Ali, R. (2021). The Relationship Between Human Resources Development and Sustainable Development Strategy: A Case of Iraq. *Akkad Journal of Contemporary Economic Studies*, *1*(1), 29-44.

THE RELATIONSHIP BETWEEN HUMAN RESOURCES DEVELOPMENT AND SUSTAINABLE DEVELOPMENT STRATEGY: A CASE OF IRAQ

Raed Saiad Ali
University of Misan, Misan, Iraq
E-mail: raid_saiadali@uomisan.edu.iq
ORCID: 0000-0002-3680-4081

Received: December 2020
1st Revision: January 2021
Accepted: March 2021

ABSTRACT. Local economic growth is inextricably linked to natural and human resource optimization. This study aims to examine how the use of natural and human resource potential functions as a factor of Iraq's economic growth. Additionally, it investigates the impact of natural resources, human capital, community culture, and legislation on Iraq's economic progress. The research technique employed is a hybrid model, which combines quantitative and qualitative methodologies. Observation, survey, and documentation were used to collect data. The study's findings indicate that maximizing natural resource usage without investing in human resource development leads to minimal contribution to economic growth in Iraq, posing a barrier to accelerating economic development. Natural resources, human capital, and community culture all significantly impact Iraq's financial success. This research advises that Iraq's economic growth be accelerated by optimizing resource potential and developing human resource capability via technology and changes in community culture.

JEL Classification: O15, Q01, O16

Keywords: Economic Development, Human Resources, Sustainable Development

Introduction

A person's environment is the physical and social arena in which they live, obtain physical and social resources, and engage in interpersonal connections (McNeill, Kreuter, & Subramanian, 2006). Water, air, and land make up the natural environment required for life to thrive (Purvis, Mao, & Robinson, 2019). An economy that relied on natural resources resulted in the production of manufactured goods and commodities, which led to the creation of pollutants that hampered human well-being and the economy's expansion. All living organisms are threatened by the degradation of air, water, and soil, which affects the entire planet's living environment. This is especially true for Iraq and, in view of the interrelationship between human well-being, the environment, and resource development and exploitation. Due to a pressing need to re-examine environmental issues and establish robust plans for utilizing their resources

effectively (Almagtome, Al-Yasiri, Ali, Kadhim, & Bekheet, 2020). Extrapolations were made to Iraq's environmental pollution due to the research.

Defining Iraq's pre-and post-2003 environmental reality, establishing the economic effects of environmental pollution, and tackling environmental pollution in Iraq after launching Iraq's ecological challenges. Environmental pollution has become a significant problem for Iraq's economy because of the country's uncontrolled exploitation of natural resources, which results in massive resource waste. As a result, it may be found in various fields and ecosystems. Environmental pollutants that significantly influence human health and economic well-being focus on this study. Using modern methods, it also seeks to discover the truth about Iraq's environment. The quality of Iraq's constituents is degrading due to multiple types of corruption and an economic strategy that has resulted in an imbalance in the background. As a result of the study's inductive and analytical approach, which relied on a variety of Arab and international sources, including UN publications published across the world, The Iraqi Ministry of Planning, the Iraqi Central Bureau of Statistics, and the Iraqi Environment Ministry contributed the data for this report.

1. The Environmental Pollution

Health-related political goals have only lately begun to include environmental concerns; for a long time, public health and ecological preservation were viewed as separate problems and budget chapters in governments and local communities (Tait, McMichael, & Hanna, 2014). But communities and governments are increasingly aware of the need to understand the considerable impact environmental degradation has on human health and the necessity to evaluate the health costs associated with environmental quality. Improve the elements that impact general health status, such as income levels and improved working conditions; GDP growth and health spending per capita; social status; lifestyle; nutrition; and health education. As a result, life expectancy has increased significantly in major economies and regions and most emerging nations. Evidence shows that pollution, induced considerably by human activity, has a more significant influence on public health (Organization, 2016). Many academics have different definitions of ecology, and the reason for this variety is due to their intellectual preferences (Mace, Norris, & Fitter, 2012). Even yet, the broader context of economics, society, and culture influence how and where natural resources are used by people (Huckins et al., 2020). Water, air, and land and their interactions with people and other creatures illustrate the diversity of natural components. In addition to providing life support, raw materials, and energy, they would also absorb trash from productive operations, reducing pollution (Piccarozzi, Aquilani, & Gatti, 2018). Five variables must be taken into account to effectively characterize the concept of the environment from an economic perspective. The Bio-aspect addresses the spatial entrance and encompassed the lower layers of air, the upper layers of water, and the surface layers of the earth's land, represented by the atmosphere, the water atmosphere, and the land cover, respectively. The boundaries of this ocean have emerged naturally from the life of the planet's organisms that are unrelated to human action. The social aspect results from the accumulations of civilized human work represented by many intellectual and legal factors and social norms. They are a set of social, cultural, political, and administrative relations and systems that are human on the one hand and which are passed down through multiple generations. The Technical aspect is represented by all human activity inside the boundaries of the first side (biosphere), such as cities, roads, industries, farms, and transportation, which is referred to as changes represented by human capital; hence, this aspect may be divided into two components:

1. **The natural aspect** refers to the physical characteristics of the environment, such as water, air, seas, oceans, and renewable and non-renewable natural resources.

2. **Environmental aspect**: it is regarded as more extensive than the natural element since it incorporates all of the industrial element's social features into a collection of social, economic, cultural, and administrative systems that man used to manage his behavior and exert control over nature.

Ecological restrictions were established in Iraq before the changeover. In 1967, legislation was passed that emphasized the construction of foundations to protect rivers and public waterways. Various agricultural and recreational uses can benefit from its explanation of the permissible Max.s on water quality (Al-jarakh, Hussein, Al-azzawi, & Mosleh, 2021). Following Iraq's participation in the Stockholm Conference on the Human Environment in 1972, this law is still today. This body was founded in 1974, and it lasted until 1975, when the Supreme Council was created. The Environmental Protection Council was later renamed.

The adoption of international drinking water standards and the necessity of incorporating each water filter project into an integrated laboratory for chemical and physical tests to determine the scientific efficacy of filtering and sterilization are essential considerations for drinking water quality. To further enhance environmental protection, a new agency was established: The Directorate General of Human Environment, the Supreme Council for Environmental Protection and Improvement Protecting the environment, stopping pollution, developing policies, and enforcing rules on environmental contaminants are all part of the organization's mandate. In addition, article 12 of Law (76) of 1986 was established to promote Iraq's international relations in environmental preservation and enhancement. Replacement for Directorate-General for Humanity, the Department of Environmental Protection and Improvement, is responsible for several different responsibilities (Chabuk et al., 2019). The functions include analyzing and offering solutions to environmental pollution concerns in Iraq, testing for all ecological toxins, and monitoring the environment's safety and improvement. Specific and unambiguous to preserve and enhance the environment, including:

- Establish standards for pollution measurement.
- Notifying the Department of Environmental Protection and Improvement of pollutant measurement data.
- Providing and operating systems for pollution control and waste management.
- Establishing procedural rules.
- All acts that have an impact on the environment are prohibited.
- Conduct a thorough feasibility analysis for each project, which should include a report on the project's environmental effect.
- Prevent the discharge of agricultural, industrial, oil, or service wastes into rivers, aquifers, the air, or land.

Despite Iraq's long-standing interest in ecology's legislative and regulatory elements for more than three decades, we have not discovered any indication of ecological growth within the chosen period. On the contrary, it exposes Iraq's weaknesses in its economic and development strategies. The environment has encountered various challenges and impediments, which vary according to decision-makers and development strategies, as well as between wars and international sanctions. Due to many human actions, fertile land turned dry. The introduction of water and air pollution affected the ecosystem's natural features regardless of the decline in service quality, infrastructure, sanitation projects, rubbish buildup, or oil industry activities. The government has become unable to deliver ecological security due to the environmental balancing criterion. It manifests itself in sound infrastructure, specialized environmental personnel, environmentally sound planning, a lack of environmental consciousness, a civic spirit, and advanced ecological technology. According to the United Nations Environment Programme, environmental damage is an inherent byproduct of conflict.

Following Iraq's change, additional environmental measures were implemented. Iraq's stance toward environmental conservation has altered due to establishing an Iraqi environment ministry. It devised a comprehensive and ambitious program in this area that included many projects to identify the country's most critical environmental problems and provide suitable solutions and remedies. Regrettably, ecology has been neglected multiple times during the previous century. According to Article 114, paragraph 3 of the 2005 Iraqi Constitution, an environmental plan must be created to ensure that the environment is protected from contamination and maintained in a state of cleanliness in collaboration with the irregular provinces and provinces in the region. As a result, the traditional method of separating environmental concerns from economic and social growth has evolved. The House of Representatives enacted the Environmental Protection and Improvement Act in 2009, considered more environmentally responsible. The guidelines successfully address concerns of environmental deterioration and enact stringent measures to manage them. This act contains a clause establishing an environmental police force to hold violators accountable and defining a set of objectives, one of which is showing an information base on the Iraqi environment. It involves the amount and source of pollutants and the preservation of water and air, noise reduction, and environmental management enhancement.

4. Procedures to Reduce Pollution in Iraq

Several aspects of contamination of the environment have already been discussed in the environmental theory framework (Khoshnevisan, Farshchi, Karimi, & Pournouri, 2019). Identifying these aspects within Iraq's real-world context is essential to determining the degree of harm.

4.1 The Air Pollution

Air pollutants are classed based on where they come from and what they do to the environment (Zeng, Liu, Feiock, & Li, 2019). Primarily, primary pollutants are emitted directly from pollution, such as the sulfur dioxide gas discharged into the atmosphere when fossil fuels are burnt to generate electricity. Secondary pollutants are created due to contaminants interacting with one another simultaneously as primary pollutants (Kumar, Shahi, & Singh, 2018). However, despite the large number and wide variety of air pollution causes in Iraq, the majority are primary pollutants produced by industrial sources and automotive exhausts that release various strange compounds into the atmosphere (Al-Obaidy, Jasim, & AlKubaisi, 2019).

Following 2003, the number of vehicles owned by state agencies, the public sector, and many other sectors increased to a total of (29,064). Including the Kurdistan region, it grew to 44,842 in 2007 and 219,550 in 2014, with car ownership reaching 44,842 in 2007. (5388968). In addition to rising environmental pollutants and suspended minutes and bullets with concentrations exceeding the national limit of 350 g/m3, most of these automobiles were powered by low-quality imported gasoline. However, the maximum permissible amounts of SO2 gas exposure ranged from 3 to 10 pm, depending on the length of time that the worker was exposed. A breakdown of outstanding minutes and the rate of gas concentration (SO2) in three provinces is shown in the following table:

Table 1. the concentration rate of suspended minutes in μg/m3 units and gas concentration rate SO2

	2017		2018		2014	
Province	The annual rate of disabled minutes	gas concentration rate (SO2)	The annual rate of disabled minutes	gas concentration rate (SO2)	The annual rate of disabled minutes	gas concentration rate (SO2)
Baghdad	830	0.035	1389	0.035	525.8	0.182
Basra	436	...	...	0.029	...	...
Nineveh	1394	...	694	0.038	242	...

Data from the annual statistics group 2016, published by the Ministry of Planning and Central Bureau of Statistics, were used to create this table illustrating the researcher's findings. Based on the data presented in the chart above, the yearly concentration rate of the outstanding minute group differs significantly amongst the three provinces, with the highest concentration rate (1394) happening in Nineveh province (1394) during 2017. When it came to national border overruns, Baghdad province was right behind it with a speed of (1389) in 2018 and national border overruns of (350) g/m3 in Baghdad in 2006. The lowest concentration rate of total suspended minutes was reported in Basra province in the three years indicated above, including the most recent year. Furthermore, it extended beyond the previously indicated national limits. In 2014, however, the amount of gas (SO2) released in Baghdad city surpassed the amount permitted by Iraqi law (0.182). In addition, ppm units are more significant than the prescribed federal limit of ppm units (0.04).

In addition, falling dust is a source of air pollution. It is one of the indicators used by provinces to measure the air quality in their respective regions, particularly in desert areas. Studies and reports from the past several years have indicated that the fundamental concern is suspended dust, followed by rising dust and dust storms, which have become well-known and frequent natural phenomena in Iraq over the previous decade. It is due to the clearing and cutting of vegetation, notably in the country's southern regions, and the influence of the drought, which is caused by water scarcity and insufficient rainfall. The following table depicts the effects of falling dust:

Table 2. The minimum and maximum amount of dust falling in units by provinces (2014-2019)

Province	2014		2015		2016		2017		2018		2019	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Nineveh	9	60	8	27	9	30	7	18	7	24	..	..
Kirkuk	20	145	20	80	20	70	19	86	10	66	7	14
Salads	11	514	16	71	8	97	9	107	37	192	32	58
Diyala	2	45	2	34	11	52	17	55	8	37	5	15
Al, Anbar	5	142	16	89	13	164	10	206	6	98	..	..
Baghdad	10	102	11	61	10	94	11	57	9	46	5	27
Babylon	14	115	20	79	16	135	16	132	12	68	5	27
Interface	21	61	21	43	20	66	6	50	2	39	6	18
Karbala	12	137	18	113	13	244	20	116	6	53	6	166
Al , Qadisiyah	7	67	15	83	10	64	6	71	8	33	7	31
Najaf	17	75	27	154	15	263	7	193	10	63	8	31
Al , Muthanna	11	44	19	226	23	181	18	100	9	47	11	32
Maisan	9	28	9	29	9	34	11	15	10	14	10	13
Dhi Qar	21	130	18	147	12	103	12	48	10	69	15	56
Basra	10	52	12	38	7	44	8	28	6	44	6	27

According to the data in the table above, the provinces of Salah al-Din, Muthanna, Najaf, Anbar, Salah al-Din, and Karbala had the most significant quantity of dust dropping compared to the rest of Iraq between 2014 and 2019. On the other hand, the lowest levels were found in the provinces of Diyala, Ninawa, Basra, Qadisiyah, Wasit, Baghdad, and Anbar, all for the same period. Increased concentrations of these pollutants in the Iraqi environment above national and international permissible limits, particularly in residential areas, substantially influence many aspects of human health, particularly in vulnerable populations such as children and the elderly. For example, it explains the high incidence of malformed births, the increased cancer morbidity, and the shortness of breath caused by pollution in the environment. Optimistic about the present and future of sustainable human development and the environment in Iraq. These problems have grown worse due to lax environmental laws and deterrents for violators, insufficient means and controls to reduce pollutant emissions from industrial centers and transportation sectors, household sources, and other sources.

4.2 The Water Pollution

Water is one of the most vital and scarce resources for development across the world, and the problem of water pollution in all its forms is one of the most pressing and widespread issues facing the world today (Bolisetty, Peydayesh, & Mezzenga, 2019). Groundwater, river water, lakes, and the sea are examples of these types of water. It arose due to most countries' economic growth procedures and plans without considering the link between development and the environment or the so-called environmental balancing system. In terms of water pollution, the most critical factor is the presence of numerous chemical compounds arising from industry, pesticides, agricultural fertilizer compounds, and urban sewage systems (Singh, Yadav, Pal, & Mishra, 2020). In addition, the expansion of the oil industry and the extraction of oil have played a critical part in the increase in water pollution, which can take many different forms. Because of the untreated dumping of polluted waste and water in rivers and territorial waters, Iraq is one of the countries most afflicted by this pollution, negatively impacting the quality of these waterways (Ali, Salman, Guda, Abojassim, & Almayabi, 2020).

Aside from that, industrial expansion in Iraq contaminated the environment extensively during the first half of the 1970s and caused severe air pollution. In addition, many existing enterprises lacked environmental balance in terms of their locations and waste disposal procedures at the time of the study. Therefore, they were regarded as one of the most significant sources of environmental contamination, particularly about water resources, for the following reasons:

- When it comes to choosing their locations or draining their wastes, most Iraqi industries are designed near rivers without considering the conditions and requirements of environmental pollutants.
- Water recovered from the industry was characterized by high concentrations of pollutants, most of which were thrown into rivers without treatment.

The present phase of water pollution is characterized by many pollutants, including industrial liquid contaminants, organic pollutants, liquid waste from hospitals, and sewage. These samples have been characterized by high quantities of contaminants in them, as seen in the following table:

Table 3. water used and spent from factories under by sector (2015-2019)

Sector		Chemical	Engineering	Food	Radar	Structural	Total
2015	Total water used(m3/day)	120940.0	13991.0	6690.0	16284.0	27012.0	184917.0
	Drained total water(m3/day)	57928.5	8249.0	2994.0	11097.0	13302.0	93570.0
2016	Total water used(m3/day)	83794.6	13487.5	4856.0	12849.4	25792.0	140779.5
	Drained total water(m3/day)	47030.5	7931.8	2358.0	8515.2	13929.5	79765.0
2017	Total water used(m3/day)	60293.6	16443.8	5052.3	13184.7	18433.4	113407.8
	Drained total water(m3/day)	27101.5	5810.9	2249.0	8395.0	8728.0	52284.4
2018	Total water used(m3/day)	91339.8	17558.5	9494.3	10898.1	35536.5	164827.2
	Drained total water(m3/day)	33739.3	9136.9	6033.8	6349.7	14058.5	69318.2
2019	Total water used(m3/day)	44338.1	20698.2	3476.0	4844.7	28743.7	102100.6
	Drained total water(m3/day)	17554.8	11534.5	1611.5	3388.0	11155.3	45244.0

The Ministry of Industry and Minerals has classified its sectors into five categories, as shown in the above table: chemical, engineering, food, textile, and construction. Over the years depicted in the table, the chemical industry consumed the total water, while the food industry consumed the least amount of total water during the same period. It deducts the amount of water that is drained directly to water, sewage, and sewage systems, some of which are exhausted to neighboring land and part of which is drained to recycling and homes.

As a result of numerous studies, it has been determined that industry and agriculture use thousands upon thousands of organic chemical compounds manufactured for the production of materials such as plastics, pesticides, medications, dyes, and other substances, many of which are highly toxic. They have the potential to cause congenital disabilities or malignancy. In addition, certain ecologically favorable substances, such as phenol, contribute to the problem by failing to break down rapidly. As a result, their access to water poses a significant hazard to

human health if waterborne contaminants are breathed or consumed by humans. As a result, the Iraqi ecosystem has been badly damaged, and the environmental equilibrium has been thrown off balance due to a lack of environmental regulation. Large quantities of organic elements characterize sewage treatment plants if we follow the reality of the situation. They are collected by sewage systems and sent to treatment plants, cleaned, and brought within acceptable criteria before being discharged into the environment. However, these stations are distinguished by their foot, a lack of maintenance, the inefficiency of treatment units, a lack of chemical treatment units, and a lack of capacity for these plants due to the absence of chemical treatment units. The Ministry of Environment reported that, even though it receives more water than it can handle, the Ministry of Environment found that (6) wastewater treatment plants discharge their water into rivers and (5) stations release their water into landfills, (11) plants are not in operation or are idle, and (8) plants are still operational.

4.3 The Soil Pollution

It is estimated that the soil in Iraq has suffered environmental degradation in terms of soil components and physical, chemical, and biological features owing to floods, over-irrigation, and the loss of vegetation from the soil throughout time (Delang, 2017). The change of fertile land into arid land has occurred due to human activities such as tree-uprooting for agricultural, fuel, building purposes, and other factors. The excessive salinity of the soil, contamination of irrigation water, and the indiscriminate use of fertilizers are all contributing factors. Pesticides and military operations in Iraq have exacerbated an already precarious environmental balance in the country. The amount of information and research on soil pollution caused by fertilizers and pesticides in Iraq is limited, and the government does not suffer from the problem of fertilizer pollution. Therefore, on the one hand, the Iraqi trinIraqsuffers from a lack of nutrients, while on the other, the Iraqi trinIraqsuffers from a lack of nutrients.

On the other hand, the use of fertilizers is still well below the necessary levels because the problem of adding fertilizers is restricted to the polluting of water supplies. Because of frequent rainfall and erosion, fertilizers applied to the soil are exposed to drift in the underground and rivers. Some of the contaminants seep into groundwater via the mud. Because of a lack of contemporary technology consistent with natural circumstances, Iraq's arable land is currently suffering from considerable environmental deterioration (Adamo, Al-Ansari, Sissakian, Knutsson, & Laue, 2018). They have caused significant harm to the amount of arable land and what is now known as desertification, including air drift, water drift, increased soil salinity, and hardening of the soil, among other effects.

Table 4. The area affected by desertification and its proportion in Iraq

Type of desertification	Hardship	The affected area (hectares)
Air drift	Light-medium Very severe.	1431000 635000
Water drift	Light-medium Very severe.	4691000
Soil salting	Light-medium Very severe.	1322000 6679000
Soil hardening	you touch you plaster	16771000 8600000
Total area and proportion affected by desertification		92.2%=40129000

Iraq's military actions during the conflicts, particularly the Gulf War, when the Allies deployed depleted uranium, aggravated this problem in recent years (Comfort, 2020), the significant harmful effects on human health. The numerous diseases associated with it lead experts to classify it as one of the most severe Iraqi environment and soil contamination cases. Because of the great distances traveled by wind and rain, we will have highly complicated contamination in the ground, which will result in the spread of depleted uranium dust on the soil crust. Its implications for human development in the long term.

The fundamental characteristics of environmental pollution (pollution, air pollution, water pollution, and soil pollution) have become a threat to the lives of humans, animals, and plants around the world, and particularly in Iraq. It is founded on associating human well-being with environmental variables around it on the one hand, and on the other hand, pollution, air, water, and soil. On the other side, there is a pressing need to develop and exploit natural resources. Therefore, the Iraqi government and the Iraqi people should rethink their approach to dealing with the environment and develop a comprehensive plan for utilizing its natural resources (Kibaroglu, 2019). It is more harmful to speak about the possible implications of incorrect exploitation of natural resources and future access to these resources. Because of this, it is vital to investigate the harm caused by air, water, and soil contamination. Environmental policy that achieves a balance between the advantages to society from economic activities linked with breakdown, or what is known as an equal marginal benefit to the cost of environmental pollution, is known as an optimum ecological policy.

5. Economic Effects of CO2 Emissions in Iraq

Several negative economic consequences of environmental contamination are illustrated in the table below:

5.1 The Elevated Temperatures

The global warming caused by air pollution is attributed to the so-called "glass greenhouse effect," which refers to the increase in temperature caused by the glass in the atmosphere (Lu et al., 2017). Many changes have occurred due to this rise, including a shift in rainfall distribution. The number of raindrops and their abundance grows in one place, whereas the number of raindrops and their quantity decrease in another region. As a result of the shift in the rainfall pattern, the problem of land degradation and desertification in the Arab area, generally and in Iraq, specifically, will worsen (Fartm, 2020). It is because of the social, economic, and environmental consequences. According to the General Authority for Environment, Iraqi air and seismic monitoring revealed significant variations in rainfall between the country's regions. Compared with the rest of Iraq provinces for different years, Nineveh province had the most considerable limit of this precipitation (455.5) and Qadisiyah province had the lowest precipitation limit (124.0) in 2014. The following table illustrates the results of this comparison:

Table 5. Total rainfall for selected provinces in Iraq (2003-2018)

Province	2003	2004	2005	2006	2007	2008	2009	2010	2011	2017	2018
Nineveh	227.6	357.1	294.5	511.2	193.8	195.7	223.8	240.6	294.7	278.6	455.5
Kirkuk	183.6	312.1	249.4	458.4	173.1	134.9	225.8	267.2	221.8	292.1	394.3
Diyala	173.9	240.6	222.0	205.2	233.2	197.9	164.7	206.9	167.2	301.9	355.4
Baghdad	64.3	...	129.4	162.3	99.2	59.1	67.5	92.5	96.0	184.4	296.7
Karbala	59.7	62.6	68.0	96.2	40.1	76.0	31.1	84.5	98.2	78.6	185.5

Al , Qadisiyah	109.2	56.6	100.6	106.9	43.6	44.2	46.2	49.1	81.4	98.8	124.0
Dhi Qar	...	98.6	105.7	245.8	112.5	65.5	56.9	57.6	85.1	116.2	175.2
Misan	7.8	...	158.2	251.4	125.1	90.6	175.9	128.3	110.7	212.1	324.6
Basra	...	...	95.5	174.1	139.2	67.1	89.8	31.9	65.3	115.3	....

Source: *Iraq Environment Statistics 2018, Ministry of Planning, Central Bureau of Statistics, Iraq,2018*

This shift will result in a change in agricultural regions throughout the world, which will harm global agricultural productivity. It is mirrored in the worldwide production of food. The expansion of desertification and the reduction of forest cover in locations where drought is common are two possible consequences of high temperatures. It becomes unsuitable for cultivation since the agricultural area is susceptible to erosion. Because of the rising severity of sand winds, it is anticipated that forest fires will destroy around 90 percent of forests in China and 35 percent of forest land in European nations in the following years. According to the Iraqi government, the entire area impacted by desertification is 40129,000 hectares. According to the statistics from the preceding table, the whole place had a 92.2 percent occupancy rate at the same period.

5.2 The Emissions of Greenhouse Gas

Several greenhouse gases, such as carbon dioxide, pose a substantial danger to the ozone layer, increasing cosmic heat emissions (Olivier & Peters, 2017). As a result of the release of these gases from fuel combustion, industrial activity, and the efficiency of the combustion process in general, this layer is being destroyed, causing dangerous UV radiation to escape into the ground and then into the atmosphere (Sadatshojaie & Rahimpour, 2020). As a result, it poses a severe threat to human beings, animals, and plants. Other gases, such as sulfur oxides, contribute to acid rain, which is returned to the earth through precipitation, dust, snow, agricultural land, pastures, and fields. Increased emissions have a substantial influence on the contamination of the Iraqi environment due to the increased emissions (Chaichan, Kazem, & Abed, 2018). Iraq has made considerable strides in preserving biodiversity since rehabilitating the marshlands between the Tigris and Euphrates rivers in the 1990s. On top of that, it is run as a natural wastewater treatment system, and there is no way to quantify some pollutant concentrations owing to a lack of measuring equipment or faults in some units. In addition, the standards for analysis are not accessible, which makes them an impediment to the implementation of environmental policies in Iraq. Nevertheless, it is possible to see the reality of Iraq's environment by looking at its CO2 emission index.

5.3 The Pollution Implications On Human Beings

The pollution of the atmosphere has had a significant detrimental influence on world health. poor air quality contributes to the development of respiratory illnesses and disorders such as chronic bronchitis and cancer, both of which are associated with early death (Martinez et al., 2018). According to World Bank research, the cost of urban air pollution was equal to (2 percent) of GDP (Sefair, Espinosa, Behrentz, & Medaglia, 2019). According to the United Nations Environment Program, air pollution and other causes of mortality are projected to cost $20,000 per year in terms of morbidity and lost revenue from potential tourists (Loizeau et al., 2018). In rural regions, the majority of the population cooks and heats their homes with biomass fuel, resulting in indoor air pollution that is hazardous to the health of the residents of these communities. Health costs in indoor areas related to air pollution are exceptionally high for

women and young children, who spend most of their time inside their homes compared to the number of times men spend at home. Health costs in indoor areas related to air pollution range from 0.15 45 percent of GDP to an estimated 1.9 percent of the country's economy.

6. The Challenges of Environmental Pollution In Iraq

Iraq's environment has experienced several issues, with rapid population increase being one of the most significant (Jarah, Zhou, Abdullah, Lu, & Yu, 2019). It is the most prominent obstacle to sustainable growth and the source of enormous environmental waste. In the aftermath of war, there has been a dependence on outdated techniques of addressing pollutants, casting a shadow over the realities of ecological contamination. It has had a detrimental impact on the environment and can only be used to the most serious of these problems at this time. Locations of sources of environmental contamination are not precisely known. The absence of thorough monitoring, control, and monitoring mechanisms for the quality of the environment has resulted in radioactive decay and contamination of all environmental elements, particularly in urban areas. Compact generators are being used more often to satisfy home, commercial, and industrial requirements. Because of the ongoing lack of energy supplies from the national grid, the surrounding environment has been harmed due to the burning of enormous volumes of fuel of various sorts in internal combustion engines that are mainly inefficient.

This includes the necessity to adapt and update current environmental legislation and regulations and existing environmental restrictions to stay up with and maintain pace with worldwide changes, notably climate change. As a result of Iraq's poor and restricted participation in international ecological activities, local environmental institutions lack resources (materials, people, technology, and knowledge). The disconnect between the ecological, economic, and social elements is beginning to appear more and more. Because of the failure to include ecological dimensions into development operations, the country is far from meeting the objectives and processes of sustainable development. There is a scarcity of rigorous studies to analyze the environmental effect of major strategic initiatives The shortages of qualified individuals in preparing and evaluating environmental contamination studies. The lack of environmental knowledge among citizens and investors, in particular, is a significant problem. Ecological norms are not considered when calculating the unique economic advantage and the ineffectiveness of some technologies introduced into the Iraqi environment. The absence of an integrated financial system Planning strikes a balance between the needs of the ecosystem on the one hand and the amount of conscious exploitation of natural resources necessary to advance sustainable development on the other to promote sustainable development. Sandstorms have become more frequent due to a considerable loss in green spaces caused by a lack of flora, rain, overgrazing by sheepherders, and deforestation, among other factors. Particularly in the aftermath of the upheaval that the country experienced during the era of regime change.

7. Environmental Pollution Strategy

Even if two people differ on the importance of having clean air, pure water, and land that has not been contaminated, the question is whether or not we are willing to work for those goals. What kind of harm does humanity face due to our failure to respect the limitations of our natural surroundings? A suitable strategy should be established, which considers environmental issues in the growth plans of various sectors, to manage air, water, and soil pollution that occurs over time. The government should require owners of air-polluting industrial facilities to install mechanisms to dispose of different gases or exhausts that emerge from productive activity as

part of the Air pollution treatment strategy. It is necessary to create cutting-edge technology ways for monitoring and measuring air pollution. It also promotes renewable energy sources by increasing the reliance on solar, wind, and hydropower to generate electrical energy. Finally, they must perform in-depth investigations of the components of the aerobic environment and the interactions between them and environmental toxins. Concerning the second sector, the Water Pollution Treatment Strategy, it is vital to employ current technology and construct water treatment units that can effectively clean heavily contaminated civilian or industrial water before reusing. It is also necessary to adopt legislative laws on the rationalization of water resource usage, the protection of water resources from contamination, and the punishment of those who violate the law. It is necessary to provide farmers with a regular mentorship course that explains the usage of agricultural fertilizers and their influence on water resources. Reduce waste, improve efficiency, and lower the proportion of losses in field irrigation by implementing current field irrigation techniques. Import advanced groundwater sensing devices in conjunction with high-tech drilling equipment.

On top of that, it is vital to restore marsh regions to protect biodiversity on the one hand while also acting as a natural wastewater treatment system. On the other hand, they must raise the capacity of water systems and improve the quality of drinking water and sewage systems to keep up with increasing population growth rates. Furthermore, the covenantal plan must contain an implicit method for monitoring the number of pollutants in river, lake, and dam waters by establishing the measurement of particular pollutant concentrations, which should be incorporated into the strategy. They are also responsible for educating residents about the significance of conserving the environment and the need to do so. According to Islamic law, both religiously and socially, under the norms of sharia In government and commercial enterprises, reducing the usage of heavy goods such as black oil is essential, monitoring their waste and overseeing their treatment techniques under environmental guidelines. In the third category, a strategy for managing soil pollution, the policymaker must perform in-depth studies on soil components, particularly processes that renew the soil's features, before implementing the system. Also needed is establishing an environmental strategy to mitigate the rise in exposed soil areas by increasing the number of green spaces and adequately caring for them. To accomplish this, it is required to lessen the phenomena of increasing soil salinity through clever and advanced technologies. In addition, it is necessary to monitor the performance of an integrated pest management system. It is based on the use of biological determinants, which, in turn, reduces pesticide application rates. Growing crops with features relevant to the nature of the country's climate is critical to ensuring the long-term viability of agriculture. Reducing urbanization and creating a suitable atmosphere for rural places uninviting the general public, are examples of actions that might be taken. Furthermore, they should develop ways to monitor soil quality to determine whether or not the soil's production capacities are appropriate for each crop.

Consequently, economic growth and development are geared toward achieving sustainable development. It has been accomplished by expanding human activities of all sorts, whether financial or social, without regard for preserving and adapting the natural environment to these activities. The result has been an imbalance in the environment's delicate equilibrium, which is today referred to as ecological pollution, in light of the earlier solutions for air, water, and soil pollution. To eliminate this pollution, there must be a trend toward educating the general people about the issue. Particularly noteworthy is that the Iraqi arena appears to be devoid of this understanding, given that public awareness is not a component. A crucial element of long-term human development that takes into consideration future generations.

Consequently, it is necessary to maintain a clean and healthy environment in Iraq through altering consumer behaviors and concentrating on the problem of recycling and reuse. Its mission is to inform the general people about the hazards of consuming manufactured goods

and food and the actions they may take to decrease their influence on the environment through education and outreach. Multiple institutions and government and non-government organizations must collaborate to achieve this, such as environmental and consumer protection organizations.

Conclusion

Even if two people differ on the importance of having clean air, pure water, and land that has not been contaminated, the question is whether or not we are willing to work for those goals. What kind of harm does humanity face due to our failure to respect the limitations of our natural surroundings? A suitable strategy should be established, which considers environmental issues in the growth plans of various sectors, to manage air, water, and soil pollution that occurs over time. The government should require owners of air-polluting industrial facilities to install mechanisms to dispose of different gases or exhausts that emerge from productive activity as part of the Air pollution treatment strategy. It is necessary to create cutting-edge technology ways for monitoring and measuring air pollution. It also promotes renewable energy sources by increasing the reliance on solar, wind, and hydropower to generate electrical energy. Finally, they must perform in-depth investigations of the components of the aerobic environment and the interactions between them and environmental toxins.

Concerning the second sector, the Water Pollution Treatment Strategy, it is vital to employ current technology and construct water treatment units that can effectively clean heavily contaminated civilian or industrial water before reusing. It is also necessary to adopt legislative laws on the rationalization of water resource usage, the protection of water resources from contamination, and the punishment of those who violate the law. It is necessary to provide farmers with a regular mentorship course that explains the usage of agricultural fertilizers and their influence on water resources. Reduce waste, improve efficiency, and lower the proportion of losses in field irrigation by implementing current field irrigation techniques. Import advanced groundwater sensing devices in conjunction with high-tech drilling equipment.

On top of that, it is vital to restore marsh regions to protect biodiversity on the one hand while also acting as a natural wastewater treatment system on the other. Furthermore, they must raise the capacity of water systems and improve the quality of drinking water and sewage systems to keep up with increasing population growth rates. Furthermore, the covenantal plan must contain an implicit method for monitoring the number of pollutants in river, lake, and dam waters by establishing the measurement of particular pollutant concentrations, which should be incorporated into the strategy. They are also responsible for educating residents about the significance of conserving the environment and the need to do so. According to Islamic law, both religiously and socially, under the norms of sharia In government and commercial enterprises, reducing the usage of heavy goods such as black oil is essential, monitoring their waste and overseeing their treatment techniques under environmental guidelines.

In the third category, a strategy for managing soil pollution, the policymaker must perform in-depth studies on soil components, particularly processes that renew the soil's features, before implementing the system. Also required is establishing an environmental strategy to mitigate the rise in exposed soil areas by increasing the number of green spaces and adequately caring for them. To accomplish this, it is necessary to lessen the phenomena of increasing soil salinity through clever and advanced technologies. It is essential to monitor the performance of an integrated pest management system. It is based on the use of biological determinants, which, in turn, reduces pesticide application rates. Growing crops with features relevant to the nature of the country's climate is critical to ensuring the long-term viability of agriculture. Reducing urbanization and creating a suitable atmosphere for rural places uninviting the general public, are examples of actions that might be taken. They should develop

ways to monitor soil quality to determine whether or not the soil's production capacities are appropriate for each crop.

As essential components of the natural environment, water, air, and land are all interconnected; as a result, the relationship between economic growth and the atmosphere is self-evident. Iraq's richness of natural resources, along with the nation's multiple conflicts and wars, has prompted the country to seek the development of all kinds without regard for the implications on the environment, resulting in a significant influence on the ecosystem. Limited resources are available to local environmental organizations to cope with environmental degradation in their respective areas of responsibility. The absence of contemporary technology compatible with the natural environment has resulted in significant damage to Iraq's arable land and what is now known as the desertification phenomenon. According to the UN Environment Program, it is symbolized by air and water drift and is a serious environmental deterioration in the country. As a result of rural-to-urban migration and the establishment of urban communities, the population density of Iraqi cities has grown, and industry has expanded without consideration for the social costs involved, resulting in rising levels of pollution in several ways, including air pollution. The use of fossil fuels emits massive amounts of carbon dioxide into the atmosphere, where it is difficult to remove and whose concentrations can rise over time due to climate change.

Before 2003, Iraq had been concentrating on its ecosystem's legal and regulatory parts for more than three decades, but there had been no indications of the ecosystem's expansion. Iraq's environmental conservation landscape was transformed in 2003 by establishing its Ministry of the Environment, which launched a comprehensive and ambitious program to identify the country's most pressing environmental issues and develop appropriate remedies and treatment plans for them. They would take care of everything for them. To conserve the environment, the government and civil society organizations must collaborate to establish institutions that will strive to design effective policies that strike a balance between sustainable development and the ecosystem. Carbon dioxide emissions must be kept to a minimum by the government, and efforts to do so must be proportional to the ability of the atmosphere to absorb carbon dioxide. An appropriate amount of the revenues from the extraction of natural resources should be set aside for environmental preservation efforts. Reduce pollution and improve environmental conditions in the country. Develop a long-term environmental plan to restrict the increase of exposed soil areas by establishing and conserving more green spaces and natural ecosystems. An electronic network identifying contaminants to reduce water pollution levels should monitor the Tigris and Euphrates rivers. Electricity may be generated using various sources, including solar, wind, and hydropower. As a result, it is vital to increase the use of renewable energy-generating technologies. The general population should be educated on the importance of environmental conservation and the necessity of employing all available methods to attain this aim.

References

Adamo, N., Al-Ansari, N., Sissakian, V. K., Knutsson, S., & Laue, J. (2018). Climate change: consequences on Iraq's environment. *Journal of earth sciences and geotechnical engineering, 8*(3), 43-58.

Al-jarakh, T. E., Hussein, O. A., Al-azzawi, A. K., & Mosleh, M. F. (2021). *Design and implementation of IoT based environment pollution monitoring system: A case study of Iraq.* Paper presented at the IOP Conference Series: Materials Science and Engineering.

Al-Obaidy, A. H. M., Jasim, I. M., & AlKubaisi, A.-R. A. (2019). Air Pollution Effects in Some Plant Leaves Morphological and Anatomical Characteristics within Baghdad City. Iraq. *Engineering and Technology Journal, 37*(1), 84-89.

Ali, M. F., Salman, A. H., Guda, M., Abojassim, A., & Almayabi, B. (2020). The Hydro Climatic Effects of Thermal Pollution on Surface waters in Iraq and its Biological Effects. *Prensa Med. Argent, 106*(2), 189-196.

Almagtome, A. H., Al-Yasiri, A. J., Ali, R. S., Kadhim, H. L., & Bekheet, H. N. (2020). Circular Economy Initiatives through Energy Accounting and Sustainable Energy Performance under Integrated Reporting Framework. *International Journal of Mathematical, Engineering and Management Sciences, 5*(6), 1032-1045.

Bolisetty, S., Peydayesh, M., & Mezzenga, R. (2019). Sustainable technologies for water purification from heavy metals: review and analysis. *Chemical Society Reviews, 48*(2), 463-487.

Chabuk, A., Al-Ansari, N., Hussain, H. M., Laue, J., Hazim, A., Knutsson, S., & Pusch, R. (2019). Landfill sites selection using MCDM and comparing method of change detection for Babylon Governorate, Iraq. *Environmental science and pollution research, 26*(35), 35325-35339.

Chaichan, M. T., Kazem, H. A., & Abed, T. A. (2018). Traffic and outdoor air pollution levels near highways in Baghdad, Iraq. *Environment, Development and Sustainability, 20*(2), 589-603.

Comfort, S. (2020). Resource Wars and Resourceful Resistance: Gender Violence and Irreal Oil Environments in Two Global Novels by Women. *MFS Modern Fiction Studies, 66*(1), 20-51.

Delang, C. O. (2017). Causes and distribution of soil pollution in China. *Environmental & Socio-economic Studies, 5*(4), 1-17.

Fartm, Z. F. A. (2020). *Desertification in Iraq and how to Combatit.* Paper presented at the IOP Conference Series: Earth and Environmental Science.

Huckins, J. F., DaSilva, A. W., Wang, W., Hedlund, E., Rogers, C., Nepal, S. K., . . . Meyer, M. L. (2020). Mental health and behavior of college students during the early phases of the COVID-19 pandemic: Longitudinal smartphone and ecological momentary assessment study. *Journal of medical Internet research, 22*(6), e20185.

Jarah, S. H. A., Zhou, B., Abdullah, R. J., Lu, Y., & Yu, W. (2019). Urbanization and urban sprawl issues in city structure: A case of the Sulaymaniah Iraqi Kurdistan Region. *Sustainability, 11*(2), 485.

Khoshnevisan, D., Farshchi, P., Karimi, D., & Pournouri, M. (2019). Environmental pollution in the common borders between Iran and Iraq and the international governing documents. *EurAsian Journal of BioSciences, 13*(1), 541-548.

Kibaroglu, A. (2019). State-of-the-art review of transboundary water governance in the Euphrates–Tigris river basin. *International Journal of Water Resources Development, 35*(1), 4-29.

Kumar, V., Shahi, S., & Singh, S. (2018). Bioremediation: an eco-sustainable approach for restoration of contaminated sites. In *Microbial bioprospecting for sustainable development* (pp. 115-136): Springer.

Loizeau, M., Buteau, S., Chaix, B., McElroy, S., Counil, E., & Benmarhnia, T. (2018). Does the air pollution model influence the evidence of socio-economic disparities in exposure and susceptibility? *Environmental research, 167*, 650-661.

Lu, Z.-N., Chen, H., Hao, Y., Wang, J., Song, X., & Mok, T. M. (2017). The dynamic relationship between environmental pollution, economic development and public health: Evidence from China. *Journal of Cleaner Production, 166*, 134-147.

Mace, G. M., Norris, K., & Fitter, A. H. (2012). Biodiversity and ecosystem services: a multilayered relationship. *Trends in ecology & evolution, 27*(1), 19-26.

Martinez, G. S., Spadaro, J. V., Chapizanis, D., Kendrovski, V., Kochubovski, M., & Mudu, P. (2018). Health impacts and economic costs of air pollution in the metropolitan area of Skopje. *International journal of environmental research and public health, 15*(4), 626.

McNeill, L. H., Kreuter, M. W., & Subramanian, S. (2006). Social environment and physical activity: a review of concepts and evidence. *Social science & medicine, 63*(4), 1011-1022.

Olivier, J. G., & Peters, J. A. (2017). *Trends in global CO2 and total greenhouse gas emissions: 2017 report*: PBL Netherlands Environmental Assessment Agency The Hague.

Organization, W. H. (2016). *Urban green spaces and health*. Retrieved from

Piccarozzi, M., Aquilani, B., & Gatti, C. (2018). Industry 4.0 in management studies: A systematic literature review. *Sustainability, 10*(10), 3821.

Purvis, B., Mao, Y., & Robinson, D. (2019). Three pillars of sustainability: in search of conceptual origins. *Sustainability science, 14*(3), 681-695.

Sadatshojaie, A., & Rahimpour, M. R. (2020). CO2 emission and air pollution (volatile organic compounds, etc.)–related problems causing climate change. In *Current Trends and Future Developments on (Bio-) Membranes* (pp. 1-30): Elsevier.

Sefair, J. A., Espinosa, M., Behrentz, E., & Medaglia, A. L. (2019). Optimization model for urban air quality policy design: A case study in Latin America. *Computers, Environment and Urban Systems, 78*, 101385.

Singh, J., Yadav, P., Pal, A. K., & Mishra, V. (2020). Water pollutants: Origin and status. In *Sensors in Water Pollutants Monitoring: Role of Material* (pp. 5-20): Springer.

Tait, P. W., McMichael, A. J., & Hanna, E. G. (2014). Determinants of health: the contribution of the natural environment. *Australian and New Zealand journal of public health, 38*(2), 104-107.

Zeng, J., Liu, T., Feiock, R., & Li, F. (2019). The impacts of China's provincial energy policies on major air pollutants: A spatial econometric analysis. *Energy Policy, 132*, 392-403.