle, the Qur’an articulates that God’s commands are supreme, and it instructs human beings to protect the environment. In this regards, God only allows one to cut down a tree only if he or she is ready to plant more. This principle ensures that land is not bare and has adequate trees and vegetation. In reference to this theory, it is worth noting that God’s commands on human beings promote abundance of nature through planting trees. In addition, this principle demands that we maintain the diversity of nature. Thus the Islamic belief is well supportive of the environmental conservation measures and practices. In addition, Islamic laws uphold honesty and dignity by ensuring a cleaner and secure environment.

If all nations can reflect on the Islamic rules and principles pertaining to the environment, then all sustainable measures on environmental regulations can be easily implemented. In the Saudi Arabia, the presence of Islamic doctrines and beliefs provide a good platform for environmental regulation. Instances of pollution and rampant felling of trees would be slowed if all states were to adopt the Islamic principles on the environment. This is the test upon which Islam judges.

This dissertation has examined how environment and sustainable productivity can be achieved when all relevant factors are understood and coordinate action is taken. Sustainability means that all social, economic and political factors must be integrated and work together in harmony. It is worth noting that most countries have immense environmental problems that are handled upon applying critical legal enforcement strategies. The concept of sustainable environment is thus attainable when a country implements global standards. In doing this work, all parties whose behaviour affects the environment must be engaged in the formulation and implementation of relevant laws. Any, inequality in the application of laws prevents their

effectiveness and is one the greatest problem facing many countries today. Public awareness and participation and involving key stakeholders is not expensive and offers the Kingdom its best means of ensuring that environmental laws are met.

For Saudi Arabia weaknesses in the system should be addressed directly. Critical environmental problems are emerging, undermining the conservation agenda. This country lacks viable frameworks necessary for managing the environment. Modes of production do not meet the international standards and exacerbate pollution, the shortage of fresh water, the lack of equitable distribution of energy resources, and poor environmental conservation. And if that were not reason enough, the UN's adoption of the Sustainable Development Goals provides another compelling reason to address these problems through the establishment of sustainable development best practices.

Saudi Arabia's environmental problems are seen by the Saudi people and by others around the world. The Kingdom's problems cannot be hidden. Fortunately, the tools to solve these problems are available, and the time has come to use them. Saudi Arabia can realize its SDGs by making full use of the available standards and measures. Its religious values and laws support doing so. Environmental law is a pillar for sustainable development that needs strengthening.

## Bibliography

- 101 Checklists for Successful Business in the Gulf: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, UAE.* Geneva, Switzerland: Business International, 1988. Print.  
<http://www.worldcat.org/title/101-checklists-for-successful-business-in-the-gulf-bahrain-kuwait-oman-qatar-saudi-arabia-uae/oclc/24102386>
- 5th Session of the United Nations Commission on Sustainable Development, Agenda 21- Saudi Arabia. Institution Aspects of Sustainable Development in Saudi Arabia Decision-Making: Strategies, Policies and Plans, “Conducted a field of study of toxic chemicals and hazardous waste in the Kingdom. Updated in April.1997. Internet source.  
<http://www.un.org/esa/agenda21/natlinfo/countr/saudi/inst.htm>
- A Study on the Evaluation of Environmental Impact Assessment in Selected ESCWA Countries.* New York: UN, 2002. Print. <http://www.worldcat.org/title/study-on-the-evaluation-of-environmental-impact-assessment-in-selected-escwa-countries/oclc/123415224>
- A Study on the Evaluation of Environmental Impact Assessment in Selected ESCWA Countries.* New York: UN, 2002. Print. <http://www.worldcat.org/title/study-on-the-evaluation-of-environmental-impact-assessment-in-selected-escwa-countries/oclc/123415224>
- ABB. Power and productivity for a better world. 2010. Internet source. ABB Flow Master flow meters are helping the Saudi Arabian capital, Riyadh, to cut leakage in its water distribution network by around 40 percent. The flow meters were repeatedly selected for their outstanding accuracy and performance.  
<http://www.abb.us/cawp/seitp202/f3a1801b3f54e7f4c12576ce00430977.aspx>
- Abdrubalrasou L M soa Al-Omran, Dr. Anwar and Abd EIRahman Aly. Status and New Developments on the use of Brackish Water for Agricultural Production in the Near East, Saudi Arabia Country Report. 2012, United Nations Food Agriculture Organization. 4.
- Abdullah F. Ansary. *A Brief Overview of the Saudi Arabian Legal System.* July 2008.  
<http://www.nyulawglobal.org/globalex/saudi>.
- Abdullah K Al- Ayoub, *Legal Systems in the Gulf States.* Nd. supra note (23) at 5A.80.6.
- Abed Khazendar, and Al-Riyadh. *Water will cost more than oil.* Saudi Gazette. 2013. Internet source.  
<http://www.saudigazette.com.sa/index.cfm?method=home.regcon&contentid=20130808176281>
- Abrol, D. P., and Uma Shankar. *Integrated Pest Management: Principles and Practice.* Cambridge, MA: CABI, 2012. Print. <http://www.worldcat.org/title/integrated-pest-management-principles-and-practice/oclc/713191656>
- Abu-Zinada, A H. *Protecting the Gulf’s Marine Ecosystems from Pollution.* Basel: Birkhauser, 2008. Internet resource. <http://www.worldcat.org/title/protecting-the-gulfs-marine-ecosystems-from-pollution/oclc/261324613>
- Ahmad, Mirza G, and Mirza G. Ahmad. *Our Teaching.* Islam International, 1996. Print.  
<http://www.worldcat.org/title/our-teaching/oclc/223163155>

- Ahmed Al-Suwaidi. Developments of the legal systems of the Gulf Arab States. 1993. 8 Arab L.Q. 289.
- Ahmed, Kulsum, and Triana E. Sánchez. *Strategic Environmental Assessment for Policies: An Instrument for Good Governance*. Washington, DC: World Bank, 2008. Print.  
<http://www.worldcat.org/title/strategic-environmental-assessment-for-policies-an-instrument-for-good-governance/oclc/191024008>
- Air quality and atmospheric pollution in the Arabia Region, Gas Emissions. Economic and Social Commission for Western Asia and League of Arab States.  
 Nd.[http://www.un.org/esa/sustdev/csd/csd14/escwaRIM\\_bp1.pdf](http://www.un.org/esa/sustdev/csd/csd14/escwaRIM_bp1.pdf)
- Al Bawaba, Saudi Arabia: Environmental issues (part one). Nd. <http://www.albawaba.com>
- Al-Azab, M, S Al-Ghais, and W El-Shorbagy. *Oil Pollution and Its Environmental Impact in the Arabian Gulf Region*. Amsterdam: Elsevier, 2005. Internet resource.  
<http://www.worldcat.org/title/oil-pollution-and-its-environmental-impact-in-the-arabian-gulf-region/oclc/427566293>
- Alberton, Mariachiara, and Francesco Palermo. *Environmental Protection in Multi-Layered Systems: Comparative Lessons from the Water Sector*. Leiden: M. Nijhoff Publishers, 2012. Print. <http://www.worldcat.org/title/environmental-protection-in-multi-layered-systems-comparative-lessons-from-the-water-sector/oclc/80105186>
- Al-Gilani, A. and Filor, S. Environmental policies in Saudi Arabia, *Journal of Environmental*. Nd
- AlHaj, Ali M. S. *Saudi Arabian Monetary Agency: A Review of Its Accomplishments, 1372 Ah-1411 Ah, 1952 G-1991 G*. Riyadh: publisher not identified, 1991. Print.  
<http://www.worldcat.org/title/saudi-arabian-monetary-agency-a-review-of-its-accomplishments-1372-ah-1411-ah-1952-g-1991-g/oclc/34281552>
- Al-Motairi, H. Water quality regulation and wastewater treatment and reuse in Saudi Arabia. Nd.
- Al-Musallam. Urban Water Sector Restructuring in Saudi Arabia'. Presentation to the Global Water International Conference, Barcelona, Spain, 2006, Print.  
[www.ukwrip.org/sites/default/files/.../Evidence\\_paper\\_-\\_2.docx](http://www.ukwrip.org/sites/default/files/.../Evidence_paper_-_2.docx)
- Al-Shuwalkhat, H and Aina, Y. Implementation of Strategic Environmental Assessment in Saudi Arabia 47(2). 2004. Print.
- Al-Tawail, Mohammed A. *Public Administration in the Kingdom of Saudi Arabia: A Study Presented to the Twentieth Congress of Administrative Sciences Organized by the International Institute of Administrative Sciences, Amman, Jordan, September 1986*. Saudi Arabia?: publisher not identified, 1986. Print. <http://www.worldcat.org/title/public-administration-in-the-kingdom-of-saudi-arabia-a-study-presented-to-the-twentieth-congress-of-administrative-sciences-organized-by-the-international-institute-of-administrative-sciences-amman-jordan-september-1986/oclc/28981008>
- Althunayan, Turki. *Dealing with the Fragmented International Legal Environment: Wto, International Tax and Internal Tax Regulations*. Berlin: Springer, 2010. Print.  
<http://www.worldcat.org/title/dealing-with-the-fragmented-international-legal-environment-wto-international-tax-and-internal-tax-regulations/oclc/449851705>



- Alyousef, Y, and Abu-ebid. M. Energy Efficiency Initiatives for Saudi Arabia on Supply and DemandSides, Energy Efficiency - A Bridge to Low Carbon Economy. 2012. Print : <http://www.intechopen.com/books/energy-efficiency-a-bridge-to-low-carboneconomy/energy-efficiency-initiatives-for-saudi-arabia-on-supply-and-demand-sides>
- Annual Statistical Bulletin. Organization of the petroleum exporting countries. 2014. Internet source. [http://www.opec.org/opec\\_web/en/about\\_us/169.htm](http://www.opec.org/opec_web/en/about_us/169.htm)
- Arab News. Aramco to cut domestic consumption of oil. Published on Saturday 13 October 2012. Website source. <http://www.arabnews.com/aramco-cut-domestic-consumption-oil>
- Arab News. KSA following strict environmental standards. 29 November 2013. Website source. <http://www.arabnews.com/news/484761>
- Article 10, Royal Order No.(A/90)27 Sha'ban 1412H. Basic Law of governance. Umm alQura Gazette No. 3397, 2 Ramadan 1412H, 1-5<sup>th</sup> March 1992, print.
- Artiola, Janick, Ian L. Pepper, and Mark L. Brusseau. *Environmental Monitoring and Characterization*. Burlington: Elsevier, 2004. Internet resource. <http://www.worldcat.org/title/environmental-monitoring-and-characterization/oclc/225441896>
- Audiovisual Library of International Law. Declaration of the United Nations Conference on the Human Environment 1972. December 6, 2012, 11:20 PM. <http://untreaty.un.org/cod/avl/ha/dunche/dunche.html>
- Ayesha Daya and Dana El Baltaji. Saudi Arabia May Become Oil Importer by 2030, Citigroup Says, Bloomberg Sustainability. Nd. <http://www.bloomberg.com/news/2012-09-04/saudi-arabia-may-become-oil-importer-by-2030-citigroup-says-1-.html>
- Ba Kader, A. Alsabbagh, A. and Alglenid, Azzidien, M. Islamic Principles for the conservation of the natural environment. 13-25. [https://www.iucn.org/about/work/programmes/environmental\\_law/elp\\_resources/elp\\_res\\_publications/?uPubsID=746](https://www.iucn.org/about/work/programmes/environmental_law/elp_resources/elp_res_publications/?uPubsID=746)
- Bagader, A. & Alsabbagh, A. & Alglenid, A. & Izzidien, M. Islamic Principles for the conservation of the natural environment.
- Banerjee, B. *Corporate Environmental Management: A Study with Reference to India*. New Delhi: PHI Learning Pvt Ltd, 2009. Print. <http://www.worldcat.org/title/corporate-environmental-management-a-study-with-reference-to-india/oclc/704513121>
- BAT. Conservation International, World Conservation Strategy. December 6, 2012. [www.batcon.org](http://www.batcon.org) › Media & Info › BATS Archives
- Benarie, M M. *Atmospheric Pollution 1982: International Colloquium Proceedings*. Burlington: Elsevier, 1982. Internet resource. <http://www.worldcat.org/title/atmospheric-pollution-1982-international-colloquium-proceedings/oclc/476216236>
- Blaser, Jürgen, Jane Carter, and D. A. Gilmour. *Biodiversity and Sustainable Use of Kyrgyzstan's Walnut-Fruit Forests: Proceedings of the Seminar, Arslanbob, Dzalal-Abab Oblast, Kyrgyzstan, 4-8 September 1995*. Gland, Switzerland: IUCN, 1998. Print. <http://www.worldcat.org/title/biodiversity-and-sustainable-use-of-kyrgyzstans-walnut->

- fruit-forests-proceedings-of-the-seminar-arslanbob-dzalal-abab-oblast-kyrgyzstan-4-8-september-1995/oclc/40050395
- Boden, T.A., G. Marland, and R.J. Andres. Carbon Dioxide Information Analysis Center, Saudi Arabia Fossil-Fuel CO<sub>2</sub> Emissions . 2011. Oak Ridge National Laboratory. [http://cdiac.ornl.gov/trends/emis/tre\\_sau.html](http://cdiac.ornl.gov/trends/emis/tre_sau.html)
- Bourquain, Knut. *Freshwater Access from a Human Rights Perspective: A Challenge to International Water and Human Rights Law*. Leiden: Martinus Nijhoff Publishers, 2008. Print. <http://www.worldcat.org/title/freshwater-access-from-a-human-rights-perspective-a-challenge-to-international-water-and-human-rights-law/oclc/233697428>
- Bowen, Wayne H. *The History of Saudi Arabia*. Westport, Conn: Greenwood Press, 2008. Print. <http://www.worldcat.org/title/history-of-saudi-arabia/oclc/166388162>
- Brackish Water for Agricultural Production in the Near East, Saudi Arabia Country Report. 2012, United Nations Food Agriculture Organization (ENE). [http://www.webcache.googleusercontent.com/search?q=cache:-x3HR\\_y4F7cJ:neareast.fao.org/Download.ashx%3FFile%3DFCKupload/BrackishWater/Pilot-Country-Reports/KSA\\_Country\\_Report\\_Brackish\\_Water.pdf+%&cd=2&hl=en&ct=clnk&gl=us](http://www.webcache.googleusercontent.com/search?q=cache:-x3HR_y4F7cJ:neareast.fao.org/Download.ashx%3FFile%3DFCKupload/BrackishWater/Pilot-Country-Reports/KSA_Country_Report_Brackish_Water.pdf+%&cd=2&hl=en&ct=clnk&gl=us)
- Brandon, Elizabeth. *Global Approaches to Site Contamination Law*. Dordrecht: Springer, 2013. Internet resource. <http://www.worldcat.org/title/global-approaches-to-site-contamination-law/oclc/820358853>
- Brans, Edward H. P. *The Scarcity of Water: Emerging Legal and Policy Responses*. London: Kluwer Law International, 1997. Print. <http://www.worldcat.org/title/scarcity-of-water-emerging-legal-and-policy-responses/oclc/36423508>
- Brauch, Hans G. *Globalization and Environmental Challenges: Reconceptualizing Security in the 21st Century*. Berlin: Springer, 2008. Internet resource.
- Brebbia, C A, and V Popov. *Water Resources Management VI*. Southampton, U.K: WIT Press, 2011. Print. <http://www.worldcat.org/title/water-resources-management-vi/oclc/681502940>
- Brebbia, C. A., G. Passerini, and H. Itoh. *Waste Management and the Environment VII*. Southampton: WIT Press, 2014. Internet resource. <http://www.worldcat.org/title/waste-management-and-the-environment-vii/oclc/878109177>
- Brebbia, C A. *Environmental Health Risk: VII*. Southampton: WIT Press, 2013. Internet resource. <http://www.worldcat.org/title/environmental-health-risk-vii-ca-brebbia-and-r-kiss/oclc/842841171>
- Bricker, Kelly S, Rosemary Black, and Stuart Cottrell. *Sustainable Tourism & the Millennium Development Goals: Effecting Positive Change*. Burlington, MA: Jones & Bartlett Learning, 2013. Print. 56
- Bristow, Colin M, and Peter W. Scott. *Industrial Minerals and Extractive Industry Geology: Based on Papers Presented at the Combined 36th Forum on the Geology of Industrial Minerals and 11th Extractive Industry Geology Conference, Bath, England, 7th - 12th May, 2000*. London: Geological Society, 2002. Print.

- <http://www.worldcat.org/title/industrial-minerals-and-extractive-industry-geology-based-on-papers-presented-at-the-combined-36th-forum-on-the-geology-of-industrial-minerals-and-11th-extractive-industry-geology-conference-bath-england-7th-12th-may-2000/oclc/249232454>
- Bruce, James P. *Economic and Social Dimensions of Climate Change: Contribution of Working Group Iii to the Second Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge Univ. Press, 1996. Print. 280.  
<http://www.worldcat.org/title/economic-and-social-dimensions-of-climate-change-contribution-of-working-group-iii-to-the-second-assessment-report-of-the-intergovernmental-panel-on-climate-change/oclc/247086842>
- Brundtland, Gro Harlem. *Report of the World Commission on Environment and Development: "Our Common Future"*. United Nations, 1987.
- Bryner, Gary C. *Gaia's Wager: Environmental Movements and the Challenge of Sustainability*. Lanham, MD: Rowman & Littlefield, 2000. Print. <http://www.worldcat.org/title/gaias-wager-environmental-movements-and-the-challenge-of-sustainability/oclc/248111787>
- Burhenne, Wolfgang E, and Alexandre C. Kiss. *A Law for the Environment: Essays in Honour of Wolfgang E. Burhenne = Un droit Pour L'environnement = Ein recht Für Die Umwelt*. Gland, 1994. Print. <http://www.worldcat.org/title/law-for-the-environment-essays-in-honour-of-wolfgang-e-burhenne-un-droit-pour-l'environnement-ein-recht-fur-die-umwelt/oclc/246962216>
- Burhenne-Guilmin, Françoise. *Environmental Law in Developing Countries: Selected Issues*. Gland, Switzerland: IUCN, 2001. Print. <http://www.worldcat.org/title/environmental-law-in-developing-countries-selected-issues/oclc/319215584>
- Carraro, Carlo, A Haurie, and Georges Zaccour. *Environmental Management in a Transition to Market Economy: A Challenge to Governments and Business: Proceedings of the International Conference Held at the University of Geneva, January 6-8, 1993*. Paris: Éditions Technip, 1994. Print. <http://www.worldcat.org/title/environmental-management-in-a-transition-to-market-economy-a-challenge-to-governments-and-business-proceedings-of-the-international-conference-held-at-the-university-of-geneva-january-6-8-1993/oclc/33048572>
- Case Study Solid Waste Treatment, Jeddah, Saudi Arabia. IROTEC Global Solutions. PP.2. [http://virotec.com/download/email/web\\_files/industrial-wastewater-remediation-viroflow/Case%20Study%20Jeddah%20Solid%20Waste.pdf](http://virotec.com/download/email/web_files/industrial-wastewater-remediation-viroflow/Case%20Study%20Jeddah%20Solid%20Waste.pdf)
- Chapin III, F. Stuart, Steward TA Pickett, Mary E. Power, Robert B. Jackson, David M. Carter, and Clifford Duke. "Earth stewardship: a strategy for social–ecological transformation to reverse planetary degradation." *Journal of Environmental Studies and Sciences* 1, no. 1 (2011): 44-53.
- Chasek, Pamela S, and Lynn M. Wagner. *The Roads from Rio: Lessons Learned from Twenty Years of Multilateral Environmental Negotiations*. New York: RFF Press, 2012. Print. 35
- Chopra, Kanchan R. *Ecosystems and Human Well-Being: Policy Responses: Findings of the Responses Working Group*. Washington: Island Press, 2005. Print.

- <http://www.worldcat.org/title/ecosystems-and-human-well-being-policy-responses-findings-of-the-responses-working-group/oclc/179772347>
- Chris E. Stapp, Mohamed S. Katkhouda, and Philip E. Reed. Environmental Protection Department Saudi Aramco Environmental Management System (EMS). 2011. Print. <http://www.saudiaramco.com/content/dam/Publications/Environews/Environews%20Winter%202011/SAEnvironmental.pdf>
- Christoffersen, Leif E, IUCN: A Bridge-BUILDER for Nature Conservation. Green Globe Year Book. 1997.60.
- Clean-up of Sewage Lakes: Case Studies in Jeddah and Riyadh, presentation to national water company, 2011. <http://www.nwc.com.sa/English/MediaCenter/Resources/Documents/Clean%20Up%20of%20Sewage%20Lakes.pptx>
- Clements, Frank. *Arab Regional Organizations*. New Brunswick, N.J. (U.S.A.: Transaction Publishers, 1992. Print. <http://www.worldcat.org/title/arab-regional-organizations/oclc/25410577>
- Clements, Frank. *Saudi Arabia*. Oxford, England: Clio Press, 1988. Print. <http://www.worldcat.org/title/saudi-arabia/oclc/20635670>
- Climate Institute. Oceans & Sea Level Rise. Consequences of Climate Change on the Oceans. Nd. Website source.
- Code of Federal Regulations, Title 40, Protection of Environment, Part 63 (sections 63.600-63.1199), Revised As of July 1, 2011*. United States Govt Printing Office, 2011. Print. <http://www.worldcat.org/title/code-of-federal-regulations-title-40-protection-of-environment-part-63-sections-63600-631199-revised-as-of-july-1-2011/oclc/759173306>
- Coenen, Frans H. J. M. *Public Participation and Better Environmental Decisions: The Promise and Limits of Participatory Processes for the Quality of Environmentally Related Decision-Making*. Dordrecht: Springer, 2009. Print. <http://www.worldcat.org/title/public-participation-and-better-environmental-decisions-the-promise-and-limits-of-participatory-processes-for-the-quality-of-environmentally-related-decision-making/oclc/260208418>.
- Collin, Robert W. *The Environmental Protection Agency: Cleaning Up America's Act*. Westport, Conn: Greenwood, 2006. Print. <http://www.worldcat.org/title/environmental-protection-agency-cleaning-up-americas-act/oclc/427538982>
- Collin, Robin M., and Robert W. Collin. *Encyclopedia of Sustainability*. Santa Barbara: ABC-CLIO, 2009. Internet resource. <http://www.worldcat.org/title/encyclopedia-of-sustainability/oclc/709839339>
- Colombo, Silvia. *Bridging the Gulf: EU-GCC Relations at a Crossroads*. Roma: Nuova cultura, 2014. Print.
- Comparative Criminal Justice Systems: Global and Local Perspectives*. Burlington, Mass: Jones & Bartlett Learning, 2012. Print. <http://www.worldcat.org/title/comparative-criminal-justice-systems-global-and-local-perspectives/oclc/820693192>

- Cordesman, Anthony H. *Saudi Arabia Enters the Twenty-First Century: The Political, Foreign Policy, Economic, and Energy Dimensions*. Westport, Conn: Praeger, 2003. Print.  
<http://www.worldcat.org/title/saudi-arabia-enters-the-twenty-first-century-the-political-foreign-policy-economic-and-energy-dimensions/oclc/51330553>
- Cotran, Eugene, and Martin Lau. *Yearbook of Islamic and Middle Eastern Law: Vol. 14*. Leiden: Martinus Nijhoff, 2009. Print. 14. <http://www.worldcat.org/title/yearbook-of-islamic-and-middle-eastern-law-vol-14-2008-2009/oclc/573397926>
- Country Profile. Johannesburg Summit Saudi Arabia. UN.2002. UN.  
<http://www.un.org/esa/agenda21/natinfo/wssd/saudiarabia.pdf>
- Coward, Harold G. *Population, Consumption, and the Environment: Religious and Secular Responses*. Albany, NY: State University of New York Press, 1995. Print.
- Crabbé, Philippe J. *Implementing Ecological Integrity: Restoring Regional and Global Environmental and Human Health*. Dordrecht: Kluwer Academic Publishers, 2000. Print.  
<http://www.worldcat.org/title/implementing-ecological-integrity-restoring-regional-and-global-environmental-and-human-health/oclc/247848486>
- Craik, Neil. *The International Law of Environmental Impact Assessment: Process, Substance and Integration*. Cambridge: Cambridge University Press, 2010. Print.  
<http://www.worldcat.org/title/international-law-of-environmental-impact-assessment-process-substance-and-integration/oclc/848634661>
- Croci, Edoardo. *The Handbook of Environmental Voluntary Agreements: Design, Implementation and Evaluation Issues*. Dordrecht: Springer, 2005. Internet resource.  
<http://www.worldcat.org/title/handbook-of-environmental-voluntary-agreements-design-implementation-and-evaluation-issues/oclc/209845365>
- Daily Kos New. Saudi King: Website source. We've halted new oil field exploration. 2010..<http://www.dailykos.com/story/2010/07/05/879306/-Saudi-King-We-ve-halted-new-oil-field-exploration>
- Das, Onita. *Environmental Protection, Security and Armed Conflict: A Sustainable Development Perspective*. Cheltenham, UK: Edward Elgar Pub, 2013. Print.
- Dashmishra, Manasranjan. *Political Economy of Development and Environmental Degradation in India*. New Delhi: Concept Pub. Co., 2011. Print.  
<http://www.worldcat.org/title/political-economy-of-development-and-environmental-degradation-in-india/oclc/747944793>
- Daven, James I, and Robert N. Klein. *Progress in Waste Management Research*. New York: Nova Science Publishers, 2008. Print. <http://www.worldcat.org/title/progress-in-waste-management-research/oclc/182621495>
- Davy, Benjamin. *Land Policy: Planning and the Spatial Consequences of Property*. Burlington, VT: Ashgate, 2012. Print. <http://www.worldcat.org/title/land-policy-planning-and-the-spatial-consequences-of-property/oclc/765880718>
- Dernbach, John C. *Stumbling Toward Sustainability*. Washington, DC: Environmental Law Institute, 2002. Print. <http://www.worldcat.org/title/stumbling-toward-sustainability/oclc/50404884>

- DeRouen, Karl R. and Paul Bellamy. *International Security and the United States: An Encyclopedia*. Westport, Conn: Praeger Security International, 2008. Print. <http://www.worldcat.org/title/international-security-and-the-united-states-an-encyclopedia/oclc/173640795>
- Dhamija, Urvashi. *Sustainable Solid Waste Management: Issues, Policies, and Structures*. New Delhi: Academic Foundation, 2006. Print. <http://www.worldcat.org/title/sustainable-solid-waste-management-issues-policies-and-structures/oclc/72871653>
- Donnelly, Annie, Barry Dalal-Clayton, and Ross Hughes. *A Directory of Impact Assessment Guidelines*. London: International Institute for Environment and Development, 1998. Print. <http://www.worldcat.org/title/adirectory-of-impact-assessment-guidelines/oclc/246091477>
- Economic aspects of sustainable development in Saudi Arabia. Sustainable Development UN (Agenda 21), Economic Aspects of Sustainable Development in Saudi Arabia, Waste and Hazardous Materials. Retrieved from the website on Sustainable Development. Nd. [www.un.org/esa/agenda21/natinfo/countr/saudi/eco.htm](http://www.un.org/esa/agenda21/natinfo/countr/saudi/eco.htm)
- Economy Watch. Saudi Arabia Economy. October 19, 2011. Internet source. [http://www.economywatch.com/world\\_economy/saudi\\_arabia](http://www.economywatch.com/world_economy/saudi_arabia)
- Edwards, A J. *Iso 14001 Environmental Certification Step by Step*. Oxford: Elsevier Butterworth-Heinemann, 2004. Internet resource. <http://www.worldcat.org/title/iso-14001-environmental-certification-step-by-step/oclc/162591130>
- Ellis, Michael E. *Infectious Diseases of the Respiratory Tract*. Cambridge: Cambridge University Press, 1998. Print. <http://www.worldcat.org/title/infectious-diseases-of-the-respiratory-tract/oclc/36511555>
- Emirates Meteorology Portal. 2011. <http://www.meteo.ae/blog/2011/01/26/jeddah-floods-january-2011>
- Empty Reforms: Saudi Arabia's New Basic Laws*. New York: Human Rights Watch, 1992. Print. 44.
- Encyclopaedia of the Qur'ān*: 3. Leiden: Brill, 2003. Print. <http://www.worldcat.org/title/encyclopaedia-of-the-quran-3-j-o/oclc/174929278>
- Encyclopedia Britannica. International Union for Conservation of Nature. December 4, 2012. (10:45 AM) <http://www.britannica.com/EBchecked/topic/291448/International-Union-for-Conservation-of-Nature-IUCN>
- Endres, Alfred, and Volker Radke. *Economics for Environmental Studies: A Strategic Guide to Micro and Macroeconomics*. Berlin: Springer, 2012. Internet resource. <http://www.worldcat.org/title/economics-for-environmental-studies-a-strategic-guide-to-micro-and-macroeconomics/oclc/809542591>
- Enforcement of Environmental Regulations: Hearings Before the Subcommittee on Environmental Pollution of the Committee on Environment and Public Works, United States Senate, Ninety-Sixth Congress, First Session, May 23 and 24, 1979*. Washington: U.S. Govt. Print. Office, 1979. Print. <http://www.worldcat.org/title/enforcement-of-environmental-regulations-hearings-before-the-subcommittee-on-environmental->

- pollution-of-the-committee-on-environment-and-public-works-united-states-senate-ninety-sixth-congress-first-session-may-23-and-24-1979/oclc/5901955
- Environment & Planning*: A. London: Pion Ltd., 1974. Print.  
<http://www.worldcat.org/title/environment-planning-a/oclc/1945034>
- Environmental Cleanup at Navy Facilities: Adaptive Site Management*. Washington, DC: National Academies Press, 2003. Print. <http://www.worldcat.org/title/environmental-cleanup-at-navy-facilities-adaptive-site-management/oclc/839925019>
- Environmental Impact Assessment, NEPA National Environmental Policy Act and Related Requirements: Ali-aba Course of Study Materials*. Philadelphia, Pa: American Law Institute, 1997. Print. <http://www.worldcat.org/title/environmental-impact-assessment-nepa-national-environmental-policy-act-and-related-requirements-ali-aba-course-of-study-materials/oclc/38826515>
- Environmental Law. Cambridge: Cambridge University Press, 2012. Print. 44
- Environmental Management Framework for Ports and Related Industries*. Brussels, Belgium: PIANC General Secretariat, 1999. Print. <http://www.worldcat.org/title/environmental-management-framework-for-ports-and-related-industries/oclc/43479509>
- Environmental Management Systems: A Tool to Help Water Utilities Manage More Effectively*. Denver, Colo: AWWA Research Foundation, 2006. Print.  
<http://www.worldcat.org/title/environmental-management-systems-a-tool-to-help-water-utilities-manage-more-effectively/oclc/70870639>
- Environmental Performance Reviews*. Paris, France: OECD, 2002. Internet resource.  
<http://www.worldcat.org/title/environmental-performance-reviews-united-kingdom/oclc/190823644>
- Environmental Performance Reviews: <czech>*. Paris: OECD, 2005. Print. 2002.
- Environmental Performance Reviews: Second Review*. New York: United Nations, 2007. Print.  
<http://www.worldcat.org/title/environmental-performance-reviews-republic-of-montenegro-second-review/oclc/173205961>
- Environmental protection standards, appendix-2. More information's (Environmental assessment of development projects information from for first category projects and from second category projects. Guidelines for compiling an environmental impact assessment study.) Sands, Philippe, and Paolo Galizzi. *Documents in International Environmental Law*. Cambridge: Cambridge University Press, 2004. Print. 814.
- Environmental Standards Prevention of Major Accidents, (PME),2012  
[http://www.pme.gov.sa/en/En\\_EnvStand5.pdf](http://www.pme.gov.sa/en/En_EnvStand5.pdf)
- Evans, James. *Environmental Governance*. Milton Park Abingdon, Oxon: Routledge, 2012. Print. <http://www.worldcat.org/title/environmental-governance/oclc/701015746>
- Fatani, Rafid. Saudi Arabia Strategic Consulting (SASIC). Nd. [www.sasiconsult.com](http://www.sasiconsult.com)
- Fauchald, Ole K, David Hunter, and Wang Xi. *Yearbook of International Environmental Law: Volume 19*. New York: Oxford University Press, n.d.. Print.

- <http://www.worldcat.org/title/yearbook-of-international-environmental-law-volume-19-2008/oclc/800567357>
- Faure, M., and N. Niessen. *Environmental Law in Development: Lessons from the Indonesian Experience*. Cheltenham: Edward Elgar Pub, 2006. Internet resource.<http://www.worldcat.org/title/environmental-law-in-development-lessons-from-the-indonesian-experience/oclc/476020532>
- Finfacts Premium. Saudi Arabia: Petrol is cheaper than bottled water. 2011. <http://www.finfacts-premium.com/free/global/saudi-arabia-petrol-cheaper-bottled-water>
- Franckx, Erik. *Vessel-source Pollution and Coastal State Jurisdiction: The Work of the ILCA Committee on Coastal State Jurisdiction Relating to Marine Pollution (1991-2000)*. Boston: Kluwer Law International, 2001. Print. 262. <http://www.worldcat.org/title/vessel-source-pollution-and-coastal-state-jurisdiction-the-work-of-the-ila-committee-on-coastal-state-jurisdiction-relating-to-marine-pollution-1991-2000/oclc/248653269>
- Gallagher, Kevin P. *Handbook on Trade and the Environment*. Cheltenham: Edward Elgar, 2009. Print.
- Gechev, Rumen. *Sustainable Development: Economic Aspects*. Indianapolis, IN: University of Indianapolis Press, 2005. Print. <http://www.worldcat.org/title/sustainable-development-economic-aspects/oclc/148646874>
- Gelil, Dr. Ibrahim Abdel. League of Arab States: Camre. The Sustainable Development Initiative in the Arab Region, Third Progress Report, 2011 print. <http://css.escwa.org.lb/sdpd/1545/3rd.pdf>
- General Environmental Law and Rules for Implementation, 28 Rajab 1422 H .2001. [http://www.pme.gov.sa/en/env\\_regul.asp](http://www.pme.gov.sa/en/env_regul.asp)
- Genske, Dieter D. *Urban Land: Degradation, Investigation, Remediation: with 28 Tables*. Berlin: Springer, 2003. Print. <http://www.worldcat.org/title/urban-land-degradation-investigation-remediation-with-28-tables/oclc/231974096>
- Gerrard, Michael, and Sheila R. Foster. *Law of Environmental Justice: Theories and Procedures to Address Disproportionate Risks*. Chicago, Ill: American Bar Association, Section of Environment, Energy, and Resources, 2008. Print. <http://www.worldcat.org/title/law-of-environmental-justice-theories-and-procedures-to-address-disproportionate-risks/oclc/212021683>
- Global Environment Outlook 5, Environment for the future we want <http://www.unep.org/geo/geo5.asp>
- Global Environment Outlook*. London: Earthscan, 2002. Print. <http://www.worldcat.org/title/global-environment-outlook/oclc/223318784>
- Go between*. Geneva, Switzerland: NGLS, 1900. Print. <http://www.worldcat.org/title/go-between/oclc/26686877>
- Gökçekus, Hüseyin, Umut Türker, and James W. LaMoreaux. *Survival and Sustainability: Environmental Concerns in the 21st Century*. Berlin, Heidelberg: Springer-Verlag Berlin Heidelberg, 2011. Internet resource



- Goldman, Benjamin A. *Hazardous Waste Management: Reducing the Risk*. Washington DC: Island Pr, 1986. Print. 152. <http://www.worldcat.org/title/hazardous-waste-management-reducing-the-risk/oclc/715821369>
- Golusin, Mirjana, Stevan Popov, and Sinisa Dodic. *Sustainable Energy Management*. Burlington: Elsevier Science, 2013. Internet resource`
- Goudzwaard, Bob, Vennen M. R. Vander, and Lange H. M. De. *Beyond Poverty and Affluence: Toward an Economy of Care : with a Twelve-Step Program for Economic Recovery*. Grand Rapids, MI: W.B. Eerdmans, 1995. Print. <http://www.worldcat.org/title/beyond-poverty-and-affluence-toward-an-economy-of-care-with-a-twelve-step-program-for-economic-recovery/oclc/611234461>
- Green Economy Blue Full. UNEP, FAO, IMO, UNDP, IUCN, WorldFish Center, GRIDArendal. 2012. Print. 13. [www.unep.org/pdf/Green\\_Economy\\_Blue\\_Full.pdf](http://www.unep.org/pdf/Green_Economy_Blue_Full.pdf)
- Gunther Handl. Declaration of the United Nations Conference on the Human Environment Stockholm, 16 June 1972. 2013. United Nations Websites. <http://legal.un.org/avl/ha/dunche/dunche.html>
- Habeeb, Kais S. *Solid Waste Management During the Haj Pilgrimage, Mecca, Saudi Arabia*. , 1987. Print. <http://www.worldcat.org/title/solid-waste-management-during-the-haj-pilgrimage-mecca-saudi-arabia/oclc/25702392>
- Hackett, Steven C. *Environmental and Natural Resources Economics: Theory, Policy, and the Sustainable Society*. Armonk, NY: M.E. Sharpe, 2011. Print. <http://www.worldcat.org/title/environmental-and-natural-resources-economics-theory-policy-and-the-sustainable-society/oclc/607084151>
- Hadith of sound authority, related by al-Bukhari and Muslim on the authority of Anas.
- Haggar, Salah. *Sustainable Industrial Design and Waste Management: Cradle-to-cradle for Sustainable Development*. Amsterdam: Elsevier Academic Press, 2007. Internet resource. <http://www.worldcat.org/title/sustainable-industrial-design-and-waste-management-cradle-to-cradle-for-sustainable-development/oclc/173649226>
- Halabi, Ahmed. Security environment in Islam, security magazine, No 13.1995.
- Halbert, Terry, and Elaine Ingulli. *Law & Ethics in the Business Environment*. Mason, OH: South-Western Cengage Learning, 2012. Print. <http://www.worldcat.org/title/law-ethics-in-the-business-environment/oclc/700312277>
- Hallaq, Wael B. *The Origins and Evolution of Islamic Law*. Cambridge [u.a.: Cambridge University Press, 2010. Print. <http://www.worldcat.org/title/origins-and-evolution-of-islamic-law/oclc/723483283>
- Hanneke Van Lavieren, and Rebecca Klaus. An effective regional Marine Protected Area network for the ROPME Sea Area: Unrealistic vision or realistic possibility? Marine Pollution Bulletin. 2012. Print. 2. <http://inweh.unu.edu/wp-content/uploads/2013/05/VanLavierenandKlaus2012.pdf>
- Harper, Robert A., Aswin Subanthore, and Charles F. Gritzner. *Saudi Arabia*. New York: Chelsea House, 2007. Internet resource. <http://www.worldcat.org/title/saudi-arabia/oclc/228428841>

- Hassan, Daud. *Protecting the Marine Environment from Land-Based Sources of Pollution: Towards Effective International Cooperation*. Aldershot, England: Ashgate, 2005. Print. <http://www.worldcat.org/title/protecting-the-marine-environment-from-land-based-sources-of-pollution-towards-effective-international-cooperation/oclc/156238405>
- Hens, Luc, and Bhaskar Nath. *The World Summit on Sustainable Development: The Johannesburg Conference*. Dordrecht: Springer, 2005. Internet resource. <http://www.worldcat.org/title/world-summit-on-sustainable-development-the-johannesburg-conference/oclc/209847997>
- Iacono, Max. *Human Resources Management, Corporate Citizenship and Small Business Development: Technical Report for Discussion*. Geneva: ILO, 1999. Print. <http://www.worldcat.org/title/human-resources-management-corporate-citizenship-and-small-business-development-technical-report-for-discussion/oclc/45345458>
- Indian Tiger Welfare Society. WWF-World Wide Fund for Nature. December 5, 2012, 7:10 Pm. Website source. <http://www.indiantiger.org/wildlife-organizations/wwf-world-wide-fund-for-nature.html>
- Indicators of Sustainable Development: Guidelines and Methodologies*. New York: United Nations, 2001. Internet resource. <http://www.worldcat.org/title/indicators-of-sustainable-development-guidelines-and-methodologies/oclc/312371665>
- Information Office of the Royal Embassy of Saudi Arabia. About Saudi Arabia; culture and art. Copyright at 2013, press. < [http://www.saudiembassy.net/about/country-information/culture\\_art](http://www.saudiembassy.net/about/country-information/culture_art)
- IPCC. Fifth Assessment Report (AR5). Nd. <http://www.ipcc.ch/#>
- IUCN Academy of Environmental Law. International Union for Conservation of Nature Academy of Environmental Law, history of the academy. December 4, 2012, 11:30 AM. IUCN Website. <http://www.iucnael.org/en/about-us/history-of-the-academy.html>
- IUCN. What is the IUCN Programme. Working for people and nature. Last updated on updated: December 7, 2014 December 6, 2014, 6:30 PM). IUCN Website. [http://www.iucn.org/what/global\\_programme/](http://www.iucn.org/what/global_programme/)
- ‘Izz, al-Dīn M. Y. *The Environmental Dimensions of Islam*. Cambridge, UK: Lutterworth Press, 2000. Print. <http://www.worldcat.org/title/environmental-dimensions-of-islam/oclc/869010128>
- Jabbara, Joseph G., and O. P. Dwivedi. *Governmental Response to Environmental Challenges in Global Perspective*. Amsterdam: IOS Press, 1998. Print. <http://www.worldcat.org/title/governmental-response-to-environmental-challenges-in-global-perspective/oclc/300261679>
- Jackson, Suzan L. *The ISO 14001 Implementation Guide: Creating an Integrated Management System*. New York: J. Wiley, 1997. Print. <http://www.worldcat.org/title/iso-14001-implementation-guide-creating-an-integrated-management-system/oclc/300170030>
- James R Silkenat, Jeffrey M Aresty. The ABA guide to international business negotiations. 852 Jacqueline kloser editors. 2009. Print

- Jeffreys, Andrew. *The Report*. London: Oxford Business Group, 2011. Print.  
<http://www.worldcat.org/title/report-saudi-arabia-2010/oclc/808412613>
- Jian, Song, and Jakob Nüesch. *Food & Water: A Question of Survival*. Zürich: vdf, Hochschulverlag an der ETH Zürich, 1997. Print. <http://www.worldcat.org/title/food-water-a-question-of-survival/oclc/83672971>
- Jiménez, Cisneros B. E, and Takashi Asano. *Water Reuse: An International Survey of Current Practice, Issues and Needs*. London: IWA Pub, 2008. Print.  
<http://www.worldcat.org/title/water-reuse-an-international-survey-of-current-practice-issues-and-needs/oclc/148633254>
- Jodoin, Sébastien and Segger M.-C. Cordonier. *Sustainable Development, International Criminal Justice, and Treaty Implementation*. 2013. Print.
- Johannesburg Summit. Saudi Arabia, country profile, UN. Chapters 20 TO 22: Environmentally Sound Management of Hazardous, Solid and Radioactive Wastes. 2002. Print.39  
<http://www.un.org/esa/agenda21/natlinfo/wssd/saudiarabia.pdf>.
- Johany, Ali D, Michel Berne, and J W. Mixon. *The Saudi Arabian Economy*. Baltimore: Johns Hopkins University Press, 1986. Print. <http://www.worldcat.org/title/saudi-arabian-economy/oclc/13003489>
- Jones, Tom. *Sustainable Development: Critical Issues*. Paris: OECD, 2001. Print. *Go between. Ibid:* 112. <http://www.worldcat.org/title/sustainable-development-critical-issues/oclc/150153927>
- Journal of South Asian and Middle Eastern Studies*. Villanova, PA: Published under the auspices of the Pakistan American Foundation, 1977. Print.
- Journal of the Air Pollution Control Association*. Pittsburgh, PA: The Association, 1955. Print. 1346. <http://www.worldcat.org/title/journal-of-the-air-pollution-control-association/oclc/1478631>
- K.S.A . Law of the Shura council. Nd. Article (3,13)
- K.S.A .Succession Commission Law. Nd. Article (7).
- K.S.A, article. Law of provinces. Published in Umm alQura Gazette No. 3397, 2 Ramadan 1412H - 5 March 1992. Article (2,4) Royal Order No. (A/92)27 Sha’ban 1412H.
- K.S.A. Law of the council of ministers. Article (7,29).
- Kaebnick, Gregory E, and Lori P. Knowles. *Reprogenetics: Law, Policy, and Ethical Issues*. Baltimore, MD: Johns Hopkins University Press, 2007. Internet resource.  
<http://www.worldcat.org/title/reprogenetics-law-policy-and-ethical-issues/oclc/794701445>
- Kannan, A. *Global Environmental Governance and Desertification: A Study of Gulf Cooperation Council Countries*. New Delhi: Concept Pub. Co., 2012. Print.  
<http://www.worldcat.org/title/global-environmental-governance-and-desertification-a-study-of-gulf-cooperation-council-countries/oclc/768399264>
- Kechichian, Joseph A. *Succession in Saudi Arabia*. New York, NY: Palgrave, 2001. Internet resource. <http://www.worldcat.org/title/succession-in-saudi-arabia/oclc/179157120>

- Kelemen, R D. *The Rules of Federalism: Institutions and Regulatory Politics in the Eu and Beyond*. Cambridge, MA: Harvard University Press, 2004. Internet resource.  
<http://www.worldcat.org/title/rules-of-federalism-institutions-and-regulatory-politics-in-the-eu-and-beyond/oclc/648548427>
- Kelliher, Felicity, and Leana Reinl. *Green Innovation and Future Technology: Engaging Regional Smes in the Green Economy*. 2014. Internet resource.  
<http://www.worldcat.org/title/green-innovation-and-future-technology-engaging-regional-smes-in-the-green-economy/oclc/89461058222>
- Khan, Nuzrat Y, Mohiuddin Munawar, and Andrew R. G. Price. *The Gulf Ecosystem: Health and Sustainability*. Leiden: Backhuys, 2002. Print. <http://www.worldcat.org/title/gulf-ecosystem-health-and-sustainability/oclc/248660893>
- Kingdom of Saudi Arabia. Environmental technologies export market plan, Waste management and recycling. 2013. 2  
[http://export.gov/%5C/static/Saudi%20EnvTech%20export%20plan%202013\\_Latest\\_eg\\_main\\_067305.pdf](http://export.gov/%5C/static/Saudi%20EnvTech%20export%20plan%202013_Latest_eg_main_067305.pdf)
- Kjellén, Bo, Irving M. Mintzer, J .A. Leonard, and Michael Chadwick. *Negotiating Climate Change: The Inside Story of the Rio Convention*. Cambridge: Cambridge Univ. Press, 1994. Print. <http://www.worldcat.org/title/negotiating-climate-change-the-inside-story-of-the-rio-convention/oclc/185332953>
- Koh, Kheng L, Lin H. Lye and Jolene Lin. *The Crucial Issues in Climate Change and the Kyoto Protocol: Asia and the World*. Singapore: World Scientific Pub. Co., 2010. Internet resource. <http://www.worldcat.org/title/crucial-issues-in-climate-change-and-the-kyoto-protocol-asia-and-the-world/oclc/613343377>
- KSA. Ministry of petroleum and mineral resources. Nd.  
[http://www.mopm.gov.sa/mopm/detail.do?content=environment\\_mining](http://www.mopm.gov.sa/mopm/detail.do?content=environment_mining)
- Kulovesi, Kati. *The Wto Dispute Settlement System: Challenges of the Environment, Legitimacy and Fragmentation*. Alphen aan den Rijn: Wolters Kluwer Law & Business, 2011. Print. <http://www.worldcat.org/title/wto-dispute-settlement-system-challenges-of-the-environment-legitimacy-and-fragmentation/oclc/753324106>
- Kummer, Katharina. *International Management of Hazardous Wastes: The Basel Convention and Related Legal Rules*. Oxford: Oxford University Press, 1999. Print.33
- Kuokkanen, Tuomas. *International Law and the Environment: Variations on a Theme*. The Hague: Kluwer law international, 2002. Print. <http://www.worldcat.org/title/international-law-and-the-environment-variations-on-a-theme/oclc/491290088>
- Kurokawa, Kosuke, Keiichi Komoto, der V. P. Van, and David Faiman. *Energy from the Desert: Practical Proposals for Very Large Scale Photovoltaic Systems*. London: Earthscan, 2006. Internet resource.
- Kwiatkowska, Barbara. *International Organizations and the Law of the Sea: Documentary Yearbook*. London: Graham & Trotman, 1987. Print.  
<http://www.worldcat.org/title/international-organizations-and-the-law-of-the-sea-documentary-yearbook-vol-1-1985/oclc/225028356>

- Labour and the Environment: A Natural Synergy*. Nairobi, Kenya: Major Groups and Stakeholders Branch, Division of Regional Cooperation, United Nations Environment Programme, 2007. Print. <http://www.worldcat.org/title/labour-and-the-environment-a-natural-synergy/oclc/173500078>
- Landon, Megan. *Environment, Health and Sustainable Development*. Maidenhead: Open University Press, 2006. Internet resource. <http://www.worldcat.org/title/environment-health-and-sustainable-development/oclc/244010554>
- Larsson, Marie-Louise. *Law of Environmental Damage: Liability and Reparation*. The Hague: Kluwer Law International, 1999. Print. <http://www.worldcat.org/title/law-of-environmental-damage-liability-and-reparation/oclc/186591115>
- Latham, S. Our planet, harnessing the Power of the Sun: Saudi Arabia Builds Massive Solar Farm. 2013. Website source. <http://ourplanet.infocentral.state.gov/tag/solar-power/>
- Leadership Resources: A Guide to Training and Development Tools*. Greensboro, N.C: Center for Creative Leadership, 1998. Print. <http://www.worldcat.org/title/leadership-resources-a-guide-to-training-and-development-tools/oclc/40183350>
- Legge, Allan H, and David Karnosky. *Air Quality and Ecological Impacts: Relating Sources to Effects*. Amsterdam: Elsevier Science, 2009. Internet resource. <http://www.worldcat.org/title/air-quality-and-ecological-impacts-relating-sources-to-effects/oclc/370435721>
- Legum, Colin, Haim Shaked, Itamar Rabinovich, Ami Ayalon, and Bruce Maddy-Weitzman. *Middle East Contemporary Survey*. New York: Holmes & Meier, 1977. Print.
- Lester R. Brown. Full Planet, Empty Plates: The New Geopolitics of Food Scarcity. 2012. Chapter 6. Peak Water and Food Scarcity. <http://www.earth-policy.org/books/fpep/fpepch6>
- Lichfield, Nathaniel. *Evaluation in Planning: Facing the Challenge of Complexity*. Dordrecht: Kluwer Acad. Publ., 1998. Print. <http://www.worldcat.org/title/evaluation-in-planning-facing-the-challenge-of-complexity/oclc/231763983>
- Liebenthal, Andrés. *Promoting Environmental Sustainability in Development: An Evaluation of the World Bank's Performance*. Washington, DC: World Bank, 2002. Print. <http://www.worldcat.org/title/promoting-environmental-sustainability-in-development-an-evaluation-of-the-world-banks-performance/oclc/248567410>
- Lippman, Thomas W. *Saudi Arabia on the Edge: The Uncertain Future of an American Ally*. Washington, DC: Potomac Books, 2012. Print. <http://www.worldcat.org/title/saudi-arabia-on-the-edge-the-uncertain-future-of-an-american-ally/oclc/728840649>
- Longhurst, James W. S, and C A. Brebbia. *Air Pollution Xx*. Southampton: WIT Press, 2012. Print. <http://www.worldcat.org/title/air-pollution-xx/oclc/769546915>
- Lovei, Magda, and Charles Weiss. *Environmental Management and Institutions in OECD Countries: Lessons from Experience*. Washington, DC: World Bank, 1998. Print. <http://www.worldcat.org/title/environmental-management-and-institutions-in-oecd-countries-lessons-from-experience/oclc/231789013>

- Macrory, Richard. *Regulation, Enforcement and Governance of Environmental Law*. London: Cameron May, 2008. Print. 261 <http://www.worldcat.org/title/regulation-enforcement-and-governance-of-environmental-law/oclc/213436022>
- Mahdi, Wael. Saudi 'slow to act on climate change. 2009. Website source. <http://www.thenational.ae/news/worldwide/middle-east/saudi-slow-to-act-on-climate-change>
- Mallat, Chibli. *Introduction to Middle Eastern Law*. Oxford, England: Oxford University Press, 2007. Print. <http://www.worldcat.org/title/introduction-to-middle-eastern-law/oclc/86166549>
- Manfredo, Michael J. *Understanding Society and Natural Resources: Forging New Strands of Integration Across the Social Sciences*. 2014. Internet resource. <http://www.worldcat.org/title/understanding-society-and-natural-resources-forging-new-strands-of-integration-across-the-social-sciences/oclc/881474202> 248
- Mann et al. Northern Hemisphere Temperatures during the Past Millennium: Inferences, Uncertainties, and Limitations, 26 Geophysical Research Letters.1999.
- Marafiq's website. Power and Water Utility Company for Jubail and Yanbu. Website source. Nd. <http://www.marafiq.com.sa/en/default.aspx>
- Marien, Michael. *Environmental Issues and Sustainable Futures: A Critical Guide to Recent Books, Reports, and Periodicals*. Bethesda, MD: World Future Society, 1996. Print. <http://www.worldcat.org/title/environmental-issues-and-sustainable-futures-a-critical-guide-to-recent-books-reports-and-periodicals/oclc/34283750>
- Marine Emergency Mutual Aid Centre, (MEMAC). Regional Organization for the Protection of Marine Environment. (ROPME). 2014. Print. <http://www.memac-rsa.org>
- Marine regions.org <http://www.marineregions.org/gazetteer.php?p=details&id=8356>  
[https://treaties.un.org/Pages/ViewDetailsIII.aspx?&src=TREATY&mtdsg\\_no=XXI~6&chapter=21&Temp=mtdsg3&lang=en#EndDec](https://treaties.un.org/Pages/ViewDetailsIII.aspx?&src=TREATY&mtdsg_no=XXI~6&chapter=21&Temp=mtdsg3&lang=en#EndDec), nd.
- Marsden, Simon. *Strategic Environmental Assessment in International and European Law: A Practitioner's Guide*. London: EARTHSCAN, 2008. Internet resource. <http://www.worldcat.org/title/strategic-environmental-assessment-in-international-and-european-law-a-practitioners-guide/oclc/300456149>
- Martin, Paul V. and Miriam Verbeek. *Sustainability Strategies*. Annandale, N.S.W: Federation Press, 2005. Print. <http://www.worldcat.org/title/sustainability-strategies/oclc/156748567>
- Massey, Stephen. *Best Practices for Environmental Project Teams*. Amsterdam: Elsevier, 2011. Internet resource. <http://www.worldcat.org/title/best-practices-for-environmental-project-teams/oclc/746769535>
- McClanahan, T R, Charles Sheppard, and David O. Obura. *Coral Reefs of the Indian Ocean: Their Ecology and Conservation*. New York: Oxford University Press, 2000. Internet resource. <http://www.worldcat.org/title/coral-reefs-of-the-indian-ocean-their-ecology-and-conservation/oclc/71361155>
- McIntyre, Owen. *Environmental Protection of International Watercourses Under International Law*. Aldershot, England: Ashgate, 2007. Internet resource.

- <http://www.worldcat.org/title/environmental-protection-of-international-watercourses-under-international-law/oclc/648340284>
- Meho, Lokman I, and Mona A. Nsouli. *Libraries and Information in the Arab World: An Annotated Bibliography*. Westport, CT: Greenwood Press, 1999. Print. 253.  
<http://www.worldcat.org/title/libraries-and-information-in-the-arab-world-an-annotated-bibliography/oclc/246031033>
- Mekouar, Mohamed A. *The Environmental Impact of Economic Incentives for Agricultural Production: A Comparative Study*. Rome: Food and Agricultural Organization of the United Nations, 1990. Print. <http://www.worldcat.org/title/environmental-impact-of-economic-incentives-for-agricultural-production-a-comparative-study/oclc/246503483>
- Mensah, Adelina Castro. *Luciana Sustainable Resource Use & Sustainable Development: A contradiction?! University of Bonn*. 2004. Print. 7
- Mergent International Manual*. New York: Mergent, 2001. Print.  
<http://www.worldcat.org/title/mergent-international-manual/oclc/48969159>.
- Metz, Helen C. *Saudi Arabia: A Country Study*. Washington, DC: Supt. of Docs., US Gov. Print. Office, 1992. Print. <http://www.worldcat.org/title/saudi-arabia-a-country-study/oclc/165153278>
- Miller, Christopher. *Planning and Environmental Protection: A Review of Law and Policy*. Oxford ; Portland, OR: Hart, 2002. Print. <http://www.worldcat.org/title/planning-and-environmental-protection-a-review-of-law-and-policy/oclc/799178346>
- Miller, G T, and Scott Spoolman. *Living in the Environment*. Pacific Grove, CA: Brooks/Cole Cengage Learning, 2012. Print. <http://www.worldcat.org/title/living-in-the-environment/oclc/728840318>
- Miller, G T, and Scott Spoolman. *Living in the Environment: Concepts, Connections, and Solutions*. Belmont, CA: Thomson Brooks/Cole, 2009. Print.  
<http://www.worldcat.org/title/living-in-the-environment-concepts-connections-and-solutions/oclc/226358126>
- Ministry of education Portal. Nd. Moe website., K.S.A,  
<http://www.moe.gov.sa/Pages/Default.aspx>
- Ministry of Foreign Affairs. About Saudi Arabia. Last Updated in 2013.  
<http://www.mofa.gov.sa/SITES/MOFAEN/ABOUTKINGDOM/Pages/KingdomGeography46466.aspx>
- Ministry of higher education Portal. Nd. Mohe Website. K.S.A.,  
<http://www.mohe.gov.sa/en/Pages/default.aspx>
- Ministry of petroleum and mineral resources, Kingdom of Saudi Arabia. Nd.  
[http://www.mopm.gov.sa/mopm/detail.do?content=environment\\_oil\\_spill\\_en](http://www.mopm.gov.sa/mopm/detail.do?content=environment_oil_spill_en)
- Ministry of petroleum and minerals. (Nd). Website source
- Ministry of water and electricity. Nd. <http://www.mowe.gov.sa/NewMowe/Index.aspx>

- Mintz, Joel A. *Enforcement at the Epa: High Stakes and Hard Choices*. Austin: University of Texas Press, 1996. Print. <http://www.worldcat.org/title/enforcement-at-the-epa-high-stakes-and-hard-choices/oclc/123257382>
- Mohamed El Raey. Air quality and atmospheric pollution in the Arabia Region, Gas Emissions. Economic and Social Commission for Western Asia and League of Arab States. Air quality and atmospheric pollution in the Arab region. University of Alexandria. Nd. Print.2. [http://www.un.org/esa/sustdev/csd/csd14/escwaRIM\\_bp1.pdf](http://www.un.org/esa/sustdev/csd/csd14/escwaRIM_bp1.pdf).
- Morella Erica. Public Comment Periods and Federal Environmental Impact Statements: Potentials and Pitfalls from the American Experience. 2013. Michigan University Journal. <http://quod.lib.umich.edu/m/mjs/12333712.0001.008/--public-comment-periods-and-federal-environmental-impact?rgn=main;view=fulltext>
- Mostyn, Trevor. *Saudi Arabia*. London: Middle East Economic Digest, 1983. Print. 21. <http://www.worldcat.org/title/saudi-arabia/oclc/10509666>
- Muhammad bin Saud. Royal embassy of Saudi Arabia, Saudi Arabian, History of Civilization. 1744, internet source. <http://www.saudiembassy.net/about/country-information/history.aspx>
- Müller, Joachim W. *Reforming the United Nations: New Initiatives and Past Efforts*. The Hague: Kluwer Law Internat, 1997. Print. <http://www.worldcat.org/title/reforming-the-united-nations-new-initiatives-and-past-efforts-1/oclc/231713423>
- National Climate Data Centre. Nd. Website source. <http://www.ncdc.noaa.gov/oa/ncdc.html>
- National Implementation of Agenda 21. Kingdom of Saudi Arabia, country profile, Implementation of Agenda 21, Chapter 19 Environmentally Sound Management of Toxic Chemicals, Including Prevention of Illegal International Traffic in Toxic and Dangerous Products. 1997, United Nations Department of Economic and Social Affairs. <http://www.un.org/esa/earthsummit/saudi-cp.htm>
- Neefjes, Koos. *Environments and Livelihoods: Strategies for Sustainability*. Oxford: Oxfam, 2000. Print. <http://www.worldcat.org/title/environments-and-livelihoods-strategies-for-sustainability/oclc/248635520>
- Nerz, Alexander. *Das Saudi-Arabische Rechtssystem*. Bremen: Europäischer Hochschulverl, 2011. Print. <http://www.worldcat.org/title/saudi-arabische-rechtssystem/oclc/723513361>
- Nolon, John R. *Compendium of Land Use Laws for Sustainable Development*. Cambridge, UK: Cambridge University Press, 2006. Print. <http://www.worldcat.org/title/compendium-of-land-use-laws-for-sustainable-development/oclc/61687789>
- Oberthür, Sebastian, and Thomas Gehring. *Institutional Interaction in Global Environmental Governance: Synergy and Conflict Among International and EU Policies*. Cambridge, Mass: MIT Press, 2006. Internet resource. <http://www.worldcat.org/title/institutional-interaction-in-global-environmental-governance-synergy-and-conflict-among-international-and-eu-policies/oclc/191935456>
- O’Kane, Michael. *Doing Business in Saudi Arabia*. , 2013. Print. <http://www.worldcat.org/title/doing-business-in-saudi-arabia/oclc/869738587>
- OPEC. Brief History. 1960. [http://www.opec.org/opec\\_web/en/about\\_us/24.htm](http://www.opec.org/opec_web/en/about_us/24.htm)



- Orrego, Vicuña F. *The Changing International Law of High Seas Fisheries*. Cambridge, UK: Cambridge Univ. Press, 1999. Print. <http://www.worldcat.org/title/changing-international-law-of-high-seas-fisheries/oclc/245816478>
- OSHA. Material Safety Data Sheets, United States Department of Labor, Occupational Safety and Health Administration. Washington, DC. Print. <https://www.osha.gov/oilspills/msds.html>
- Paddock, LeRoy. *Compliance and Enforcement in Environmental Law: Toward More Effective Implementation*. Cheltenham, UK: Edward Elgar, 2011. Internet resource. <http://www.worldcat.org/title/compliance-and-enforcement-in-environmental-law-toward-more-effective-implementation/oclc/753966336>
- Peacock, Kathy W. *Natural Resources and Sustainable Development*. New York: Facts On File, 2008. Internet resource. <http://www.worldcat.org/title/natural-resources-and-sustainable-development/oclc/300450658>
- Pepper, D W, and C A. Brebbia. *Water and Society*. Southampton: WIT Press, 2012. Print.160 <http://www.worldcat.org/title/water-and-society/oclc/773025518>
- Peretz, Don. *The Middle East Today*. Westport, CT: Praeger, 1994. Print. <http://www.worldcat.org/title/middle-east-today/oclc/28634082>
- Proceedings of the Expert Group Meeting on Harmonization of Environmental Standards in the Water Sector of Escwa Member States: Beirut, 28 September - 1 October 1999*. New York: United Nations, 1999. Print. <http://www.worldcat.org/title/proceedings-of-the-expert-group-meeting-on-harmonization-of-environmental-standards-in-the-water-sector-of-escwa-member-states-beirut-28-september-1-october-1999/oclc/231864579>
- Publishing, OECD. *Development Co-Operation Report 2014: Mobilising Resources for Sustainable Development*. Paris: OECD Publishing, 2014. Internet resource. <http://www.worldcat.org/title/development-co-operation-report-2014-mobilising-resources-for-sustainable-development/oclc/897071714>
- Ramady, M. A. *The Saudi Arabian Economy*. New York: Springer, 2010. Internet resource. <http://www.worldcat.org/title/saudi-arabian-economy/oclc/676700248>
- Regional Organization for the Protection of the Marine Environment. The eight coastal States of the Region (Bahrain, I.R. Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates) ropme.org, 4 May 2, 2014.
- Regional Organization for the Protection of the Marine Environment. 2011-2012. Internet source. <http://ropme.org/home.clx>
- Renard, John. *Understanding the Islamic Experience*. New York: Paulist Press, 2002. Print. <http://www.worldcat.org/title/understanding-the-islamic-experience/oclc/49626923>
- Renewable Energy Desalination: An Emerging Solution to Close the Water Gap in the Middle East and North Africa 's*. Washington DC: World Bank, 2012. Print. <http://www.worldcat.org/title/renewable-energy-desalination-an-emerging-solution-to-close-the-water-gap-in-the-middle-east-and-north-africas/oclc/801050777>
- Research Grants Program*. Washington, DC: National Academies Press, 2003. Print. <http://www.worldcat.org/title/measure-of-star-review-of-the-us-environmental->

- protection-agencys-science-to-achieve-results-star-research-grants-program/oclc/839924964
- Review of Sustainable Development and Productivity Activities: Issue No. 1.* New York: UN, 2003. Print. <http://www.worldcat.org/title/review-of-sustainable-development-and-productivity-activities-issue-no-1/oclc/81427482>
- Rieu-Clarke, Alistair. *International Law and Sustainable Development: Lessons from the Law of International Watercourses*. London: IWA Pub, 2005. Print. <http://www.worldcat.org/title/international-law-and-sustainable-development-lessons-from-the-law-of-international-watercourses/oclc/426931634>
- Rio +20 United Nations Conference on Sustainable Development . The History of Sustainable Development in the United Nations. 2012. Website. <http://www.uncsd2012.org/history.html>
- Rio 20 - United Nations Conference on Sustainable Development.” *Rio 20 - United Nations Conference on Sustainable Development*. United Nation Website
- Robinson, Nicholas A. *Agenda 21: Earth’s Action Plan Annotated*. New York: Oceana Publications, 1993. Print. <http://www.worldcat.org/title/agenda-21-earths-action-plan-annotated/oclc/29610457>
- Rodwell, Dennis. *Conservation and Sustainability in Historic Cities*. Oxford: Blackwell Publ., 2007. Internet resource.54. <http://www.worldcat.org/title/conservation-and-sustainability-in-historic-cities/oclc/238366670>
- Royal Commission for Jubail and Yanbu (RCJY). Saudi Aramco Environmental Stewardship, Environmental Technology; RC Environmental Program, Volume II.2014. Internet source. <http://www.rcjy.gov.sa/en-US/AboutUs/Environment/Pages/default.aspx>
- Royal Decree. The Law of the Board of Grievances. No. M/78, Article 23 19/9/1428H, Oct. 1, 2007. <<http://www.boe.gov.sa/ViewSystemDetails>
- Royal Decree. The Law of the Judiciary. Oct. 1, 2007. No. M/78, art. 5. <http://www.boe.gov.sa/ViewSystemDetails.aspx>
- Royal embassy of Saudi Arabia. About Saudi Arabia; Water resources. Internet source DC. [http://www.saudiembassy.net/about/country-information/agriculture\\_water/Water\\_Resources.aspx](http://www.saudiembassy.net/about/country-information/agriculture_water/Water_Resources.aspx)
- Royal Order No. A/13. 3 Rabi’ I 1414H. The bureau of experts at the council of ministers,. Published in Umm al Qura Gazette, No. 3468 .10 Rabi’ I 1414H / 27. August 1993.
- Sabah Al-Jeneid, Nader Hammad Moussa, Maha Mahmood Alsabbagh, Heba Elhusseini, Maria Snoussi, Ali Amasha, and Mohamed Tawfic Ahmed. Environment Outlook for the Arab Region, Chapter 4, Coastal and Marine Environments, League of Arab States, UNEP, CEDARE. [http://eoar.cedare.int/report/EOAR\\_Chapter%204%20\(EN\).pdf](http://eoar.cedare.int/report/EOAR_Chapter%204%20(EN).pdf)
- Şādiq, Muḥammad, and John C. MacCain. *The Gulf War Aftermath: An Environmental Tragedy*. Dordrecht: Kluwer, 1993. Print. <http://www.worldcat.org/title/gulf-war-aftermath-an-environmental-tragedy/oclc/26015124>

- Salman, Salman M. A, and Daniel D. Bradlow. *Regulatory Frameworks for Water Resources Management: A Comparative Study*. Washington, DC: World Bank, 2006. Print.  
<http://www.worldcat.org/title/regulatory-frameworks-for-water-resources-management-a-comparative-study/oclc/31372962>
- Sam, Peter A. *International Environmental Consulting Practice: How and Where to Take Advantage of Global Opportunities*. New York: Wiley, 1999. Print.  
<http://www.worldcat.org/title/international-environmental-consulting-practice-how-and-where-to-take-advantage-of-global-opportunities/oclc/39299389>
- Sandler, Deborah. *Protecting the Gulf of Aqaba: A Regional Environmental Challenge*. Washington, DC, 1993. Print. <http://www.worldcat.org/title/protecting-the-gulf-of-aqaba-a-regional-environmental-challenge/oclc/260146370>
- Sands, Philippe, Jacqueline Peel, Aguilar A. Fabra, and Ruth Mackenzie. *Principles of International Environmental Law*. Cambridge: Cambridge University Press, 2012. Print. 539. <http://www.worldcat.org/title/principles-of-international-environmental-law/oclc/760904889>
- Sands, Philippe, Jacqueline Peel, Aguilar A. Fabra, and Ruth Mackenzie. *Principles of International Environmental Law*. Cambridge: Cambridge University Press, 2012. Print. <http://www.worldcat.org/title/principles-of-international-environmental-law/oclc/760904889>,
- Sands, Philippe. *Principles of International Environmental Law*. Cambridge: Cambridge Univ. Press, 2003. Print. <http://www.worldcat.org/title/principles-of-international-environmental-law/oclc/237827003>
- Sands, Philippe. *Principles of International Environmental Law*. Manchester: Manchester University Press, 1995. Print. <http://www.worldcat.org/title/principles-of-international-environmental-law/oclc/317113846>
- Saudi Arabia: A Justice System Without Justice: End Secrecy, End Suffering*. New York: Amnesty International USA, 2000. Print. <http://www.worldcat.org/title/saudi-arabia-a-justice-system-without-justice-end-secrecy-end-suffering/oclc/263113552>
- Saudi Arabian Business magazine. ICTs and Environmental Sustainability. 2010.  
<http://www.giswatch.org/fr/node/316>
- Saudi Gazette . New oil fields saved for future generations: King. 2014. Website source.  
<http://www.saudigazette.com.sa/index.cfm?method=home.regcon&contentID=2010070377026>
- Scanlon, John, Angela Cassar, and Noémi Nemes. *Water As a Human Right?* Gland, Switzerland: IUCN Publications, 2006. Print. 38-39.
- Schmidt, Michael, Elsa M. João, and Eike Albrecht. *Implementing Strategic Environmental Assessment*. Berlin: Springer, 2005. Internet resource.  
<http://www.worldcat.org/title/implementing-strategic-environmental-assessment/oclc/209856330>
- Schrijver, Nico. *Development without Destruction: The UN and Global Resource Management* 116 (United Nations Intellectual History Project Series. Bloomington, IN: Indiana

- University. 2010. Press.  
<http://books.google.com/books?id=oBaJ3OXWr9UC&pg=PA116#v=onepage&q&f=false>
- Selected Texts of Legal Instruments in International Environmental Law*. Nairobi, Kenya: United Nations Environment Programme, 2005. Print. <http://www.worldcat.org/title/selected-texts-of-legal-instruments-in-international-environmental-law/oclc/76765808>
- Serageldin, Ismail, and Joan Martin-Brown. *Partnerships for Global Ecosystem Management: Science, Economics and Law : Proceedings and Reference Readings*. Washington, DC: World bank, 1998. Print. <http://www.worldcat.org/title/partnerships-for-global-ecosystem-management-science-economics-and-law-proceedings-and-reference-readings/oclc/239784311>
- Shaahid.S.M. and Elhadidy, M.A. Wind and solar energy at Dhahran, Saudi Arabia. *Renewable Energy*. 1994. Print.  
<http://www.sciencedirect.com/science/article/pii/0960148194900523>
- Shabbaj, Ibrahim I. *Solid Waste Management in the City of Jeddah (Kingdom of Saudi Arabia)*. Manchester: University of Manchester, 1986. Print. <http://www.worldcat.org/title/solid-waste-management-in-the-city-of-jeddah-kingdom-of-saudi-arabia/oclc/642485995>
- Shoult, Anthony. *Doing Business with Saudi Arabia*. London: Blue IbeX Ltd, 2005. Print.  
<http://www.worldcat.org/title/doing-business-with-saudi-arabia/oclc/475965639>
- Silkenat, James R, Jeffrey M. Aresty, and Jacqueline Klosek. *The ABA Guide to International Business Negotiations: A Comparison of Cross-Cultural Issues and Successful Approaches*. Chicago: American Bar Association, Section of International Law, 2009. Print. <http://www.worldcat.org/title/aba-guide-to-international-business-negotiations-a-comparison-of-cross-cultural-issues-and-successful-approaches/oclc/313078825>
- Sillitoe, Paul. *Sustainable Development: An Appraisal of the Gulf Region*. New York: Berghahn Books, 2014. Internet resource. <http://www.worldcat.org/title/sustainable-development-an-appraisal-of-the-gulf-region/oclc/884645694>
- Simon Anstey. The International Union for Conservation of Nature IUCN; Kingdom of Saudi Arabia to expand collaboration with Iucn. November 18 2005. News story.  
[https://www.iucn.org/news\\_homepage/news\\_by\\_date/previous\\_years\\_news/?67/Kingdom-of-Saudi-Arabia-to-expand-collaboration-with-IUCN](https://www.iucn.org/news_homepage/news_by_date/previous_years_news/?67/Kingdom-of-Saudi-Arabia-to-expand-collaboration-with-IUCN)
- Sirāğ, al-Dīn I. A.-H. *Advancing Sustainable Development: The World Bank and Agenda 21*. Washington, DC: World Bank, 1997. Print. <http://www.worldcat.org/title/advancing-sustainable-development-the-world-bank-and-agenda-21/oclc/237642382>
- Snape, William J, and Oliver A. Houck. *Biodiversity and the Law*. Washington, DC: Island Press, 1996. Print. <http://www.worldcat.org/title/biodiversity-and-the-law/oclc/840290480>
- State of the Environment and Policy Retrospective. Coastal and marine areas. 1972-2002. print.  
[http://www.grida.no/geo/geo3/english/pdfs/chapter2-6\\_marine.pdf](http://www.grida.no/geo/geo3/english/pdfs/chapter2-6_marine.pdf)

- Steger, Ulrich. *The Sustainable Development and Innovation in the Energy Sector*. Berlin: Springer, 2005. Internet resource <http://www.worldcat.org/title/sustainable-development-and-innovation-in-the-energy-sector/oclc/209862118>
- Sustainable Practices: Concepts, Methodologies, Tools, and Applications*. 2014. Internet resource. <http://www.worldcat.org/title/sustainable-practices-concepts-methodologies-tools-and-applications/oclc/864415003>
- Taher, Nahed, and Bandar Hajjar. *Energy and Environment in Saudi Arabia: Concerns & Opportunities*. Cham: Imprint: Springer, 2014. Internet resource. <http://www.worldcat.org/title/energy-and-environment-in-saudi-arabia-concerns-opportunities/oclc/867051941>
- Taher, Nahed, and Bandar Hajjar. *Energy and Environment in Saudi Arabia: Concerns & Opportunities*. Cham: Imprint: Springer, 2014. Internet resource. <http://www.worldcat.org/title/energy-and-environment-in-saudi-arabia-concerns-opportunities/oclc/867051941>
- Tahir Husain . Air pollution monitoring, assessment, control technologies for Saudi Arabia - An integrated approach. Environmental Engineering Memorial University of Newfoundland, Canada. 2012. Print. 27. <http://kacstetc.com/2012/en/images/speakers/pdf/122.pdf>
- Taylor, Dorceta E. *Environment and Social Justice: An International Perspective*. Bingley, UK: Emerald, 2010. Print. <http://www.worldcat.org/title/environment-and-social-justice-an-international-perspective/oclc/681544246>
- Temperman, Jeroen. *State-religion Relationships and Human Rights Law: Towards a Right to Religiously Neutral Governance*. Leiden: Martinus Nijhoff Publishers, 2010. Print. <http://www.worldcat.org/title/state-religion-relationships-and-human-rights-law-towards-a-right-to-religiously-neutral-governance/oclc/500820583>
- Terborgh, John. *Making Parks Work: Strategies for Preserving Tropical Nature*. Washington, DC: Island Press, 2002. Print. 27-28. <http://www.worldcat.org/title/making-parks-work-strategies-for-preserving-tropical-nature/oclc/421970617>
- Teuteberg, Frank, and Jorge M. Gomez. *Corporate Environmental Management Information Systems: Advancements and Trends*. Hershey, PA: Business Science Reference, 2010. Print. <http://www.worldcat.org/title/corporate-environmental-management-information-systems-advancements-and-trends/oclc/468978043>
- The central department of statistics and information, Saudi Arabia. Nd. <http://www.cdsi.gov.sa>
- The Environmental Forum*. Washington, DC: Environmental Law Institute, 1982. Print. <http://www.worldcat.org/title/environmental-forum/oclc/8227987>
- The Government of Saudi Arabia. Institutional aspects of sustainable development in Saudi Arabia, Sustainable Development. April 1997. <http://www.un.org/esa/agenda21/natinfo/countr/saudi/inst.htm>
- The KICP Annual Strategic Study, Promoting Wastewater Reclamation and Reuse in the Kingdom of Saudi Arabia: Technology Trends, Innovation Needs, and Business Opportunities. King Abdullah University Science and Technology. 2010-2011, print. P. 3-6

- The Link*. New York: Americans for Middle East Understanding, 1968. Print.  
<http://www.worldcat.org/title/link/oclc/2244248>
- The Middle East, Abstracts and Index*. Pittsburgh, PA: Library Information and Research Service, 1978. Print. 934. <http://www.worldcat.org/title/middle-east-abstracts-and-index/oclc/243460930>
- The ministry of agriculture, KSA & the Saudi network (nd), <http://www.the-saudi.net/saudi-arabia/agriculture.htm>
- The ministry of finance, Kingdom of Saudi Arabia,  
<http://www.mof.gov.sa/English/Pages/Home.aspx>
- The Muslim World League Journal*. Makkah al-Mukarramah, Saudi Arabia: Press and Publications Dept., Muslim World League, 1980. Print.  
<http://www.worldcat.org/title/muslim-world-league-journal/oclc/9273501>
- The Report: Emerging Saudi Arabia 2007*. London: Oxford Business Group, 2007. Print.  
<http://www.worldcat.org/title/report-emerging-saudi-arabia-2007/oclc/782130590>
- The United States Government Manual, 2012*. Washington, DC: Office of the Federal Register, National Archives and Records Service Administration, 2012. Print.  
<http://www.worldcat.org/title/united-states-government-manual-2012/oclc/824167727>
- Thomas, Ian G. *Environmental Management: Processes and Practices for Australia*. 2005. Print.  
<http://www.worldcat.org/title/environmental-management-processes-and-practices-for-australia/oclc/255370553>
- Thomas, Ken D, and Helen E. Muga. *Handbook of Research on Pedagogical Innovations for Sustainable Development*. 2014. Internet resource.  
<http://www.worldcat.org/title/handbook-of-research-on-pedagogical-innovations-for-sustainable-development/oclc/874029531>
- Thoresen, Victoria W, Robert J. Didham, Jørgen Klein, and Declan Doyle. *Responsible Living: Concepts, Education and Future Perspectives*. 2015. Internet resource.  
<http://www.worldcat.org/title/responsible-living-concepts-education-and-future-perspectives/oclc/902846594> 11
- Thorp, Teresa M. *Climate Justice: A Voice for the Future*. 2014.  
<http://www.worldcat.org/title/climate-justice-a-voice-for-the-future/oclc/883513288>
- Tortora, Marco. *Sustainable Systems and Energy Management at the Regional Level: Comparative Approaches*. Hershey, PA: Information Science Reference, 2012. Print.  
<http://www.worldcat.org/title/sustainable-systems-and-energy-management-at-the-regional-level-comparative-approaches/oclc/720025595>
- U.S.-Saudi Arabian Business Council. *The Water Sector in the Kingdom of Saudi Arabia*. Nd.  
[http://www.us-sabc.org/files/public/Water\\_Brochure.pdf](http://www.us-sabc.org/files/public/Water_Brochure.pdf)
- Uberoi, N. K. *Environmental Management*. New Delhi: Excel Books, 2003. Print.  
<http://www.worldcat.org/title/environmental-management/oclc/86074456>

- UNEP, Basel Convention. The overarching goal of the Basel Convention is to protect human health and the environment against the adverse effects of hazardous wastes. 1989. Internet Source. <http://www.basel.int/TheConvention/Overview/tabid/1271/Default.aspx>
- UNEP. Background Guide MMUN, Montessori Model United Nations MMUN 2012. 2012. Print.
- UNEP. Arab Regional Strategy for Sustainable Consumption and Production. 2009, print.<http://www.unep.fr/scp/marrakech/publications/pdf/Final%20Draft%20Arab%20Strategy%20on%20SCP%20-%202006-10-09.pdf>
- UNEP. Environmentally sound management of toxic chemicals including prevention of illegal international traffic in toxic and dangerous products. Speeches 2004. Introduction 19.8 <http://www.unep.org/Documents.multilingual/Default.asp?>
- UNEP. Policy Solutions: The Way Towards Sustainable Water Management. Chapter Eight 2012, Print. [http://www.unep.org/dewa/portals/67/pdf/vulnerability/Chapter8\\_Hi.pdf](http://www.unep.org/dewa/portals/67/pdf/vulnerability/Chapter8_Hi.pdf)
- United Nations Convention on the Law of the Sea*. New York: Nova Science Publishers, 2009. Print.<http://www.worldcat.org/title/united-nations-convention-on-the-law-of-the-sea/oclc/243605775>
- United Nations Department of Economic and Social Affairs. Sustainable Development Knowledge Platform, UN, chemicals and waste, waste (Hazardous). Source taken from UN Website<http://sustainabledevelopment.un.org/index.php?menu=214>
- United Nations Documents. Gathering a body of global agreements. 2012. United Nations web sites. <http://www.un-documents.net/ocf-a2.htm#I.1>
- United Nations Environment Programme. Global Environment Outlook- 5 (GEO-5) report. <http://www.unep.org/geo/geo5.asp>
- United Nations Sustainable Development Goals (SDGs) <https://sustainabledevelopment.un.org/index.php?menu=1565>
- United Nations World Commission On Environment And Development (WCED). Nd. supra note 2. Website Source
- United Nations World Commission On Environment And Development (WCED). Our Common Future 1 (Oxford University Press. 1987).
- United Nations. Global issues, environment. 2012. Website source. <http://www.un.org/en/globalissues/environment/>
- Viana, Mar. *Urban Air Quality in Europe*. Berlin: Springer, 2013. Internet resource. <http://www.worldcat.org/title/urban-air-quality-in-europe/oclc/852159944>
- Vincent, Peter. Saudi Arabia an Environmental Overview. 2008.
- Water and Sanitation in the World's Cities: Local Action for Global Goals*. London: Earthscan Publications, 2003. Print. <http://www.worldcat.org/title/water-and-sanitation-in-the-worlds-cities-local-action-for-global-goals/oclc/153316525>
- Water Scarcity in the Arab World*. New York: United Nations, 2003. Print. <http://www.worldcat.org/title/water-scarcity-in-the-arab-world/oclc/254850470>

- Weerakkody, Vishanth. *Social and Organizational Developments Through Emerging E-Government Applications: New Principles and Concepts*. Hershey, PA: Information Science Reference, 2010. Print. <http://www.worldcat.org/title/social-and-organizational-developments-through-emerging-e-government-applications-new-principles-and-concepts/oclc/406133211>
- Weigl, Constanze. *Reproductive Health Behavior and Decision-Making of Muslim Women: An Ethnographic Study in a Low-Income Community in Urban North India*. Berlin: Lit, 2010. Print. <http://www.worldcat.org/title/reproductive-health-behavior-and-decision-making-of-muslim-women-an-ethnographic-study-in-a-low-income-community-in-urban-north-india/oclc/656776490>
- Weiß, Philipp, and Jörg Bentlage. *Environmental Management Systems and Certification*. Uppsala: Baltic University Press, 2006. Print. <http://www.worldcat.org/title/environmental-management-systems-and-certification/oclc/243922227>
- Woodsworth, Anne, and William D. Penniman. *Management and Leadership Innovations*. Bingley, UK: Emerald, 2014. Internet resource. <http://www.worldcat.org/title/management-and-leadership-innovations/oclc/883335733>
- World Economic Outlook*. Washington: IMF, 1999. Print. <http://www.worldcat.org/title/world-economic-outlook/oclc/813359643>
- World Health Organization. World Summit on Sustainable Development. Nd. Website source. <http://www.who.int/wssd/en/> World Wildlife Fund. History. Washington, DC 20037. December 5, 2012, 6:17. Website source. <http://worldwildlife.org/about/history>
- WWF. A brief history; the world's leading independent conservation organization. (December 5, 2012, 7:10PM) [http://www.wwf.org.uk/what\\_we\\_do/about\\_us/history/](http://www.wwf.org.uk/what_we_do/about_us/history/)
- Wynbrandt, James. *A Brief History of Saudi Arabia*. (Nd). Website source
- Yearbook of the United Nations, 2004: Volume 58*. New York: Dept. of Public Information/United Nations, 2006. Print. <http://www.worldcat.org/title/yearbook-of-the-united-nations-2004-volume-58/oclc/76832892><http://www.un.org/en/globalissues/environment/>