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Faculty of Economics and Management

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Bachelor Thesis

Natural Resources: Case Study of the Middle east

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Natural resources – Case study of The Middle East

Objectives of thesis

The objective of this thesis is to describe and analyze natural resources in Middle east. A case study discussing in depth the Natural resources effects on the Indian economy growth and the industries associated through the natural resources medium.

Methodology

At the very beginning of the case study will be general exploratory and cumulative of Natural resources information. Then descriptive and persuasive methods to emphasize the economic factors effected by Natural resources production.

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Declaration

I declare that I have worked on my bachelor thesis titled "Natural resources: Case Study of The Middle East" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break the copyrights of any their person.

In Prague on 30th of November, 2020

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Natural Resources: Case Study of The Middle East

Abstract

Natural Resources are scattered around the Middle East region. This thesis presents the types of natural resources in a descriptive manner and considers the economic influence of the natural resources in developing and developed countries and addressing the oil countries' impact through the region. This case study will emphasize the effects and factors of Natural resources in the Middle East.

Initially, a brief literature review on natural resources. Its definition, characteristics and what types of natural resources are being extracted sustainably enough. Besides, the first part will highlight the types of categorizations and criteria of natural resources around the world. Emphasizing natural resource scarcity, depletion, and sustainability. This section will include examples from across the globe as an illustration of natural resource classifications.

In the practical part, will focus on the role of natural resources in the middle east region. Describing the economic impact on the developing and developed countries of the middle east. Using economic indicators to indicate information about the production and consumption of natural resources in the middle east. Afterward, illustrating the challenges that confront the middle east as a resource-rich in the region. Lastly, a conclusion of the impact of natural resources through the region.

Keywords: Natural resources, Middle East, MENA, Oil, Natural gas, Resource-rich, Diversification.

Přírodní zdroje: Případová studie Středního východu

Abstrakt

Přírodní zdroje jsou roztroušeny po regionu Středního východu. V této práci popisně popisuje druhy přírodních zdrojů a zohledňuje ekonomický vliv přírodních zdrojů v rozvojových a rozvinutých zemích a řešení dopadu ropných zemí na region. Tato případová studie zdůrazní účinky a faktory přírodních zdrojů na Středním východě.

Zpočátku krátký přehled literatury o přírodních zdrojích. Jeho definice, charakteristika a to, jaké druhy přírodních zdrojů se těží dostatečně udržitelným způsobem. První část dále zdůrazňuje typy kategorizace a kritéria přírodních zdrojů po celém světě. Zdůraznění nedostatku přírodních zdrojů, vyčerpání a udržitelnosti. V této části budou uvedeny příklady z celého světa jako ilustrace klasifikace přírodních zdrojů.

V praktické části se zaměřím na roli přírodních zdrojů v regionu Středního východu. Popis ekonomického dopadu na rozvojové a rozvinuté země Středního východu. Využití ekonomických ukazatelů k indikaci informací o produkci a spotřebě přírodních zdrojů na Středním východě. Poté ilustruje výzvy, kterým čelí Střední východ jako zdroj bohatý v regionu. Na závěr o dopadu přírodních zdrojů na region.

Klíčová slova: Přírodní zdroje, Blízký východ, MENA, ropa, zemní plyn, bohatý na zdroje, diverzifikace

Table of content

1	Introduction	10
2	Objectives and Methodology	11
2.1	Objectives	11
2.2	Methodology.....	11
3	Literature Review	12
3.1	Natural Resources	12
3.2	Classifications of Natural Resources.....	13
3.2.1	Renewable and Nonrenewable Resources.....	13
3.2.2	Biotic and Abiotic Classification.	14
3.2.3	Types of resources development.....	15
3.3	Water Resources	15
3.4	Energy Resources.....	17
3.4.1	Fossil Fuels	19
3.4.2	Hydropower	20
3.4.3	Solar and Wind Energy	21
3.4.4	Nuclear Energy	23
3.5	Land Resources	24
3.6	Mineral Resources.....	26
4	Practical Part	28
4.1	An Overview of The Middle East.	28
4.1.1	Economical Aspects of the middle east.....	29
4.2	Role of Natural Resources in the Middle East.....	30
4.2.1	Oil and Natural Gas.....	31
4.2.2	Renewable Energy Sources.	36
4.2.3	Water Resource.....	39
4.2.4	Land Use of The Middle East.....	42
4.3	Challenges Facing Resource-Rich Countries in the Middle East.	44
4.3.1	Resource Cures and Regionalism.	44
4.3.2	Diversification and Sustainable Growth.....	47
5	Conclusion.....	49
6	Reference.....	51

List of figures

Figure 1 Distribution of earth's water	16
Figure 2 Primary and secondary energy	18
Figure 3 Global Consumption of fossil Fuel	20
Figure 4 Global hydropower consumption	21
Figure 5 Electricity Production by source, World	23
Figure 6 How the world's land is used: total area sizes by type of use & land cover (Ritchie & Roser, 2019).....	25
Figure 7 GDP Per Capita, MENA Region,2016	29
Figure 8 Fossil Fuel production in TWh	33
Figure 9 Saudi Arabia Oil Consumption and Production in barrels per day	34
Figure 10 Qatar Gas Consumption and production	35
Figure 11 Iran Gas Consumption and production (MMcf)	35
Figure 12 Oil rents (% of GDP) - Kuwait, Libya, Saudi Arabia, Iraq, Qatar, United Arab Emirates. 2018	36
Figure 13 GIS map of solar radiation in the Middle East. 2016	38
Figure 14 regional distribution of water resources	41
Figure 15 Share of land area used for arable agriculture, 2015	42
Figure 16 Agricultural land (% of land area)(pasture and livestock included) - Middle East & North Africa, Lebanon, Syrian Arab Republic, Saudi Arabia, Iraq, United Arab Emirates, Egypt, Arab Rep., Morocco, Kuwait, Yemen and Tunisia in 2016	43
Figure 17 Total Natural Resources Rents (% of GDP), 1970 to 2016	46

1 Introduction

Since the appearance of life on this planet, its resources are being consumed by living things. And with the appearance of the first civilizations, human beings learned how to cultivate more necessary natural resources from the surrounding environment and biosphere. Natural resources were the essence and core engine for human activity through history. On one hand, countries and civilizations established around the common needs of natural resources. On the other hand, Wars and treaties are placed for acquiring and protecting natural resources.

This thesis, at first, Concludes the natural resources definition and classifications. Which includes the types of natural resources and some disadvantages to it. as a summary, the first part illustrates how natural resources are essential to humans and other living organisms as well as the ecosystem. Natural environmental resources are resources that humans do not interfere in their existence and due to their vital importance and human dependence on them, they are influenced and affected by them as well.

At last, as for the middle east, a region that is well known for its oil and natural gas. The abundance of resources and fast-growing economies, when discovered. For instance, Iraq and Saudi Arabia were the first to discover oil in the early 20th century. Followed by neighboring countries to start exploring oil fields as Kuwait and the United Arab Emirates later in the same century. And as result, economies started to thrive, and the demand for labor force outcomes as decreases in employment (Balat, 2006). Moreover, the MENA region faces challenges to be discussed in the practical part, where a sustainable economy could be a hard journey for some countries and subregions.

2 Objectives and Methodology

2.1 Objectives

The objective of this thesis is to describe and analyze natural resources in the Middle east. A case study discussing the natural resources effects on the Middle eastern economy growth and the industries associated with the natural resources medium. Which will clarify the relationship between natural resources and the Arab world in general.

2.2 Methodology

At the very beginning of the case study will be general explanatory and cumulative information on Natural resources. Describing the types and classifications of natural resources. Then, in the practical section, descriptive and persuasive methods to emphasize the economic factors effected by Natural resources production. And, Comparative method to illuminate the differences and similarities among the Arab world. At last, the conclusion and discussing the results of the practical part.

3 Literature Review

3.1 Natural Resources

The term Natural Resources is self-explanatory, hence the meaning resources of nature. However, in oxford dictionary, it defines natural resources as “*Materials or substances occurring in nature which can be exploited for economic gain*”¹. These materials and substances can be minerals, fossil fuels, solar energy, or land. Furthermore, the world wild Fund (WWF) defined it a little deeper. It is explained and considers that farming land and gardening cannot be placed as natural resources activities – for example, extraction. The reason for that; is because raw materials and resources are created by nature. Without the intervention of mankind (World Wild Fund, 2019).

This term, natural resources, expresses the commodities, all the vital materials and things that exist in the environment naturally without human intervention in their existence, but rather, mankind benefits from them in all daily activities, and obtains these natural resources in more than one way. We can also say that natural resources are the raw materials that the earth provides to societies, and these resources are formed naturally, that is, there is no presence or interference from mankind because it cannot form and shape them through human activities.

It is extracted or obtained either through an exploration process such as mineral extraction, or the resources themselves are a phenomenon that does not need extraction processes such as water, and natural resources are divided into two main parts, the first part is renewable natural resources, meaning inexhaustible and endless resources. The second section is the non-renewable natural resources, which are less present when extracted and used, these resources are used in the manufacture of many new products that are more complex to benefit from them and also adjust them in proportion to the use.

¹ https://www.lexico.com/definition/natural_resources

3.2 Classifications of Natural Resources

Natural resources through time declared importance for the prosperity of economies. Where societies depend on such resources as water, gas, and energy. These needs and wants should be fulfilled sustainably enough to maintain the availability of natural resources. Therefore, as important natural resources, classifying them is important too. As natural resources vary and have many types and forms. However, before mentioning the types, it's important to indicate the classification of those resources.

Natural resources can be classified based on different factors – location, stock, the composition of the resources, or renewability. Furthermore, natural resources depend on nature to formulate. But, also depends on how difficult to extract or bring the raw material resource into use. So, it's deeply important to consider political and economic factors surrounding natural resources. Nevertheless, natural resources can be classified by different criteria, it can be renewable and nonrenewable. It can biotic and abiotic; depending on the molecular level of the resource.

3.2.1 Renewable and Nonrenewable Resources

This category, as mentioned before, is assessing the replenishment period of a certain natural resource. In other words, it evaluates the continuity of the resource and its utility. also, every kind of natural resources can fall under the Renewable and Nonrenewable classification.

- Renewable resources: are resources that replenish and regenerates much faster after being extracted and consumed (Stark, 2019). These resources are:
 - Solar energy.
 - Biomass (animals, plants...).
 - Wind.

- Water.
 - Geothermal
- Nonrenewable resources: are resources that replenishment takes place under conditions that might take millions of years – for example fossil fuels, to form in a usable raw material (John V. Walther, 2013).
 - Oil.
 - Natural gas
 - Nuclear energy
 - Minerals (steel, aluminum...) (Stark, 2019)

Within this classification, it is necessary to mention a subclassification. It is called Inexhaustible Resources. It is resources that give an infinite supply to take. Yet, this term is mostly used energy-wise. In other words, the property that is being classified as energy. For instance, the energy obtained from wind or hydro turbines. And, solar panels for energy resources. In this sense, inexhaustible resources are mostly used in energy form. None the less, inexhaustible resources list the renewable resources; but not every renewable resource is inexhaustible. (Xaxx, 2017)

3.2.2 Biotic and Abiotic Classification.

Environmental researchers have classified natural environmental resources into two main categories. This classification considers the origin of the resource. In other words, it observes the molecular level of the resource whether it is organic or nonorganic.

- Abiotic resource group includes water, air, solar thermal and photovoltaic energy, minerals, radioactive minerals. Hence, these resources derive from a nonorganic origin.
- Biotic resources: includes natural plants such as forests, weeds, plants, and animals. This group also includes plant and animal aquatic organisms such as algae, fish, shellfish, and others. This is the general classification for the

natural resources based on the composition level of the resources. (Kumar, 2017)

3.2.3 Types of resources development

This category lists the types of forms that the resources can be explored. And, it suggests whether the resource is ready to extract or not, describing the resource development stage.

- *Stock resources*: are resources that there is no sufficient technology to extract. Yet, it is used for different beneficiary purposes. Take hydrogen and oxygen in the water as an example. These elements are flammable and can be used for energy instead of just consuming and irrigation.
- *Reserve resources*: when the resources are discovered. A reserve is identified within the resource discovered. And, this reserve is extracted for commercial purposes and profitability. But, for a resource to be reserved, it has to be measured precisely, approved by drilling, and economically recoverable²
- *Actual resources*: this term refers to a resource that has been already discovered, extracted, and is used in the present time.
- *Potential resources*: are resources that are known to be located. However, it is not extracted or consumed; but might be extracted in the future.

3.3 Water Resources

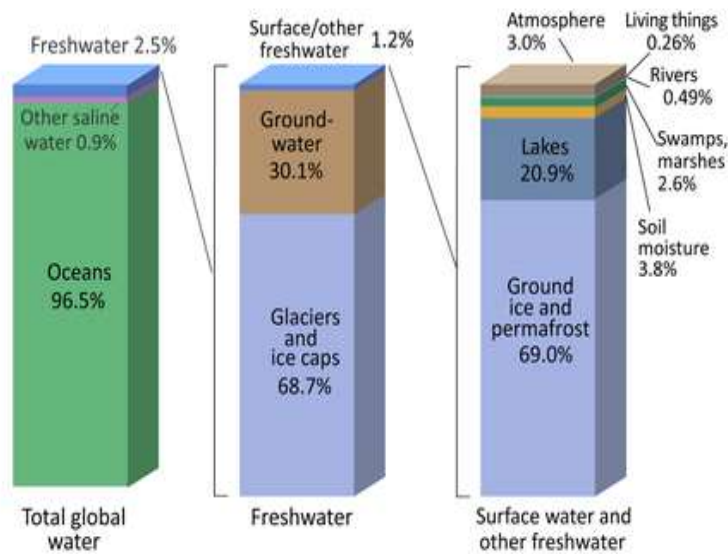
The water resource is the most important resource for all living things on this planet, from plants and fungi to human beings. Being dependent on such vital resources

² <https://worldoceanreview.com/en/wor-3/oil-and-gas/sating-our-energy-hunger/reserves-or-resources/>

leads mankind to settle around freshwater resources such as rivers and lakes. Throughout history, humans learned to reproduce crops through intensive farming. Resulting in much more reliance on freshwater. To notice that most populations thrive around usable water resources for consumption, production, and transportation.

The effect of the irresponsible use of water resources was slight to notice. However, Professor I. A. Shiklomanov mentioned – in his summary of the monograph of ‘World Water Resource’ under the publication of UNESCO’s International Hydrological Programme (IHP); “The magnificent properties of natural waters - their renovation during the water cycle and their ability for self-purification – allowed a state of relative purity, quantity, and quality of freshwaters to be retained for a long time. This gave birth to an illusion of immutability and inexhaustibility of water resources, considered as a gift of the natural environment. Under these preconceptions, a tradition has arisen of a careless attitude in the use of water resources, along” (Shiklomanov, 1998)

Figure 1 Distribution of earth's water



Source: <https://www.usgs.gov/media/images/distribution-water-and-above-earth>

Our planet's surface is covered by 71% water. Equivalent to 1,386 million cubic meters – as per the USGS³. Besides, this majority determines the climate on the earth's surface. However, the distribution of the types of water is a different subject. The absolute majority of the 71% is ocean or salty water. As per the USGS, Shiklomanov stated that oceans make up 96.5% of all the observed water on and on the planet. Where the rest holds 2.5% for fresh water and 0.9% is other salty water. To a certain extent; it cannot be used for consumption. Unfortunately, within the 2.5% of freshwater, 68.7% are glaciers and ice caps, 30.1% are underground water and 1.2% is the rest of freshwater on the surface. (Shiklomanov, 1993)

The distribution of water shows how scarce freshwater could be, in a particular region. As a result, a conflict between states on such resources could be fatal. For illustration, the Nile river in Africa. Major cities were built around its belt in different states. Being the source of nutrition and transportation in those cities. But disagreements and conflicts occurred recently this year (2020) between Ethiopia and Egypt. as Ethiopia is an upstream member of the Nile and Egypt is downstream. However, Policies and agreements are made all around the world. Making most of the rivers in the world to be a transboundary border; to let everyone benefits from rivers in a sustainable way.

3.4 Energy Resources

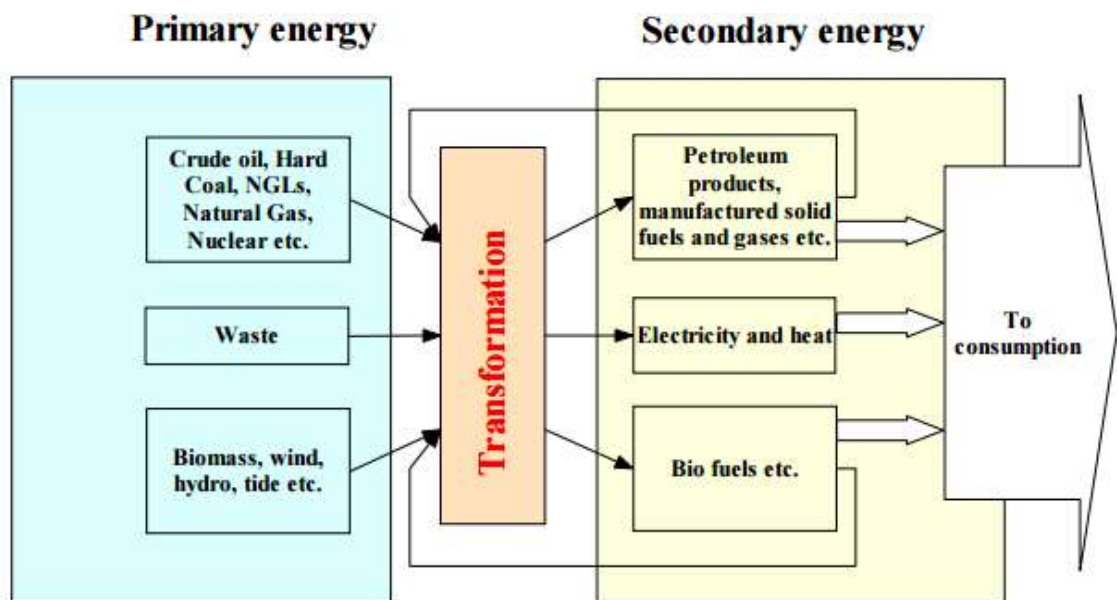
Energy is considered one of the important elements in the life of nations and people, as it provides warmth in winter, and it illuminates the nights and dispels the darkness, and it manages machinery, cars, factories, and all the various methods of transport. Therefore, the discovery of fossil fuels and different energy resources have had an important role in human life, as the world has witnessed many changes and developments, as the pace of scientific and industrial progress has greatly accelerated,

³ https://www.usgs.gov/special-topic/water-science-school/science/how-much-water-there-earth?qt-science_center_objects=0#qt-science_center_objects

especially the Arabian Gulf – contains large reserves of oil and natural gas, and rich in solar energy, Where the sun shines on them most days of the year.

Energy sources are sorted – as mentioned before – into renewable and nonrenewable energy resources. Yet, the most abundant and used resources are the nonrenewable. However, there are types of uses for energy resources. Defined as primary and secondary sources. Primary energy sources are resources that after extraction and removal of a harmful substance, it can be used directly without any further process (e.g. coal). While secondary energy sources are requiring transformation processes after extraction. For instance, oil requires refineries to produce petroleum products available for consumption.⁴

Figure 2 Primary and secondary energy



Source: <https://medium.com/culture-of-energy/energy-transitions-changing-physical-forms-1b7f42d0694d>

⁴ http://www.eniscuola.net/wp-content/uploads/2011/02/pdf_energy_knowledge_11.pdf

3.4.1 Fossil Fuels

Fossil fuels are nonrenewable natural resources that are formed million years ago. Located under the crust of earth's surface. Fossil fuels are made in nature by decomposed organic substance, that contains hydrocarbon elements. Which through time will decompose and turn to fossil fuels. The main kinds of fossil fuels are: (Nunes, 2019)

- oil,
- coal
- natural gas.

Being the engine of economies, fossil fuels played an important role in human development. Not only in recent history, but also in ancient ages. Oil was a well-known product in ancient times in Babylon and Persian civilizations (2000 B.C.). the raw material of oil has been used to fuel oil lamps, lubricants for a wheel, and medicinal purposes. In addition, coal, also, was used in ancient communities for warmth and smelting metals⁵. However, fossil fuels established a necessity in our daily life. Until the industrial revolution in the 19th century. A revolution used coal as an essential and primary source of energy to power the steam engines. Leading to new discoveries and innovations (e.g. Steel and railroads). This proves how vital mankind dependent on such resources.⁶

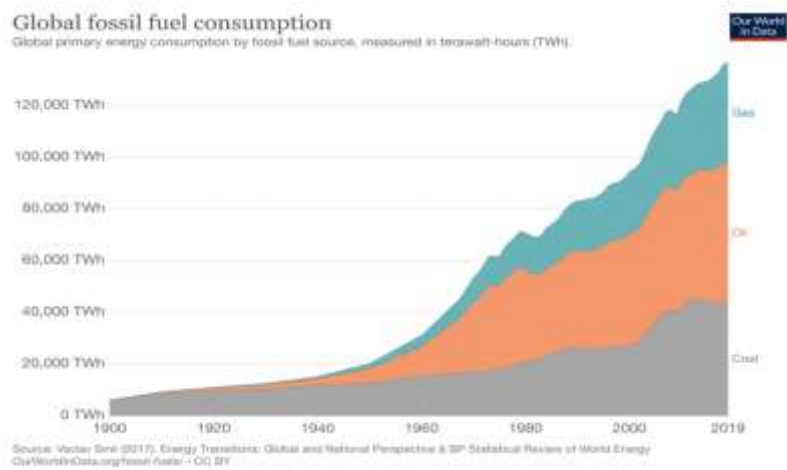
Fossil fuels' importance and dependency can be shown in the consumption of the world's fossil fuel through time. From the industrial revolution, coal was the main source of energy. Until the discovered methods of advanced drilling for oil in the late 1800s. the chart below shows the world's consumption of fossil fuels by fuel type in TWh (Terawatt-hours). published by Ourworldindata.org, using BP Statistical review of the world's energy (by Hannah Ritchie and Max Roser) (BP, 2019). The chart shows a clear consumption increased in all fossil fuels from 1900 to 2019. Whereas, in the first half of the 20th century, the most used fossil fuel was coal. Later, a shift from coal to oil then to gas. Yet,

⁵ <https://www.ancientpages.com/2018/06/28/how-and-when-did-ancient-people-start-using-oil/>

⁶ <https://www.history.com/topics/industrial-revolution/oil-industry>

all fossil fuels are still for consumption. If observed, the last 20 years for the consumption of fossil fuels, the change in coal is 60%, oil 25%, and gas by 64%. (BP, 2019).

Figure 3 Global Consumption of fossil Fuel



Source: <https://ourworldindata.org/grapher/global-fossil-fuel-consumption?time=earliest..lates>

3.4.2 Hydropower

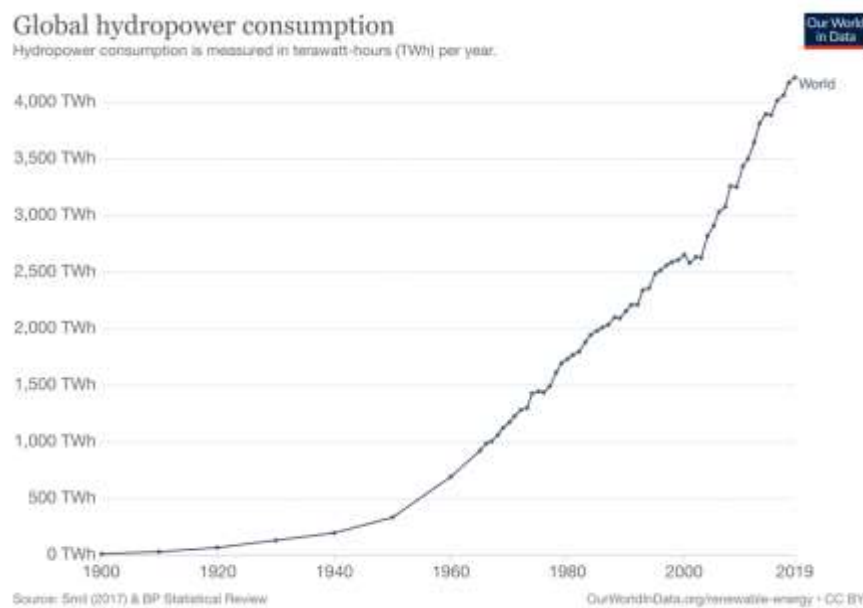
Hydropower is a renewable energy source that uses water flow to generate electricity. Converting the kinetic energy stored water flow to useable energy stored in power cells; that can be used for commercial purposes. The electricity that is harnessed from the moving water is called hydroelectricity. Furthermore, the energy exploited sources differ based on the region. These sources are rivers, lakes, waterfalls, or melted ice from the tops of mountains. Whereas, hydropower plants are built for these water sources to be stored and used for generating power through turbines.

There are types of powerplants that are specializing to harness energy. Firstly, all famous dams. Dams are huge powerplants constructed and – made of cement – on one side of a water reservoir. preventing any further movement. Sometimes, dams are called pondage powerplants. Another type of hydropower plant is the run of river powerplants. Unlike dams, river powerplants use the ongoing flow of rivers without blocking water to create reservoirs.

Hydropower comes with many advantages, other than hydroelectricity. Firstly, one of the environmental benefits, is that hydropower plants can help decrease harmful

emissions that fossil fuels yield. Also, the water used in the powerplant can be reused for different purposes. Or, it can be restored into the reservoir through an electric pump. Furthermore, powerplants control water flow which is beneficial for regions with flooding. Lastly, powerplants require big investments. Diplomatic politics among region countries. Yet, it's cheap to operate it.⁷

Figure 4 Global hydropower consumption



Source: <https://ourworldindata.org/grapher/global-hydro-consumption?time=earliest..latest>

3.4.3 Solar and Wind Energy

Solar and wind are both clean and renewable energy sources. In fact, these resources are inexhaustible, which means it has an unlimited supply of the resource. Yet, wind and solar have many factors that rule their accessibility. For instance, it's not guaranteed that wind will blow or as projected. Or, whether might be cloudy, resulting in inefficient production of solar energy. However, it is still considered the most effective replacement of fossil fuels, to reduce greenhouse gases emission and climate change.

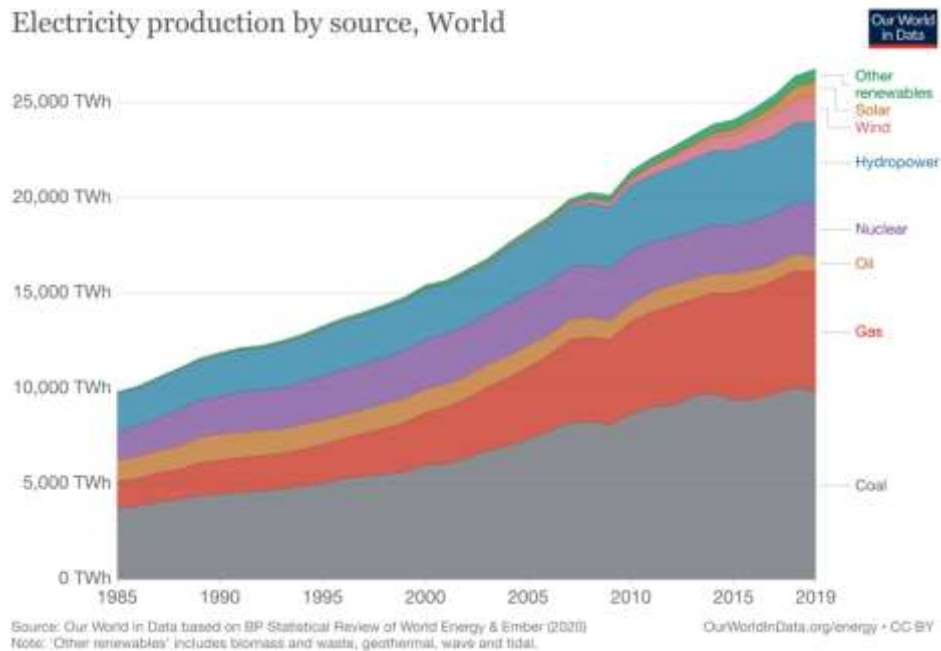
⁷ <https://www.iberdrola.com/environment/what-is-hydroelectric-energy>

Solar energy works by absorbing solar sunlight – most of the light spectrum, ultraviolet, and infrared rays - and converting it into electrical energy for use in homes or workplaces. Our sun is a massive natural nuclear reactor that releases tiny beams of energy called photons, which travel through space from the sun to the earth's surface. a distance of 93 million miles in a time of 8.5 minutes. Every hour, photons collide with enough solar energy to meet global energy needs for an entire year. Currently, the use of solar energy is very limited. In the United States, for example, it is only five-tenths of one percent of the energy consumed. But solar technology is going to improve, and the cost associated with its production continues to decrease. (Malloch Brown, 2000).

The wind is caused by the sun. When the sun warms an area of the earth, the air around that area absorbs part of that heat. At a certain temperature, that warm air begins to rise very quickly because the volume of warm air is lighter than the same volume of cold air. The hotter air molecules in their fast movement exert more pressure than the slow-moving ones, so they take less of them to maintain the normal pressure of the air at a certain height. When that hot, lighter air rises suddenly, the cooler air flows quickly, filling the void left by the hot air behind. This cold air blows to fill a space with the wind. In the case of a wind-electric turbine, the blades of the turbine are designed to capture the kinetic energy of the wind, and the remaining steps are nearly identical to a hydroelectric system. The generator converts the rotational energy into electricity. So, generating electricity from wind is, in essence, a transfer of energy from one medium to another. (Malloch Brown, 2000).

In the figure below, it clarifies the shift of the world's generation of electricity from nonrenewable energy sources (fossil fuels), to renewable energy. Yet solar and wind energy. As shown before in figure 3, hydropower renewable energy started the journey in the mid of the last century. However, the contribution towards wind and solar energy sources technologies is on the rise. One of the reasons, solar and wind energy technologies are continuing to decrease in price. Which makes more and more coinvent to invest in such technologies. As a result, it is projected that generating electricity from solar and wind sources will grow in the upcoming decades(BP, 2020)

Figure 5 Electricity Production by source, World



Source: <https://ourworldindata.org/grapher/electricity-prod-source-stacked?time=earliest..latest>

3.4.4 Nuclear Energy

Nuclear energy is the energy produced by a nuclear reaction; These reactions produce massive amounts of energy when bonds between atoms are reshaped through fusion or fission. Energy is generated from the nuclear fusion process when atoms are merged into a larger atom, and it is the same reactions that provide the sun with energy. In the process of fission, large amounts of energy are generated by splitting the nucleus of an atom or splitting atoms into smaller ones. This is the type of process used in nuclear power plants. Besides generating electricity; Nuclear energy is used in many areas that include consumer products; such as smoke detectors, cameras, sterilization of cosmetics and medical dressings, in addition to its use in food and agriculture, medicine and scientific research, water desalination, and space exploration.⁸

⁸ <https://www.nationalgeographic.org/encyclopedia/nuclear-energy/>

Nuclear Powerplants is where the process of producing nuclear energy is managed, and in which the process of nuclear fission or fusion takes place, which results in huge thermal energy that is used to heat water to produce water vapor, which in turn is released to engines and special turbines to convert kinetic energy into electrical energy that is used to run many cities and factories. And one of the most important components of the nuclear reactor is the core of the reactor that contains nuclear fuel and in which the processes are carried out on the nucleus, in addition to the speed reducer, which calms the speed of the neutrons in order to exploit the largest possible energy from their movement, and the nuclear reactor contains the coolant which consists of water or hydrogen gas, which works on removing the heat of the nuclear reaction on the one hand, and using the resulting steam in other processes on the other hand (Malloch Brown, 2000).

3.5 Land Resources

Land resources are underestimated natural resources that support ecosystems for living things. However, land resources don't refer to the agricultural sense or the earth's surface; agriculture is a way of cultivating the land resources (soil fertility). Nonetheless, land resources include water aquifers, regional climate, forests, moisture soil, and mineral deposits. Everything that can be exploited in any land, is a land resource.

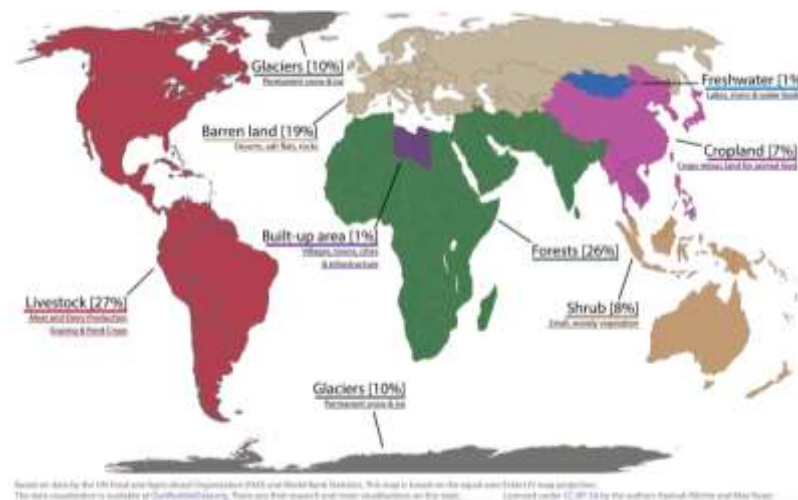
land as a term is usually used to describe geographical features. Nonetheless, Di Gregorio and Jansen, in their introduction of 'A New Concept for A Land Cover Classification System', stated terms to land; to make it easier to compare and differentiate between lands. Land use and land cover. In which land use refers to the activities and actions are made by people in the observed land. Secondly, land cover is the (bio)physical cover on the earth's surface (Di Gregorio & Jansen, 2000). By understanding these two terms, it elaborates details of land resources, to the sustainable use of land resources by monitoring and controlling resources in use.

In an economic and environmental sense, land resources can fit in both renewable and nonrenewable resources. Sometimes, because of the slow regeneration of such resources. For example, timber and forests raw materials take decades to renew what was

consumed. Nonetheless, sustainably managing such diverse resources is challenging looking at how the population is increasing with enormous demands.⁹

Furthermore, one of the most widespread uses of land in food production. In figure 5, how the world's land is used, clarifies the total areas of each uses of land in terms of the actual size of continents and countries. In which the land used for the production of crops and livestock is equivalent to the total area of China, North America, and South America. Covering 34% of the world's land. This 34% of the land is unevenly distributed between livestock and crops. In which crops consists of 7% only. As it is known, livestock production can be linked to greenhouse gas emissions, climate change, or soil degradation. Yet, 27% of the world's land used for livestock production. As a conclusion, land resources should be approached as a vital resource. Since mankind and living rely heavily on such a resource. (Ritchie & Roser, 2019)

Figure 6 How the world's land is used: total area sizes by type of use & land cover (Ritchie & Roser, 2019).



Source: Our World in Data, <https://ourworldindata.org/land-use>

⁹ <http://www.fao.org/3/x3810e/x3810e04.htm#g>

3.6 Mineral Resources.

Mineral resources are resources that are extracted from the earth's crust through mining, these resources are inorganic raw materials. Used in almost every aspect of human life. Considering the economic interests to cultivate such a resource. The mineral resource uses vary – as any types of natural resources, for example, gravel and sand to build structures and gold used in electronic devices. Mineral resources can be found in different concentrations that are called mineral deposits. Mineral deposits are formed by a moving medium and mineral making ore. A moving medium like magma or water. In which a medium shifts the mineral ores to create deposits of minerals that later on can be exploited. In another way, mineral deposits can be formed through pressure and heat. After extracting ores, production processes are applied to remove impurities and unneeded materials according to economic interests.¹⁰

As mineral resources are shaped through a different mechanism, resulting in different components of the ore deposits. These diverse deposits result in a mixture of many different minerals. After the assessment of a certain region, the extraction from reserves of initiates under economic interest. However, there are three main categories under mineral resources classification. Metallic, nonmetallic, and energy minerals like coal.

Metallic minerals are ores or elements that contain one or more metal substances. Metallic resources are characterized by many aspects. Based on appearance, in which, the metal should have a shiny appearance. Another one, it must contain metals in its chemical composition. Furthermore, metallic minerals are divided into 3 classes:

1. Ferrous metals: metals containing iron (iron, magnesium, titanium.)
2. Non-ferrous metals: doesn't contain iron (tin, aluminum, copper...)

¹⁰ <https://www.nationalgeographic.org/encyclopedia/mineral-deposits/#:~:text=Deposits%20of%20minerals%20form%20when,leases%20and%20deposits%20the%20ore.&text=When%20magma%20or%20lava%20cools,might%20include%20feldspar%20or%20mica.>

3. Precious metals: gold, silver, and platinum. (classified as non-ferrous too)
4. Radioactive metals: (radium and uranium)

Meanwhile, non-metallic resources are used for many and different purposes. Yet, it has the same importance to economies as nonmetallic minerals. As a result of ore deposits complex structure elements and material and the formation of deposits. Different structures and mixtures give a wide range of materials to benefit from. Non-metallic can vary from region to region and climate to climate. Providing materials for construction clay, limestone, sand, and gravel.... etc. And, raw chemical substances like sulfur or salts. These different materials are distributed around the world with different concentrations. (Nelson, 2012).

4 Practical Part

4.1 An Overview of The Middle East.

The middle east, an enormous and resource-rich. The land of ancient civilizations and the birthplace of Islam, Christianity, and Judaism. Currently, the vast area consists of many countries located in the east and the south of the Mediterranean Sea, the Arabian Peninsula, and Mesopotamia. The term middle east is used to describe the regions that were under the rule of the ottoman empire in the earlies of the last century. However, this term now refers more to Arab speaking countries which are incorrect; yet, the majority is Arabic speaking countries. Middle east has many official languages (other than Arabic), like Turkish, Kurdish, Persian, and Hebrew. The middle east covers roughly 7.2 million km² with Saudi Arabia being the largest. And, the population of the middle east has crossed recently 400 million, excluding turkey.¹¹ Mainly, the middle east is a confusing notion in terms of which countries are involved. However, this thesis will focus on countries concerning their natural resources.

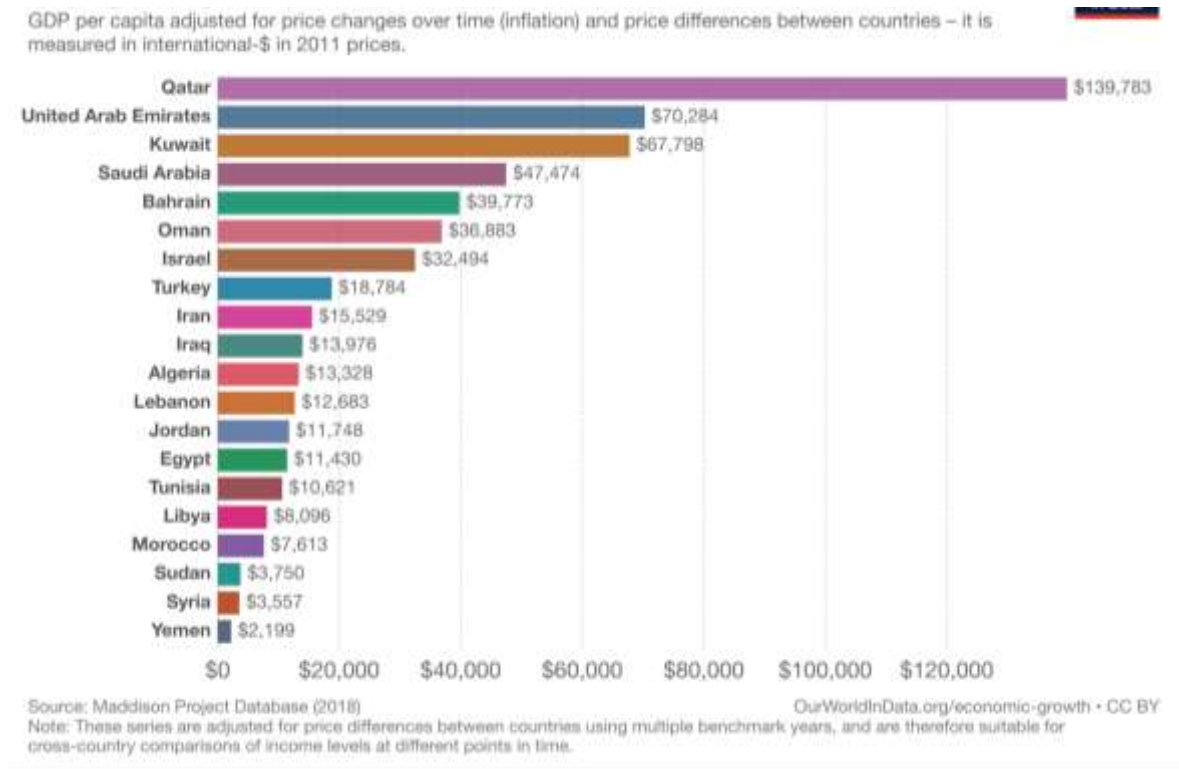
The natural resources in the middle east vary. As the climate also varies in such a huge area. Regions with vast deserts, and mountains in another region. Understanding the variety and diversity that is present in the middle east should result in many natural resources. In deserts, like Saudi Arabia and Libya are dependent on oil and gas reserves for economic growth. Or at least in the recent past. Meanwhile in the Mesopotamian region, used to depend on land resources such as fertile soil which is called fertile crescent. Played a vital role in civilization development in the early stages of human. Going to the Levant region. Which

¹¹ <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=ZQ>

consist of Lebanon, Syria, Jordan. These countries are considered water-rich resources comparing relatively to other regions in the middle east.

4.1.1 Economical Aspects of the middle east.

Figure 7 GDP Per Capita, MENA Region, 2016



Source: <https://ourworldindata.org/grapher/average-real-gdp-per-capita-across-countries-and-regions?time=2016..latest&country=DZA~BHR~EGY~IRN~IRQ~ISR~JOR~KWT~LBN~LBY~MAR~OMN~QAT~SAU~SDN~SYR~TUN~TUR~ARE~YEM>

Before diving into economics, it is important to take into consideration the political situation that is causing economic uncertainty. So, it is necessary to group the middle east countries into more sophisticated categories. Not in development wise, but in relation to natural resources. In this sense, the authors of ‘Natural Resource Abundance, Growth, and Diversification in the Middle East and North Africa’ mentioned a classification for the middle east and north Africa to compare among countries of the region. This classification was introduced by the world bank in 2005. With the purpose to identify the varieties and weaknesses of natural resource countries. However, there are 3 main categories. First,

resource-poor – labor abundant (RPLA), includes Egypt, Jordan, Lebanon, Morocco, and Tunisia. Secondly, Resource-Rich – Labor abundant (RRLA), this includes Yemen, Iran, Iraq, Libya, Algeria, and Syria. Lastly, Resource-Rich – Labor Importing (RRLI) includes the GCC Countries. Which are Saudi Arabia, United Arab Emirates, Bahrain, Oman, Kuwait, and Qatar.(Diop et al., 2012).

In figure 7 , it describes the GDP in 2016, it shows that even of the unfortunate events in the last few years, some developing countries shows growth in GDP. Iraq for example, 3.4% GDP growth in 2017. Even though it is from RRLA countries. Producing approximately 4.7 million barrels per day.¹² However, this indicates that the factor of growing GDP does not show the internal activities in a resource-rich country. In the upcoming section. Other factors will be elaborated. Especially when taking current situations in the Arab world that consequences from corruption and bad management.

4.2 Role of Natural Resources in the Middle East.

The middle east is the most famous region for its resources, especially fossil fuels. In this part, the role of natural resources on the middle east economy and political activity. Initially, it important to differentiate between resource-rich and resource-poor countries of the region. Also, to keep into consideration that the population of middle east countries varies. Which makes it difficult to compare income levels within different states of the middle east (Diop et al., 2012).

The natural resource race in the middle east after the discovery of oil in 1859. In the middle east, the wave of exploration started after the first major discovery of oil in 1908, in Iran – Persia at that time. Through an Anglo Persian company. Following its neighbor, Iraq

¹² <https://www.statista.com/statistics/265188/oil-productionin-iraq-in-barrels-per-day/#:~:text=This%20statistic%20shows%20Iraq's%20oil,million%20barrels%20of%20oil%20daily.>

was the next to discover oil fields in 1927; although exploration started in 1902.¹³ However, the winner of the race, in my view, was Saudi Arabia. Discovering the most important reserves in the world in the 1930s. Moreover, the middle east is not only rich with oil or natural gas. But also rich in mineral resources. located mainly in North Africa and Saudi Arabia. Besides, in this section, the water resources of this region will be described to emphasize the strategic locations, potential crisis, and hydropower. Evaluating the abundance of water. Plus, land resources of the middle east and land use. Showing the activities done on the region's land. Lastly, after describing and comparing the resources of the middle. The challenges and current issues that the middle east faces considering the natural resources.

4.2.1 Oil and Natural Gas

Starting with fossil fuels, the primary natural resource of the middle east. Mainly oil and natural gas. Almost all of the world's reserves of oil are located in the middle east. Leaving Saudi Arabia as the 2nd top oil producer in the world after the united states. Producing at its peak 12 million barrels per day in 2016 as per Worldometer. As for natural gas, the middle east is also rich in natural gas. Shares more than one-third of the world natural gas; as Qatar shares 12.5% and Iran shares 17.3% of the world's natural gas reserves¹⁴. Furthermore, fossil fuels of the middle east are not distributed evenly across the region. And, the populations of the MENA region are obviously different from one country to another. This indicates that some comparisons might be inaccurate towards the income levels between resource-rich and resource-poor countries(Diop et al., 2012). For instance, in figure 7, Qatar's populations being small, for such abundant resources as natural gas. For a high demand of the world's consumption. keeps the country on top of the GDP per capitalist.

¹³<https://grandemotte.wordpress.com/iraq/#:~:text=Oil%20exploration%20drilling%20began%20in,95%2C00%20bopd%20for%20nine%20days.>

¹⁴<https://www.worldometers.info/oil/saudi-arabia-oil/>

The middle east produces 48.1 % of the 1.7 billion oil barrels that the world generally produces in 2019. Some countries like Qatar and UAE, are showing plans of diversification, although they are resource-rich, yet the population of these two countries are way too less than other resource-rich countries with high populations, for example, Iraq and Iran. On the other hand, Kuwait is still relying more on oil production, almost half of Kuwait's GDP comes from oil. The same thing with Saudi's oil, 42% of its GDP comes from oil. Comparing to the rest of the middle east, the developing countries are devastated by unfortunate events like the war in Yemen, Syria, and Libya. Obviously, which is affecting the process of oil production¹⁵.

As per BP reviews, Saudi Arabia is accounted alone for 12.4% of the world's oil production. Producing almost 11.8 million barrels per day in 2019. 3.5% lower than the year before. meanwhile, the UAE scored 3.9 million barrels per day in 2019. Which is increased in the last decade by 2.3% growth of production. Qatar produced 1.8 million; not that huge amount compared to other neighboring countries. But to show the Qatari efforts to diversify production away from natural gas. Those were illustrations of the resource-rich – Importing labor (RRIL). Moving to resource-rich – labor abundant countries (RRLA) – like Iraq, Yemen, Iran. Taking Iran as an example from this category. Iran is one of the countries that is sanctioned by the united stated. Yet, Iran is accounted for 21.4 billion barrels reserve, a 9% share of the total. Iran produced by the end of 2019, 3.5 million barrels per day. Lower 26.4% than in 2008 (BP, 2020). Most of the resource-rich labor abundant countries, tend to have access to abundant fossil fuel. Yet such countries are not achieving notable growth due to bad human resource management. The rest of the middle east produces or imports oil for domestic use. But, at the same time, rich in different resources(Diop et al., 2012)

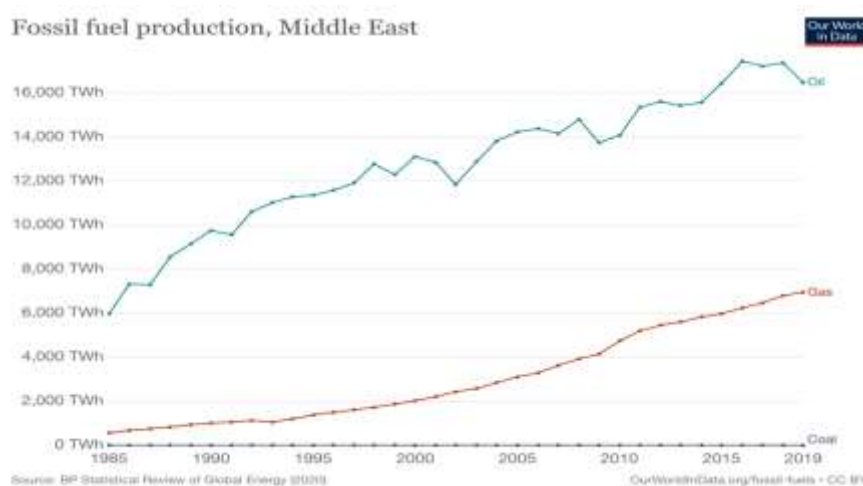
As for the production of natural gas, the top producers of the middle east are Iran and Qatar. The location of these two countries' proven reserves is in the Persian Gulf. However, BP reviews for 2019, shows that Iran shares for 16.1% of the global natural gas

¹⁵ <https://www.middleeasteye.net/news/renewable-energy-oil-middle-east>

reserves. Also, Qatar comes in 2nd place of the world's natural gas reserves. Shares 12.4% of its total (BP, 2020). Iran produced 2019 about 244 billion cubic meters. Followed by Qatar, Producing 178 billion cubic meters. Then Saudi Arabia; 113 billion cubic meters. In total, the middle east (excluding North Africa); extracting and producing 659.3 billion cubic meters of natural gas. Sharing 17.4% of the world's production of natural gas.

In general, fossil fuels are mainly consumed as a source of electricity in most of the middle east countries. In figure 8, it shows a comparison between fossil fuels type, of the middle east's production in terms of terawatt-hour. As the middle east total production of oil exceeds 16 thousand TWh comparing to gas which is six thousand TWh only. As for coal production in the middle east is barely noticeable. As a result, this indicator shows a middle eastern reliance on oil to fulfill domestic and global demand.

Figure 8 Fossil Fuel production in TWh

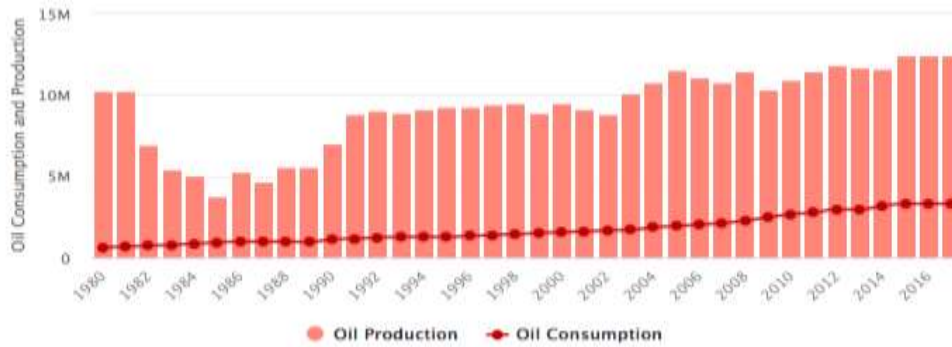


Source: <https://ourworldindata.org/grapher/fossil-fuel-production?time=1965..latest&country=~Middle%20East>

In the figure below, it shows Saudi's consumption and production. it shows a steady growth of oil production and consumption in the Saudi economy in 2016. The consumption of oil in Saudi Arabia exceeds 3.3 million barrels per day from 12 million (approximately) production. which leaves the country with more than 9 million barrels per day as a daily surplus. From this 9.1 million, 7.3 million barrels per day are being exported with no oil imports which leave the country in many with net exports of 7.3 million. However, in a percentage, 59% of Saudi oil is exported. Leaving the country in the top

exporters of the world. Also, Saudi Arabia produces 1.7% only of its total reserve (266 billion barrels).

Figure 9 Saudi Arabia Oil Consumption and Production in barrels per day

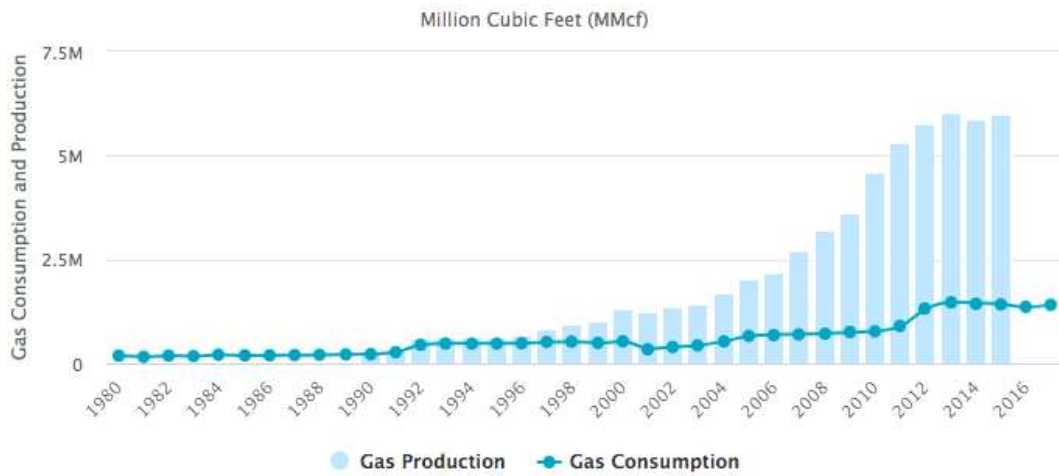


Source: <https://www.worldometers.info/oil/saudi-arabia-oil/#oil-consumption>

As for natural gas and as mentioned before, Qatar and Iran are the top producers of the middle east; Qatar (6 MMcf) and Iran (9 MMcf). However, in Figures 10 and 11, a comparison of consumption between these resource-rich countries. Yet, Qatar is a resource-rich labor importing state (RRLI). And, Iran is a resource-rich labor abundant (RRLA) country. first, Qatar consumes 1.4 MMcf of the 6 million. Barely a third of Qatar’s natural gas production. exporting the rest 73% of its abundant natural gas. This results in a stable growth of the countries since the population of Qatar doesn’t exceed 3 million. Leaving it at the top of GDP per capita. ¹⁶

¹⁶ <https://www.worldometers.info/gas/>

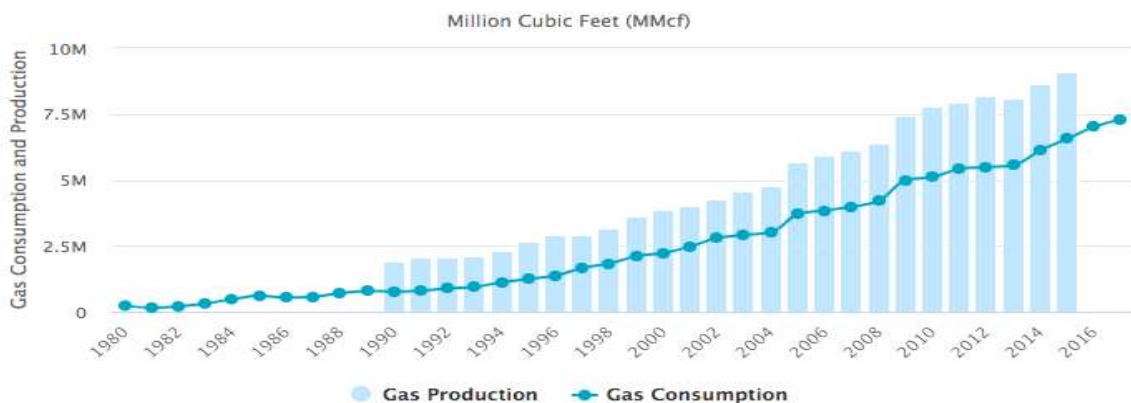
Figure 10 Qatar Gas Consumption and production



Source: <https://www.worldometers.info/gas/qatar-natural-gas/#:~:text=Qatar%20holds%20858%20trillion%20cubic,609.2%20times%20its%20annual%20consumption.>

As for Iran, a population of over 80 million. A labor abundant country, and GDP per capita of 15,000\$ in 2016. For such a huge population, Iran produces 244.2 billion cubic meters in 2019, as per BP reviews. However, it is projected that Iran supplies more natural gas for the future demand of the world. As for the consumption of natural gas in Iran. Iran consumes more than 70% its produces gas; due to the sanction placed on Iran by the United State, Iran barely exports small part of it produced gas. Also, take into consideration that Iran is conflicting constantly with neighboring countries, mainly GCC countries.

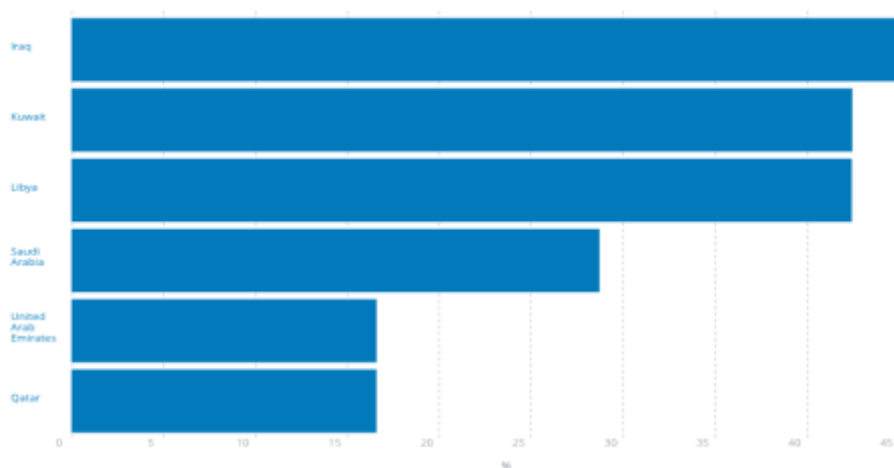
Figure 11 Iran Gas Consumption and production (MMcf)



Source: <https://www.worldometers.info/gas/iran-natural-gas/#gas-reserves>

As a recap, the figure below shows the share of oil rents of the country's GDP in 2018. Starting with the high percentages, Kuwait (RRIL) and Iraq (RRLA), two countries for two different categories. Both depend heavily on oil. As it shows in the figure above, Iraq 45.4% and Kuwait 42.4% of their GDP came from oil in 2018. As a consequence, these economies are vulnerable to demand. Surprisingly, Saudi Arabia had 30% of its GDP from its oil. This shows the will of the Saudi government towards diversification of its energy supply. Which also a part of the crown prince's vision 2030. However, Qatar and UAE recorded a low percentage of oil's share in GDP. Because both have a diverse economy.¹⁷

Figure 12 Oil rents (% of GDP) - Kuwait, Libya, Saudi Arabia, Iraq, Qatar, United Arab Emirates. 2018



Source: <https://data.worldbank.org/indicator/NY.GDP.PETR.RT.ZS?end=2018&locations=IR-KW-LY-SA-OA-AE&start=2018&view=bar>

4.2.2 Renewable Energy Sources.

Oil and gas are undoubtedly the focus of conflicts in the Middle East, whether political or economic, in the past and the present. Fossil fuels distinguished most countries in the region from the rest of the world. The Middle East is considered a large storehouse of the two most important commodities in the world, oil and natural gas, but with the growing interest and dependence on solar energy, some may believe that the role of the Middle East countries concerning energy is nearing to an end, but the energy data revealed

¹⁷ <https://www.middleeasteye.net/news/renewable-energy-oil-middle-east>

in the last period that the region will maintain its position; Being an energy reservoir even after the end of the oil era.

In this part, I will describe and compare countries in the middle east. However, renewable energy sources consist of many types, as discussed in the first section. The middle east, especially the Arabian Peninsula and the north African desert, receives sunlight for most of the day and barely clouds. As result, these desert traits might be the way for a new Energy supply race. Solar Energy might be inconvenient for an economy that has a reliance on fossil fuels as a source of energy. Lastly, this part will conclude the efforts that resource-rich countries are doing to diversify their energy supply. And, illuminate the rising demand for renewable energy in developing countries.

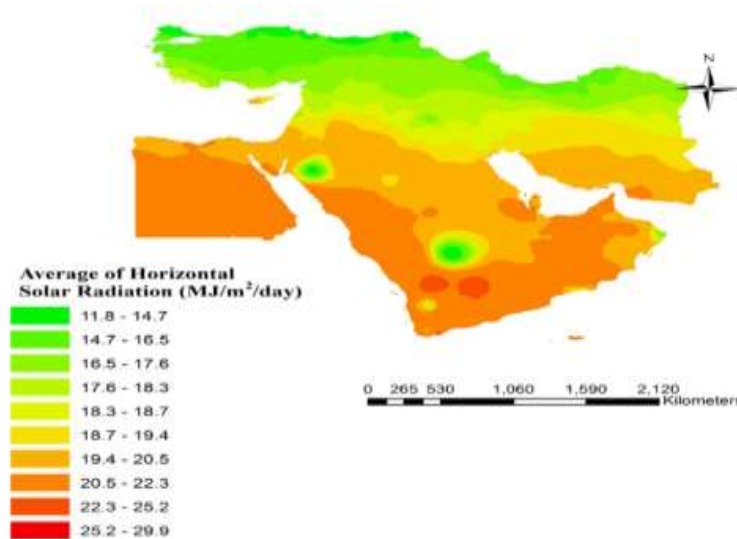
BP Reviews of 2019 shows the renewable energy intake in the middle east is growing fast. As a reaction to the increasing demand for clean energy and to lower the environmental impact of fossil fuel on the climate. As a whole, the middle east and north Africa in 2019, produced 26.7 terawatt-h. equal to 15.7 million barrels of oil equivalent. With Morocco and Egypt being the highest among the MENA region with 6 terawatt-hour. However, these numbers include energy sources from every type of renewable resource except for hydroelectricity (BP, 2020).

As the demand for energy increases with population growth. The consumption of most of the middle east had already established photovoltaic fields or have a great potential of either solar or wind energy supply. One of the first huge projects for solar energy was established in Morocco in 2013. Michael Hochberg in his report of Renewable energy growth in Morocco. He describes the government response to the growth of demand for energy supply to produce energy sustainably after analyzing that the countries expenditure goes more to imported energy supplies like Crude oil and natural gas. Spending an average of 9 billion US dollars to cover electricity consumption in the residential and industrial sectors. However, Michael Hochberg also said, "Morocco has the most ambitious renewable energy targets in the MENA region, pledging to increase renewable energy capacity to 42 percent of total installed capacity by 2020, and 52 percent by 2030:". Moreover, he stated the demand for energy supply was already on the rise on average of

7% per year since 2000. In which the Moroccan government efforts covered 98% of the population with electric supply in 2014 (Hochberg, 2016).

Nevertheless, Morocco is not a country that took the big steps towards renewable energy, Qatar and UAE being advanced economies compared to other middle eastern developing countries. Shows the ability to establish renewable energy facilities. In general, the region's strategic geographic location. Just between the tropic of cancer and the equator line. Being in such a location, exposed to most of the solar radiation coming from the sun. Also, high altitudes for wind energy source through turbines.

Figure 13 GIS map of solar radiation in the Middle East. 2016



Source: (Nematollahi et al., 2016)

A simple study in a journal done by Omid Nematollahi et al. measures the level of the potential of solar radiation in the middle east. Using Geographic Information System (GIS). In a nutshell, GIS is a program that collects geographical information and can create layers of information from different locations that gather weather data to visualize all information on a map. Figure 13 is an example of this system. However, in this case, the figure above is a visualization of weather data that is collected from three hundred ninety different locations. Analyzing the daily total solar radiation on the region in megajoule per meter square per day. From the figure above, Nematollahi et al. stated that almost all

countries in the middle east have significant exposure to solar radiation. However, Yemen has the most solar radiation in the middle east. Taking 27 MJ per meter square. Coming next, Oman and some parts of Iran. Yet, other countries of the region can easily cultivate solar ration (Nematollahi et al., 2016)

As a reminder, The most common renewable energy sources currently are limited to solar energy, wind, hydroelectricity, tides, geothermal, and biomass, and have become about 26% of the global electricity production, and the International Energy Agency (IEA) expects to increase the share of alternative energy to about 30% by 2024, and the International Renewable Energy Agency - IRENA - predicts that the proportion of renewable energy use in societies will reach 86% by 2050.¹⁸

4.2.3 Water Resource

The MENA region has a well know climate across the globe. Half of the Middle East region has a desert climate recording the highest temperature in summers. Desertification, in general, is proceeding and expanding in the middle east, countries Jordan, Iraq, Syria, and Iran. These countries are located on the famous ancient fertile crescent of the Mesopotamian civilizations. Hence desertification these countries are losing land towards harsh desertification. However, water resources in the MENA region are turning towards scarce conditions and degraded water quality. On the other half, the middle has numerous water surfaces like the sea and rivers. The MENA region contains one of the largest deserts; other than the polar deserts. And, contains 3 major rivers. The Nile River in Egypt and Sudan, Jordan river, passing by Jordan, Palestine, Syria, and Israel. And Tigris and Euphrates rivers. The great rives of the Mesopotamia region. Passes by Armenia and mainly Iraq. These rivers are the most important water resources of the Middle East and North Africa (Khater, 2002).

¹⁸ <https://www.iea.org/reports/renewables-2020>

In addition, the Arabian Peninsula is surrounded by water. Hence the name peninsula. First, located at the southwest of the peninsula, is the red sea. Forms a narrow passage called Bab Almandab in Yemen and Djibouti. The red sea is considered the most vital passage for ships, which is located at the center of the globe. Plays the role of a backbone of trade. From the northwest, the shores of north Africa are hit by the Mediterranean Sea and the shores of Lebanon, Palestine, and Israel from the west. However, the middle east is the most region reliant on water produced outside the country.¹⁹

There are many uses of water in any economy. Water is mostly used in agriculture - whether it is crops or livestock. Industrial uses and Municipalities use. Industrial uses have the highest share of water withdrawal in the world. However, in the middle east most uses go to agriculture. In general, developed countries tend to consume water for industrialization. While developing countries lean towards agriculture irrigation. However, the middle eastern region is considered to be arid and semi-arid areas. Typical the middle east is one of the driest regions, yet water consumption is high. Mainly for agriculture.²⁰

The amount of precipitation per year in the middle east is roughly 1547 cubic kilometers. It is stated that this volume of water has an average of 238 millimeters per year. Lebanon has the highest precipitation level and Oman has the lowest of 22mm per year. For clarification, the near east is the region containing Jordan, Syria, Iraq, Palestine, Lebanon, and Turkey. Moreover, in the figure below, it estimates the regional distribution of water resource. Analyzing the annual precipitation and annual renewable water resources; the Arabian peninsula has the lowest share of renewable water (Frenken, 2009).

¹⁹ <https://www.mei.edu/publications/freshwater-resources-mena-region-risks-and-opportunities#pt1>

²⁰ <https://www.mei.edu/publications/freshwater-resources-mena-region-risks-and-opportunities#:~:text=While%20the%20MENA%20region%20is,Earth's%20total%20renewable%20freshwater%20resources.&text=It%20is%20the%20world's%20most%20water%2Dscarce%20region>.

Figure 14 regional distribution of water resources

Subregion	Annual precipitation		Annual internal renewable water resources		
	Height	Volume	Volume	% of the Middle East	Per inhabitant (2005)
	(mm)	(million m ³)	(million m ³)	(%)	(m ³)
Arabian Peninsula	117	362 041	6 110	1	108
Caucasus	702	130 582	73 104	15	4 597
Iran (Islamic Republic of)	228	397 894	128 500	27	1 849
Near East	439	673 531	276 376	57	1 964
Total Region	238	1 564 048	484 090	100	1 711

Source: (Frenken, 2009)

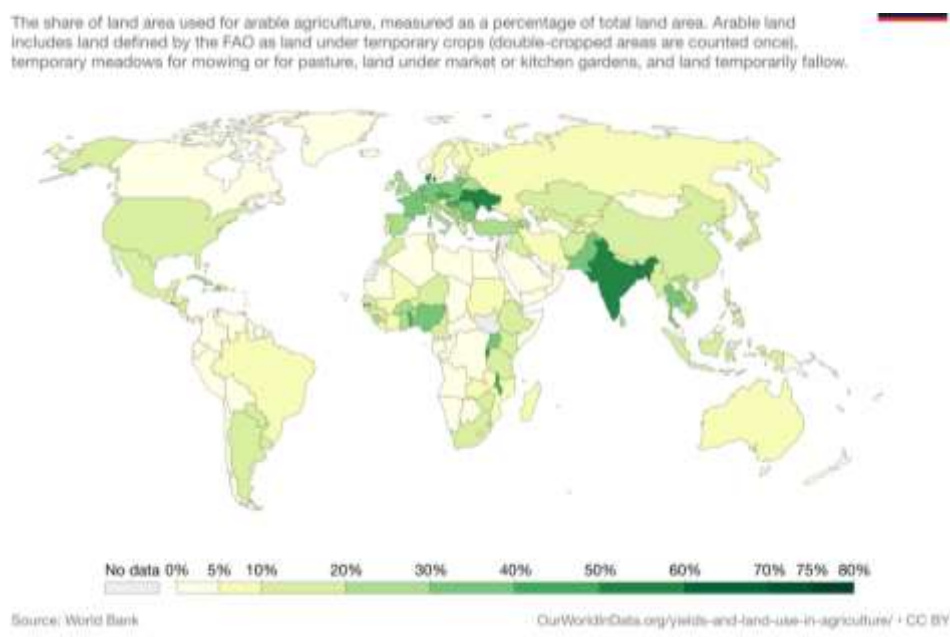
The middle east is so scarce in water. Yet, countries with low actual water resources, whether renewable or fossil, tend to consume more than what available within the country's boundaries. However, Frenken stated in his report, that Kuwait has the least total actual renewable freshwater, 20 million cubic meters. Yet, the consumption is two thousand percent more, comparing to other countries to near east. (Frenken, 2009) Similarly, the United Arab Emirates and Saudi Arabia. These resource-rich labor abundant countries are able to compensate for the scarcity of water by the apply technological processes.

Because of the scarcity of water, Saudi Arabia is working hard to preserve agriculture and avoid almost total dependence on imports. Therefore, Saudi Arabia has established many dams to store rainwater and use it for irrigation, especially in areas located in the southwest of the country, such as the Bish Dam and King Fahd Dam which contains the largest reservoir in the Country. The efforts made by resource-rich countries to produce water is contributing to maintaining the level of stable condition. The environment agency in Abu Dhabi mentions that the United Arab Emirates established 8 desalination plants to change seawater to freshwater. Which contributed to 31% of water demand in UAE in 2012 (Abu Shawish et al., 2019)

4.2.4 Land Use of The Middle East.

The middle east, being the driest region in the world. Agriculture in the Arab world faces obstacles that limit the strengthening of the agricultural investment capabilities, most notably limited freshwater resources, desertification, weak investments, and low wages for labor. however, according to a recent study issued by the World Food Policy Research Institute, agricultural production and economic development suffer from neglect in the Middle East and North Africa regions, with the proportion of poor people in rural areas in the region reaching 70 percent. the reason for that is most of the investments go-to imports. The study assured that agriculture is of strategic importance to the region's economy, even though it only contributes about 13 percent of the GDP, and with water scarcity and climate change, it has become difficult to provide sufficient agricultural products (PRATT et al., 2018).

Figure 15 Share of land area used for arable agriculture, 2015

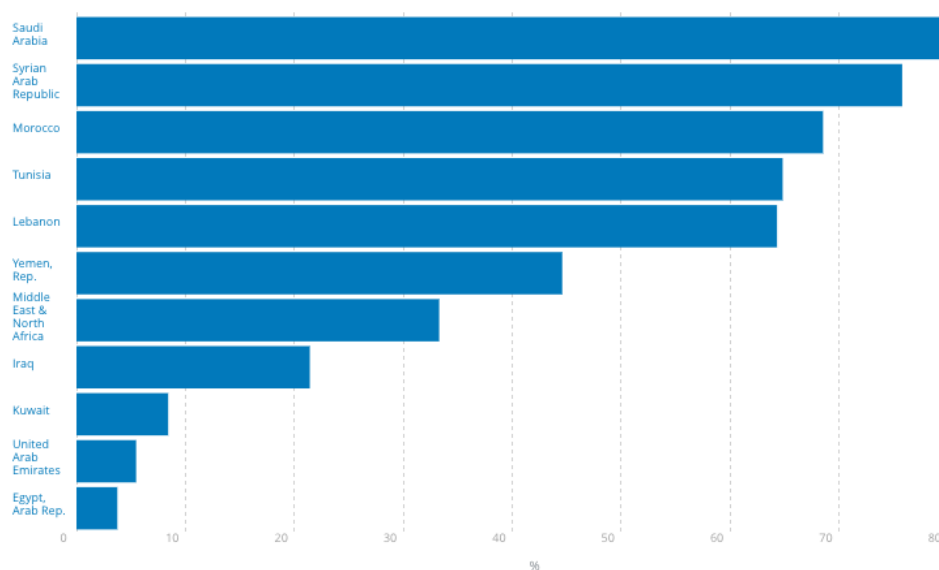


Source: <https://ourworldindata.org/grapher/share-of-land-area-used-for-arable-agriculture?time=2015>

In the figure above, it reveals the share of land that is used for agriculture. Land used for livestock is excluded in the figure. However, the middle east region, as a whole, show low percentages of arable land that is used for temporary crops and meadows. Showing less than 5%, of the total of the country, is arable for temporary crops. Kuwait records the lowest among the middle east with 0.43%. as per the world bank. And, the

highest percentage is recorded to be in the Syrian Arab republic by 25.39% . which arable and suitable for temporary crops.²¹

Figure 16 Agricultural land (% of land area)(pasture and livestock included) - Middle East & North Africa, Lebanon, Syrian Arab Republic, Saudi Arabia, Iraq, United Arab Emirates, Egypt, Arab Rep., Morocco, Kuwait, Yemen and Tunisia in 2016



Source: <https://data.worldbank.org/indicator/AG.LND.AGRI.ZS?end=2016&locations=ZQ-LB-SY-SA-IQ-AE-EG-MA-KW-YE-TN&start=2016&view=bar>

In figure 15, illustrated the middle east to be low in arable lands in general, with some exceptions. However, in figure 16, it emphasizes the percentage of land area used in both cropland and pasture of the middle east. In contrast to crops, livestock appears to exploit more land resources. for instance, Saudi Arabia has the highest use of land for agriculture. Mainly, in Saudi Arabia, the land goes to livestock and meadows. Using more than 80% of its land for crop and animal raise. In general, Saudi Arabia is the only country in the resource-rich in the middle east to have a high share of livestock agriculture, comparing to Kuwait and the United Arab Emirates. Which they import most of their

²¹ <https://ourworldindata.org/land-use>

livestock. However, poor countries like Yemen and the Syrian Arab republic tend to have a high share in pasture and meadows lands due to the high arable lands.²²

4.3 Challenges Facing Resource-Rich Countries in the Middle east.

In general, the middle east as a whole is facing challenges whether it's political, economic, or social. However, in this section, it's chosen to discuss the challenges of the resource rich importing labor countries. The reason for that is because the majority of the resource-poor labor abundant and resource-rich labor abundant are facing a complex version of challenges that contributed to their economic uncertainty and unstable growth. However, resource-rich labor importing are countries with stable economic growth – in recent years. Yet, some still dependent on natural resources for general income in a country like Kuwait. The highest country in the region depending on natural resources. At last, this section focuses on the political and economic challenges and shows the efforts made towards these challenges.

4.3.1 Resource Cures and Regionalism.

The impact of oil on the global economy effectively emerged in the fifties and sixties of the last century, with a steady increase in exploration work and production levels. which allowed producing countries to raise their national income to high levels compared to the pre-oil period. After obtaining their political independence, the third world countries began managing their resources and set plans to achieve their economic and human development. And, it succeeded in achieving great economic growth, accumulating its wealth and increasing its influence. Also, to influence in its regional and international environment. Despite this blessing, which has more than enough returns, compared to its easy cost of production, many researchers considered it a curse, being on both economic

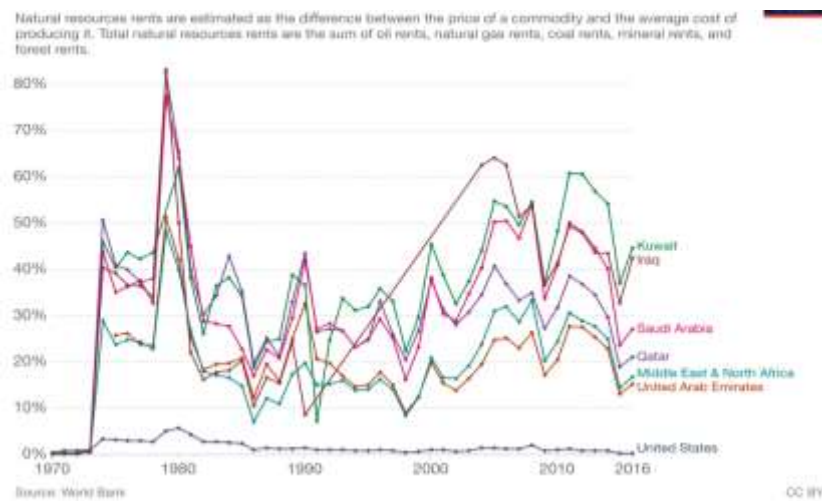
²² <http://www.fao.org/neareast/perspectives/transboundary-animal-diseases/en/>

and political levels. Within this context. The "resource curse" emerged a political theory that assumes, at first, the existence of a negative relationship between democracy and oil abundance and holds that the abundance of natural resources may not be a blessing, as much as it is a curse on the owners. (Ben Ali et al., 2016)

The term resource curse emerged widely in the 1990s after the British researcher Richard Ottey used it in his various studies, which sought to find a causal relationship between the abundance of natural resources in countries and their economic failure, unlike countries that depended on industrialization resources. On his guidance, many dug deep, most notably Thorvaldur Gylfason. who provided several explanations for this phenomenon, represented by the Dutch disease and the influence of human, material, and social capital. According to Thorvaldur Gylfason, a negative relationship arises between the dependence of GDP on exports of raw materials and the rate of economic growth, which would be reflected in the institutional structure of the state and contribute to the production of reliance behaviors. On the other hand, since the beginning of the last century, many researchers have been studying the political effects of the abundance of resources, especially Oil as a resource. Some of them have focused on its relationship to conflicts and civil wars, such as Paul Cooper and Anck Hoofler, and some of them have been concerned with the relationship of oil to corruption, Like Joseph Sebgel and others (Thorvaldur Gylfason, 2001).

According to Ben Ali et al, the Dutch disease is appearing in MENA region resource-rich countries. In which they depend more on national natural resources. which results in an appreciation of the exchange rate and a reduction in another sectors' share of GDP. However, there are many exceptions in this case, for example, Scandinavian countries and Canada; where democracy and rich resources are on the same side. Despite that, MENA region governments tend to place policies that control the Dutch disease effect on other sectors(Ben Ali et al., 2016). Considering democracy, the MENA region is known to be a monarchy system in the resource rich countries of the region. Which also confirms the negative relationship between oil and democracy.

Figure 17 Total Natural Resources Rents (% of GDP), 1970 to 2016.



Source: <https://ourworldindata.org/grapher/natural-resource-rents?tab=chart&time=earliest..latest&country=ARE-KWT-QAT-SAU-Middle%20East%20%26%20North%20Africa-USA-IRO>

In the figure above, a comparative between main rich resource countries in MENA, the middle east and north Africa and one example of a resource-rich developed country in this case United States. To illustrate the share of natural resources of the GDP for 1970. In the case of the Dutch Disease, it is clear, in the early 1980s, most of the Resource-rich countries of MENA had a high share of their GDP depends on natural resources. Qatar and Saudi Arabia have reduced their dependency on natural resources since the 80s.

Resource Regionalism:

Resource regionalism is another phenomenon that might affect rich resource countries, where the area of a country is large enough to state subregions within its boundaries in which people of these subregions are been neglected by the government and relatively poor comparing to main cities of a country. To some extent, this phenomenon has similarities to resource nationalism. Yet, it is considered as a political challenge for the government responsible for the extraction and exploitation from that subregion and convert it into infrastructure for the rural parts, where the natural resources are from. However, people from those regions started to protest and request basic rights from their resources. sometimes these issues could cause civil wars.

Robin mills and Fatema Alhashemi, defined in their book, “resource regionalism is now echoed by local communities in resource-rich regions to justify demands to retain further benefits from locally-generated resource revenues”. Also, they said “The emergence of resource regionalism reflects a reality where spatial inequality is coupled with high levels of social fragmentation and conflict. When colonial powers retreated, new highly centralized governments emerged that continued a spatially biased development policy that had featured under colonial rule, favoring urban and coastal centers over the remote rural areas where most resources happen to be located”. So basically, the local community asks for revenues of the resource, since the government only spend them in urban and coastal regions (Mills & Alhashemi, 2018).

4.3.2 Diversification and Sustainable Growth

The middle east has a big portion of the world’s oil, and a third of the natural gas reserves are found in the middle east in the Persian Gulf. The abundance of such valuable resources and the strategy has given the middle east a unique set of challenges. For instance, Diop et al. mention several challenges that face the middle east, especially rich recourses countries. first, the employment in the middle east is mainly in the public sector with 39%, which indicates the decline in the other sectors, especially agriculture. As a result, people show a desire to work in the natural resource sector to produce income. (Diop et al., 2012)

This indicates high importance towards diversification of exports to expand other sectors rather than a decline in employment. Countries with abundant resources tend to experience growth volatility due to reliance on one source for income while the price of oil or natural gas is volatile in the market. Generally, the volatile revenue effects long term financing and future planning. Also, uncertainty might lead to repelling investments internally and externally due to the absence of diversification(Ben Ali et al., 2016).

However, resource-rich countries, like Kuwait and Iraq, should apply constant changes in the infrastructure and projects to raise investment and create jobs for the growing population. Achieved diversification in exports results in sustainable growth. (Pérez et al., 2017)

Fortunately, some resource-rich countries initiated efforts in diversifying income to sustain the economy to slow growth. These efforts, in some cases, are going towards the energy sector and in other cases towards investment. For instance, as mention by East analytics, United Arab Emirates has diversified its energy sector in many ways. One interesting way was by purchasing mining equipment and explosives to enhance coal mining abilities. Also, Saudi Arabian vision 2030, which aims to diversify exports, attract foreign investments. Expand the energy sector by investing in renewable energy²³.

²³ <https://www.eastanalytics.com/en/coal-middle-east/>

5 Conclusion

Natural resources, in general, might be abundant in regions of one type and scarce in another. Despite that, natural resources are abundant in different forms and states. Classifying natural resources could be tricky. Discovery and extraction range from manual to heavy machinery. However, the world's consumption is increasing with the growth of the population. And natural resource replenishment is considered to identify the continuity of a resource. For example, fossil fuels take millions of years to form in the crust of the earth's surface. Anyway, with high depletion of natural resources, except for renewables, need to be replaced at some point or some way. To maintain resources for longer periods.

In this study, it is concluded that natural resources could be a double edge sword. As in reality, some countries benefit from natural resources to attain growth and stability. Some others might be more abundant in resources. Yet, it fails to achieve stability or even certainty. This thesis illustrated the Middle east. The abundance of oil and natural gas in this region introduced different groupings of resource related classifications. More than half of the world's reserve in the middle east, 5% of the globe's population. A region Specialized in oil and natural gas mainly. Economies thrived due to their low populations and dependence on oil and natural gas. Facing unique challenges because of resource abundance and dependence. Which forced the relatively advanced economy of the middle east to diversify the exports and energy intake due to volatility of income from vital resources such as oil.

As a conclusion, the middle east with its unevenly distributed overly abundant resources. Confronted many challenges, and the solution for this region to thrive again and prosper is to diversify. Diversification could lead to job creation in neglected sectors. Other countries in the region should Take Qatar and UAE as an example for succeeding in lowering GDP rents of oil or gas. And, the majority of the

MENA region invested towards renewable energy like Morocco; after being dependent on phosphate. As a result, sustainable growth and quality lifestyle for the nations to prosper and raise the employment rate. Shifting from one sector economy to diverse to reduce the impact of volatile prices of resources commodities.

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