ENVIRONMENTAL PROBLEMS & DEVELOPMENT SUSTAINABILITY IN LIGHT OF THE KINGDOM'S 2030 VISION: OPPORTUNITIES & CHALLENGES

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Abstract - The study aims to investigate the environmental problems, their causes and impact, the role of the government towards sustainable development to reduce the effect of these problems in light of vision 2030 and the challenges and opportunities they face in doing so. This is a narrative study focusing on all the environmental issues of the country and highlighting major 3 environmental concerns and what the country is doing to bring about sustainability in light of vision 2030 as well as the challenges and opportunities it has to face to develop sustainable development goal in this area. The Kingdom of Saudi Arabia has made significant progress in the areas of agriculture, water, and the environment. The study concluded that the vast and sound management structure and policy planning designed to implement the Vision 2030 agenda lays solid ground work for the 2030 sustainable development agenda.

Keywords - Environmental Issues, Sustainable Development, Vision 2030, Saudi Arabia, Pollution, Deforestation, Desertification.

I. INTRODUCTION

Regardless effects of global society and the scientists to decrease the reliance on gas and oil and as a major source of energy and to find new alternative renewable and green sources oil still remains the most effective source (Rehbein et al. 2020). The major problem of this dependency on oil and gas is causing pollution in the environment. For example, petroleum companies release about two thousand tons of chemicals into the environment and about seventy million tons of polluted waste is being discharged into the sea annually (Achakulwisut et al. 2021). This continuous pollution is not caused accidentally but it is a result of normal activities which is a threat to the ecosystem and living things. The major cause of pollution globally is due to vehicle emissions and industrial discharges. Without any doubt, the urban atmosphere especially of big cities is 90% polluted with automobile residue (Galuzzi-Silva and Mata-Lima 2021).

After the new environmental regulations given by organizations such as API, IPIECA, and OGP, the oil and gas industry are trying to pay more attention to protecting the environment. Regrettably, 100% there lies no practical safe operation for the pipeline networks and plants in processing oil. Therefore, hazards for instance gaseous emissions and oil spills are unavoidable by industry producing energy (Mojarad et al. 2018). Taking Saudi Arabia into context, the General Authority of Meteorology and Environmental Protection (GAMEP) is paying a lot of attention in order to protect the environment of the country. This is observed in Saudi Aramco's environmental worries, where an increasing emphasis is placed on monitoring and controlling pollution on both the eastern and western coasts.

Because the oil and gas companies in Saudi Arabia conduct their operations offshore, oil spills and another possible pipeline, oil tanker, facility, or rig mishaps are common, posing a threat to marine life as well as public health. Climatic changes and environmental issues pose vast risks to Saudi Arabia due to its geographical location as it is surrounded by water. The country has significant natural resources which are essential for important plants and animals (Alshuwaikhat and Mohammed 2017). The country depends heavily on the extraction, production, and shipment of oil and gas. It has vast reservoirs of natural gas that is why the country is expanding its use of gas as it is a more environment-friendly source of energy for urban and industrial usage. The country's economy is highly dependent upon oil and several environmental concerns in the country hold significant importance because of are either pervasive or necessary for the country's continuous habitability. With regard to this, it is very essential to investigate the various environmental issues in the country and what measures have been taken or put forward by the concerned authority in light of vision 2030 to ensure sustainable development of the environment (Sarrakh et al. 2020).

Number of studies have focused on sustainability in Saudi Arabia in terms of policies, strategies, barriers, technological development, economic growth (Aalsalem et al. 2018; Abubakar and Dano 2020; Krarti, et al. 2017; Raggad 2018). etc., in light of vision 2030 but there remains a gap with context to environmental concerns and the country's sustainable development goal in the light of vision 2030, the challenges and opportunities faced by the country. This current research fills this gap by carrying out a narrative study focusing on all the environmental issues of the country and highlighting major 3 environmental concerns and what the country is

doing to bring about sustainability in light of vision 2030 as well as the challenges and opportunities it has to face to develop sustainable development goal in this area. Therefore, the study aims to investigate the environmental problems, their causes, and impact, the role of the government towards sustainable development to reduce the effect of these problems in light of vision 2030, and the challenges and opportunities they face in doing so. To achieve the aim, the study designed the following research questions:

Q1. What are the major environmental concerns of KSA?

Q2. What causes them and how the government of KSA is dealing to reduce their effect?

Q3. What are the sustainable development goals towards environmental problems in light of vision 2030?

Q4. What are the challenges and opportunities faced by the country?

II. LITERATURE REVIEW

Environmental Problems in Saudi Arabia

Land, water and air pollution is caused due to the Kingdom's urbanization and high standards of living whereas consumption of natural resources and agriculture leads to deforestation and desertification. This country produces crude oil in huge amounts. Saudi Arabia has strong leadership in OPEC and the cities placed alongside sea are very much developed. Due to oil sales, the country has a strong economy, which makes it capable enough to import goods in large quantities (Ouda, et al. 2016). The country is majorly comprised of a desert (98%) and because of this, the country cannot produce sufficient amounts of industrial goods and foods for itself. Moreover, as Saudi Arabia is the largest crude oil producer this contributes towards air pollution which is a serious concern. Also, to fight back droughts and desertification, the country has its own water supply by desalinating seawater (Salih et al. 2021).

Water pollution around the Gulf of Aden, Red Sea, and the Arabian Sea is led by the desalination process as after the process the plants throw the polluted water into the sea. The process of desalination is an energy-intensive procedure and is becoming difficult as the raw intake is even more polluted which is extracted from the Red Sea and the Arabian Gulf because of which the price of water is even higher than the price of gasoline. The country faces 3 major environmental issues which are water pollution, desertification, and air pollution which are considered hazardous for the country's environment (Mirzabaev et al. 2019).

Air pollution in the Kingdom of Saudi Arabia (KSA) is mainly because of crude oil. During the refining process of crude oil, various greenhouse gases are emitted causing air pollution. These gases are also responsible for increasing the country's temperature as well which in turn contributes to desertification due to an increase in temperature (Farahat 2016). Moreover, the country's greenhouse in urban cities is causing air pollution as well. According to UNCCD (United Nations Convention to Combat Desertification), roughly 98% of lands in Saudi Arabia are deserts.

This is considered a serious problem because desertification reduces the production of food on large scale, specifically the production of crops. The country has deserts on large scale, only 1.6% of the land is used for growing crops which makes the country highly dependent upon importing food and industrial goods (70%) (Mirzabaev et al. 2019).

Desertification also results in the disappearance of the oasis as it eliminates the water table underground. In order to resolve this issue, the Saudi government builds its desalination plant to provide its residents with pure water from the sea (Sabea 2018). Unfortunately, this process leads to another environmental problem which is water pollution. The water is contaminated during the desalination process, the machines heat the sea water and collect the water vapour, which is considered pure water suitable for agricultural and industrial usage. However, the sea water becomes polluted with excessive levels of salt after the desalination process. The water not only contains a lot of salt, but it also has a lot of metals in it after the process (Al-Othman 2019). Therefore, this water does not remain appropriate for city and agriculture use and it is thrown into the sea. Consequently, the ecosystem of the sea is disturbed. Extinct hundreds of sea creatures destroying the biodiversity of the Red Sea, the Arabian Sea, and the Gulf of Aden due to this polluted or contaminated water. The polluted water of the well, cement factories waste, increase in the emission of sulfur dioxide and nitrogen oxide, desertification, and land degradation, and other problems may lead to an increase in environmental pollution and risks (El-Sorogy and Youssef 2021). Desertification, water pollution, and air pollution are three major environmental challenges in Saudi Arabia, and the government is working on a number of remedies to mitigate their effects.

Cause and impact of Desertification, Air and Water Pollution

Desertification turns productive deserts into non-productive ones which occur due to poor management of the land. There are several things that can cause desertification such as lack of rain, repeated periods of droughts, high temperature, increased activities of the population, degradation of vegetation as a result of logging and overgrazing, wind drift, and water, wrong agricultural methods causing deterioration of agricultural lands. The impact of desertification is that it decreases the land's capability to support life, and affects wildlife,

domestic animals, humans, and agricultural crops. Furthermore, the decrease in plant cover that accompanies desertification causes soil erosion by water and wind (Amin 2004). As the soil layer and vegetation cover is decreased, the impact of rainfall and runoff increases. Desertification has devastating impacts such as it is next to impossible to do farming, reducing crop production, hunger, flooding, poor quality of water, overpopulation, poverty, loss of biodiversity, extinction, and endangerment of species, migration, and destruction of habitats (Alqarni et al. 2018).

The quality of air in Saudi Arabia has received substantial attention during the last 15 years because of the overall economic growth and the flourishing oil and gas industry. As the country is basically dependent upon oil production, the production of oil and urban activities are responsible for air pollution in the country. Air pollution affects everyone but it tends to trouble the poor more as they do not have access to proper medical health care when they get sick because of air pollution. Apart from this, it causes a decrease in visibility, increases in traffic accidents, high levels of respiratory diseases, cough, irritation in eyes, headache, sleep, and psychological disturbances, and body ache. Saudi Arabia is a desert country that extends across the Arabian Peninsula having its widespread coastline on the Red Sea and the Persian Gulf. As the country experiences high levels of heat and humidity, water is a major concern (Salama et al. 2017). Desalination causes water pollution in Saudi Arabia, as the sea water becomes contaminated with high quantities of salt and metals following the procedure. This water no longer remains suitable to be used for agriculture, city and is thrown into the sea. This results in the disturbance of the ecosystem. It further affects marine life or destroys the biodiversity of the Red Sea, the Arabian Sea, and the Gulf of Aden (Tlili, et al. 2020).

Steps taken to Reduce the Effects of Desertification, Water and Air Pollution

Saudi Arabia has been working to ensure it contributes toward the protection of the environment and resources (Amran et al. 2021). This section talks about the steps taken by the Saudi government to protect the environment and meet international standards.

Reducing Air Pollution

One of the main tasks of the General Authority of Meteorology and Environmental Protection is to protect the quality of air. With the help of general environment systems and regulations, the standards of air quality and follow-up applications are in line with the framework of the general policy provided by the state which emphasizes human health and the need to protect the environment from hazardous materials. The main global issue that overpopulated regions are facing is the preservation of air quality. It is also affected by the number of vehicles used in major cities globally (Saudi Arabia national Portal n.d).

Air Quality Index- A means to reduce Air pollution

The National Center of Meteorology provides this service. It is a method that helps to identify the status of air quality based on the data received from the monitoring stations. The system converts the pollutants concentrations into simple numbers which can be easily understood by the general public and then these numbers are assigned a specific color. The air quality index reflects the major air pollutants such as carbon monoxide (CO), ground ozone (O3), nitrogen dioxide (NO2), sulfur dioxide (SO2), dust particles (PM10, PM205). On the map of Saud Arabia which is displayed on the center's website, the quality of air is shown by geographical location in 6 colors such as: green, yellow, orange, red, purple, and brown (Saudi Arabia national Portal n.d).

Green colour: The quality of air is excellent and the concentration level of air pollutants is low than the acceptable standards.

Yellow colour: The quality of air is in acceptable condition, and the air pollutants level is within the accepted range.

Orange colour: The quality of air is at a moderate level as it is slightly exceeding the limits permissible and therefore, some sensitive individuals may experience health issues.

Red colour: The quality of air is unhealthy as the pollutants level exceeds the acceptable limit exceeds and the individuals may experience allergies and other health-related problems.

Purple colour: The quality of air is extremely unhealthy because it crosses the permissible limits and is a warning sign as the general public health may get seriously affected.

Brown colour: The quality of air is reaching dangerous levels that are life-threatening.

Reducing Water Pollution

Water is one of the most significant pillars of social and economic development because it is necessary to meet human needs, manage the environment, and ensure the sustainability of economic development. Knowing the importance of water, Saudi Arabia is facing significant challenges in terms of sustainability of water resources as well as a very limited stock of groundwater which is non-renewable and is experiencing a speedy depletion. Having an arid climatic condition, scarcity of renewable water, and high demand of water in the agriculture sector is worsening the problem in the Kingdom. Sanitation and water in the urban part of the city represent a substantial cost to the state. The country needs to work upon several areas such as the involvement of stakeholders and assessing the current state such as the demand for water, water resources, operations of the sector and the enabling factors as well as investigate the magnitude and nature of the gap

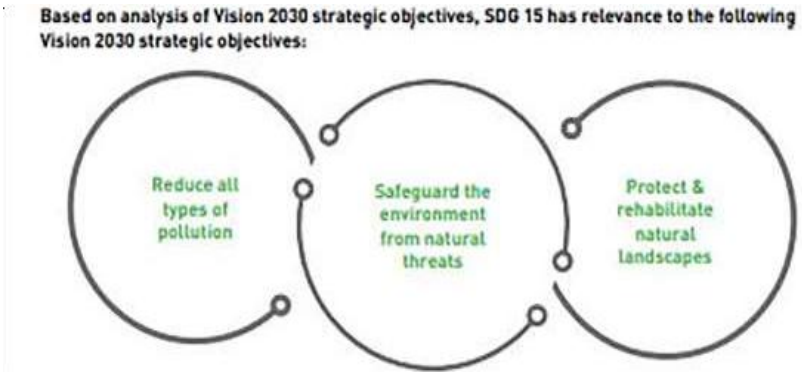
between demand and supply as well as the economies of the sector under various conditions (Saudi Arabia national Portal n.d).

In regard to the Ministry of Environment, Water and Agriculture have developed a united framework of reference for the water sector which includes a complete and comprehensive water strategy that comprises policies, legislations, trends, and practices at the national level with the aim of addressing the major challenges and re- construction of the entire water sector. This involves the participation of stakeholders and the assessment of the current situation of the sector such as demand of water, sector's operations, water resources, enabling factors, and investigates the size and nature of the gap between demand and supply as well as the economic sector under various conditions.

Reducing Desertification

An increase in population activity, logging, overgrazing, agricultural and urban expansion, lack of rain, and recurrent droughts have augmented the pressure on renewable natural resources and this has led to desertification in various regions of KSA. The Ministry of Agriculture is putting extensive efforts to fight desertification and sand creeping while maintaining and preserving the environment of the deserts and their biodiversity. The ministry is also working towards spreading public awareness for community work to implement national action programs to fight desertification (Saudi Arabia national Portal n.d).

To protect plants from overgrazing 40 different sites in the regions are recognized by the Ministry of Agriculture. Also, 3 stations have been put up for the propagation of pastoral plant seeds, 27 forestries and a plant gene bank, and pastoral plant nurseries. In addition, many national parks are given an offer for investors who are significant for tourism and entertainment purposes, it is an attempt to bring in the respondent from the private sector towards the development of national parks and the preservation of the environment. Furthermore, a center has been developed which receives satellite images of the movements of sand dunes. It is done to study and monitor the movement that is threatening suitable human settlement and agriculture. Works have been done for the process of rehabilitation of vegetation cover in forest and rangelands have been made as well as special centers have been put up to study deserts and to fight desertification.



[Figure 1] (Al-Tuwaijri 2018)

Reducing the impact of desertification, air and water pollution to achieve Sustainable Development goals in light of vision 2030

The world leaders on September 25th, 2015 set up goals to end combat inequalities, poverty, protect the planet Earth and safeguard prosperity for everyone as a part of Agenda for Sustainable Development 2030. Civil societies, businesses, and governments around the world together with the United Nations started to put in their efforts to attain sustainable development agenda 2030. It calls for action to be taken by all the countries to improve people's lives globally. In context to this, the Kingdom of Saudi Arabia has exerted efforts to manage issues such as poverty, climate change, inequality, peace, prosperity, justice, education, health, availability of employment, and social protection, making sure that all these are part of its national strategy (The General Authority of Meteorology and Environmental Protection n.d.).

Initiatives for Sustainable development towards Water sector

Saudi Arabia has made a significant investment in sanitation and desalination of water and is experiencing an extraordinary progress in its never-ending government support (Al-Tuwaijri, 2018). Projects are in line with the vision 2030 and National Transition 2020 that are pertaining to wastewater and water which are speedily working to gain a sustainable environment. With 16.5 percent of global production, Saudi Arabia is the world leader in desalinated water production. Following initiatives have been taken by the country to produce clean drinking water and to ensure general sanitation.

Construction of 508 water dams with a total capacity of 2.2 billion cubic metres of storage.

To promote the surface water sources by installing 1000 dams.

The national aquaculture program, which aims to enhance the country's fisheries sector.

Moreover, the Ministry of Agriculture has devised strategic programs and initiatives to meet the sustainable development goal in light of vision 2030. Therefore, 10 projects were developed as a part of strategic initiatives.

Project 1: Water System and Resources Management Regulations

This program is aimed to present a detailed and comprehensive series of policies and to implement an adequate legislative framework to manage water resources. Currently, this program is being implemented by the ministry.

Program 2: Management of Water Resource

A program to manage water resources has been designed to integrate planning and resource management in Saudi Arabia. The aim is to make sure the water available is being used in the best way by justifying the existing resources such as groundwater, surface water, and treated wastewater. The program also ensures to reduce the current consumption rates in the agricultural and municipal sectors. This program consists of 15 initiatives and is supervised by the ministry itself.

Program 3: Preparedness for Emergency Management

This program aims to ensure that water and wastewater sectors are fully prepared to face any disturbance in their daily operations. It also ensures that the ministry of environment, water, and agriculture takes into consideration all the possible risks that could disturb the operations of water supply chain. This program will implement under the sponsorship of the ministry of environment, water and agriculture and the agency for water affairs.

Program 4: Research, development, and building capacity

This program promotes research, development, and localization and further improves leadership and management of water and capabilities. This program will be implemented under the sponsorship of water affairs agency in the ministry of environment, water and agriculture.

Program 5: Quality of Service and Supply Chain Efficiency

Saudi Arabia's water supply chain still faces many operational and service quality challenges. The devised strategies propose a program to improvise the sector's operations and services. This program is sponsored by the ministry of environment water and agriculture.

Program 6: Water Services Regulations

This program ensures that the regulator, electricity, and cogeneration regulatory authority perform its duties in regulating water, electricity, and cogeneration services. The program is closely associated with policies, laws, and legislation as the regulator will be supervising the licenses to service providers, will be reviewing the municipal and industrial staff, and implement adequate commercial agreements as well as balance accounts. Whereas the electricity and cogeneration regulatory authority will be responsible to sponsor this program.

Program 7: The Restructuring of Saline Water Conversion Corporation

This program is developing within the framework of the saline water conversion corporation (SWCC) privatization strategy. It comprises of restructuring and transformation of the institution to accomplish the mission assigned to it. This program will be sponsored by the saline water conversion corporation.

Program 8: Including Private Sector in Production and Wastewater Treatment

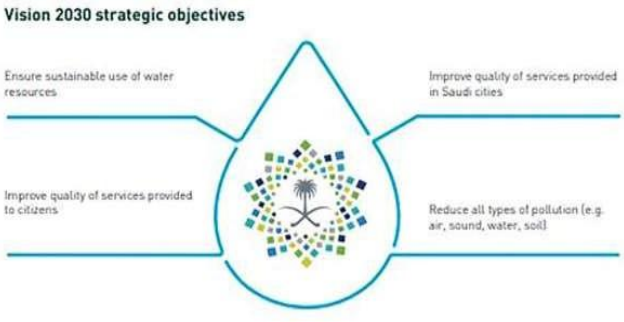
This program was designed within the framework of project privatization strategy for saline water conversion corporations. It emphasizes the collection of wastewater treatment and production assets for privatization objectives and will be carried out under the sponsorship of water and electricity companies.

Program 9: Restructuring, Distribution and Involvement of the Private Sector

This program is aimed to completely transform the structure of the distribution sector by positioning distribution facilities and making sure that they are ready for the process of privatization. This program will be sponsored by the national water company.

Program 10: Restructuring of Public Irrigation Corporation and Irrigation Improvisation

This program restructures the Saudi Irrigation Authority which was formerly known as the Al-Ahsa irrigation and Drainage Authority to expand the role assigned to it. This program will be sponsored by the Saudi irrigation authority.



[Figure 2] (Al-Tuwaijri 2018)

Initiatives for Sustainable development towards Quality of Air

Saudi Arabia is attempting to improve the living environment, with the climate being the most crucial factor. In this context, the country has pushed for the use of clean energy and the construction of green structures. It has also placed a strong emphasis on tree planting, particularly in urban areas. Efforts have been made to build the infrastructure needed to adapt to climate change. The country has employed many projects which have a positive impact on the environment such as the construction of dams, in the mountainous area's establishment of agricultural walkways, growth, and maintenance of flood control systems, as well as work in valleys to reduce greenhouse gas emissions. Recently, a smartphone app on the quality of air has been released by the Riyadh Environment (Al-Tuwaijri 2018). This web-based application pinpoints the user's position and displays air quality indicators recorded by the closest air monitoring station. It also displays the time and date of the station's most recent monitoring. Two sub-indicators make up the air quality indicator. The status of pollutants such as carbon monoxide and nitrogen dioxide are shown in the first sub-indicator. The condition of aerial planktons and suspended particles that can enter the human respiratory system and infiltrate the lungs is shown in the second sub-indicator. These particles cause air fog to occur. (Shafi and Khelif 2021).

Initiatives for Sustainable development towards Desertification

Saudi Arabia's national vision is in line with vision 2030 to achieve sustainable development goals. In order to do so the country has put in substantial efforts to combat environmental hazards which lead to be a threat to animal and human life like drought and desertification. To address these issues, Saudi Arabia established a regional center for drought monitoring and early warning (RDMEC), which monitors drought and other related effects across the country. Help is provided by the center to the government agencies of the country and plans for upcoming measures to encounter negative effects, with the aim to decrease the effects of droughts on all life forms. In terms of the environment, the country has made significant investments in waste management, detailed and thorough recycling initiatives, and measures to reduce desertification and other forms of pollution (Mirzabaev et al. 2019).

To conclude, the country's transformational movements, which are intended to achieve the goals and objectives of Vision 2030, can be a means of addressing the country's current environmental concerns. For example, using Artificial Intelligence (AI) to build environmentally-friendly industries and factories, raising company knowledge about global environmental concerns, investing in recycling facilities, and implementing environmental policies, plans, and legislation. The country's effort to deal with environmental difficulties, challenges, and global climate concerns are encouraging, and it demonstrates its role as a G20 country group member.

Challenges and Opportunities faced by the Kingdom in achieving Sustainable Development Goal (SDG)

The Kingdom of Saudi Arabia's Vision 2030 was launched in April 2016 and approved by the Council of Ministers. Vision 2030 seeks to solve existing regional and international issues, sustain development gains, diversify and boost economic growth, and reduce dependence on oil as a primary income source.

Vision 2030 is a striving plan and road map for Saudi Arabia to achieve global prominence in all social, cultural, and economic arenas. It also lays out Saudi Arabia's strategy for continuing and fast-tracked sustainable development activities aimed at raising citizens' living standards and improving their quality of life. Vision 2030 envisions three pillars to achieve this goal: a dynamic society, a strong economy, and a determined nation (Alsharif et al. 2021).

Main Challenges

Promoting the Sustainable Development Goals at the Subnational Level: Promoting SDGs at the subnational level means tailoring SDG targets and indicators to local conditions and incorporating them into subnational policy planning and implementation. The SDG framework has the potential to assist local governments to enhance their planning and more closely tie their performance to evidence and results by speeding capacity building for local government.

Building on the Foundations of Existing Institutions: As these efforts are under process to increase the implementation of the Sustainable Development Agenda, it is important to avoid creating overlapping of the mechanisms by building a new institution where existing ones can fulfill the same functions. This can be difficult because building on existing institutional frameworks necessitates government employees gaining a greater understanding of the SDGs and increasing their competence to deal with them. Vision 2030 infrastructure creation offers a fantastic chance to integrate more SDGs into the existing governance system, particularly the funding and planning frameworks (Al-Tuwaijri 2018).

Multiple Actors and Sectors Working Together: Due to the SDGs' comprehensiveness, several stakeholders from the business, non-profit, and governmental sectors play a crucial role in transforming them into practical instruments for explaining sustainable development, managing implementation, ensuring accountability, and reporting on progress. As a result, it's vital that all of these parties support a comprehensive plan,

guaranteeing that sustainable development isn't simply a worry for specialized sustainable development focus points, but rather a priority for the entire government. This emphasizes the significance of great coordination between the government and non-governmental organisations in order to avoid duplication of efforts. It is difficult to achieve effective coordination amongst all of these actors. As a result, efforts and resources are required to strengthen current coordinating mechanisms and adapt them to the SDGs' requirements (Al-Tuwaijri 2018).

Statistical Capacity and the Availability of Data: For the adaptation and monitoring of the SDGs, data and statistics that are accurate, timely, appropriately disaggregated, relevant, accessible, and easy to use are necessary. Despite the fact that data availability and quality have improved over time, the alignment of Vision 2030 with the SDGs revealed that data is still unavailable in several sectors. To fill these gaps and ensure that critical measurements are included in official indicators, better procedures and data gathering methods will be required. One of the major issues raised in this study is the necessity to invest in improving data collection methods and statistical agencies' capabilities. Improved coordination between data producers and users, as well as creative techniques to data and statistics generation and usage, will be required (Al-Tuwaijri 2018).

Opportunities

The Kingdom is committed to attaining sustainable development, and its vision 2030 plans consider the economic, social, and environmental aspects of this goal. The Kingdom continues to enhance its climate-change policies in order to fully implement the Paris Agreement. It also continues to work with other GCC countries to address global, environmental, and climatic concerns associated with the usage of fossil fuels. It is apparent that the Kingdom has made significant progress in the field of environmental protection, which will improve the quality of life for everyone and everything who lives there. Sustainable development goals led to a number of opportunities for the kingdom such as eradication of poverty, zero hunger, gender equality, good health, clean water and sanitation, quality education, affordable and clean energy, economic growth and decent work, industrial innovation and infrastructure, sustainable cities and communities, good climatic conditions, partnerships with private organization,etc (Kumaraswamy and Quamar 2020).

III. METHODOLOGY

The study adopts a narrative approach that involves the following steps:

Identifying the problem or phenomenon to Explore

The study identifies three major environmental concerns and what the government of Saudi Arabia is doing to bring sustainability in light of vision 2030 as well as what challenges and opportunities the country faces to develop sustainability goals.

Selection and Collection of Data

The data of this study was restricted to the Kingdom of Saudi Arabia and relevant studies, documents, regulations and policies, articles, and thesis were taken under consideration to achieve the aim of this study. These relevant documents were extracted from Web of Science, Scopus, relevant ministries website, and Google Scholar.

Analyzing the Collected data

The data collected was analyzed based on the research questions of the study. The content of each study, article, thesis, document, regulation, and policy was thoroughly analyzed before compiling the result.

Validate the study outcome

This step is followed in the findings of the study as the understanding developed by the researcher is supported by the outcomes of the study cited in the current study to protect the credibility.

IV. FINDINGS AND DISCUSSION

The aim of this study was to investigate the environmental problems, cause, and impact, and the role of government towards sustainable development to reduce the effect of these problems in light of vision 2030 and the challenges and opportunities that come along. To achieve this aim, the study designed four research questions, the content of the relevant studies was analyzed thoroughly and the findings are as follows:

The study found that land, water, and air pollution is caused due to urbanization and high standards of living and on the other hand deforestation and desertification is due to the consumption of natural resources and agriculture. Moreover, the country relies mostly on oil production and the refining of crude oil causes air pollution which is a serious concern for the Kingdom (Ouda et al. 2016; Salih et al. 2021). Out of several environmental concerns, the study found that the Kingdom of Saudi Arabia is facing 3 major environmental problems such as water pollution, air pollution and desertification (Mirzabaey et al. 2019) Furthermore, the study examined the cause and the impact of each of these problems. Taking air pollution into consideration, the study found that air pollution in KSA is mainly because of crude oil reason being that the refining process of crude oil, different greenhouse gases are released into the air causing pollution. Along with polluting the air, these greenhouse gases are also responsible for increasing the temperature of the country which in turn leads to desertification. Another contributing factor to air pollution is the country's greenhouses in the urban side (Farhat 2016). It has been reported that 98% of the lands of Saudi Arabia are deserts (United Nations Convention to Combat Desertification) Taking desertification into account, the study found

that it is causing the oasis to disappear which is eradicating the water table underground. To combat this problem, the government constructed desalination plants to provide the residents with pure drinking water from the sea but unfortunately, this whole process led to another problem that is water pollution. After the desalination process, seawater not only contains an increasing amount of salts but also comprises increased levels of metals (Sabea 2018; Al-Othman 2019).

The study found that all these major environmental problems were causing havoc to the country's climate and were becoming a reason for developing many health issues for its residents. Therefore, the concerned authorities took notice and developed strategies, laws, policies, and regulations in accordance with vision 2030 to achieve sustainable development goals (Amran et al. 2021). To reduce air pollution, the country designed an Air quality index which is a monitoring device through which the quality of air can be found. The results displayed are very simple for the general public to comprehend (Saudi Arabia national Portal n.d). Secondly, for reducing water pollution, the ministry of environment, water and agriculture devised a framework that comprised of policies, trends, legislation, and practices that were in line with vision 2030 to achieve sustainable development in the water sector. Lastly, the ministry of agriculture established 3 stations for monitoring and identified some 40 different regions to protect pastoral plants from overgrazing, in order to deal with desertification.

Also, investments were offered to national parks which are important for tourism and entertainment purpose which was a way to involve the private sector towards the development of national parks and the preservation of the environment (Saudi Arabia national Portal n.d).

Under the vision 2030, the Kingdom of Saudi Arabia a developed governance framework has been designed to make sure institutionalization and greater work productivity, as well as to streamline stakeholders' efforts so that they may properly monitor progress toward vision 2030 goals. Saudi Arabia has begun a process to connect its national strategies with the SDGs in many sectors. For example, the Ministry of Environment, Water and Agriculture (MEWA) released the Water Strategy and the Environment Strategy, both of which are connected with the SDGs and have adequate social, economic, and environmental components. The study also analyzed through the available data that due to ongoing government backing, the Kingdom has made significant progress in the areas of agriculture, water, and environment. The Ministry of Environment, Water, and Agriculture (MEWA) has made significant progress in this area, as seen by the success made in these sectors. Achievement of water and food security, enhanced efficiency of various environmental conservation, services, and new solutions used to strengthen the sustainability of these sectors are only a few instances of this development, which is helping to shape Vision 2030 (Al-Tuwaijri 2018).

The Saudi Vision 2030, which defines a clear roadmap for establishing a healthy economy and society, was launched in early 2016 and has tremendously aided the early implementation of the 2030 Agenda. The vast and sound policy planning and management structure designed to implement the Vision 2030 agenda lays a solid foundation for the 2030 sustainable development agenda. This includes a vast network of government institutions that were either created from the ground up or reformed and/or merged together, as well as numerous key transformative and executive programs that established long-term priorities and aims (Kumaraswamy and Quamar 2020). In the environmental sector, Saudi Arabia has made significant investments in waste management, the building of extensive recycling projects, and efforts to prevent desertification and different forms of pollution. To confront the challenge of limited water resources and to ensure that consumers have access to high-quality drinking water, reduced consumption and the usage of desalinated and treated water are being advocated. In addition, the Kingdom vigorously endorses the use of renewable energy and the construction of green buildings. Substantial expenditures have been made on renewable energy, particularly solar energy. The study also found that the protection and sustainable use of the marine and coastal ecosystems have also been prioritized. The Kingdom has long been worried about ecosystems and is a leader and advocate for ecosystem protection as a foundation for long-term growth. The Kingdom's land-protected zones have grown significantly in this regard (Al-Tuwaijri 2018).

Despite the tremendous advances outlined in the study, major obstacles remain in the path of achieving the SDGs. They are concerned about data availability and statistical bodies' capacity to collect and distribute SDG-related statistics, as well as more effective coordination between government and non-government institutions to make sure synergies instead of duplication of efforts, construction on existing institutional frameworks rather than creating new structures, and promoting the SDGs at the subnational level (Al-Tuwaijri 2018).

V. STUDY IMPLICATIONS

Continuing to connect national programs, strategies, and plans with global development goals, indicators, and targets in order to adapt the SDGs to the circumstances of the country. The concept of sustainable development must be firmly established as a guiding principle in all policy fields. This will

demand a deeper mapping of the SDGs at the level of targets and indicators, which will be done in close coordination with the General Authority for Statistics. Improving the quality and coverage of SDG indicators and data analysis by strengthening the methodology and infrastructure for data creation and analysis, particularly in a disaggregated manner. This will be related to actions aimed at bolstering the national statistical system's capabilities using approaches that are in line with international norms. Collaboration between essential parties in the governmental, business, and non-profit sectors is being strengthened. This will be accomplished by improving existing governance institutions, particularly the institutional framework supporting Vision 2030, as well as implementing methods to promote inter-actor collaboration. The sense of ownership and dedication among those involved will grow as more people actively participate in the SDGs. Strengthening the participation of academics and the non-profit sector in the SDGs will be a priority. Increasing Saudi Arabia's participation in promoting international collaborations around the Sustainable Development Goals, particularly at the regional level. This will include the exchange of lessons, best practices, and information through bilateral and multilateral cooperation.

VI. CONCLUSION

In conclusion, the study identifies three major environmental problems such as land, water and air pollution due to various reasons including a high standard of living and urbanization. Whereas, due to the high consumptions of natural resources and agriculture the country is facing deforestation and desertification. However, the authorities also have taken notices and come up with strategies, policies, and laws in the harmony of Vision 2023 of Saudi Arabia. The Saudi Vision 2030, which establishes a clear plan for creating a healthy society and economy, was launched in early 2016 and has aided in the early implementation of the 2030 Agenda enormously. The broad and sound policy planning and management system created to carry out the Vision 2030 agenda creates a solid foundation for the 2030 sustainable development goal. This includes a vast network of government agencies that were either created from the ground up or reformed and/or merged together, as well as various key transformative and executive projects that define priority long-term goals and targets.

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