International Journal of Financial Management and Economics

P-ISSN: 2617-9210
E-ISSN: 2617-9229
IJFME 2025; 8(2): 882-892
www.theeconomicsjournal.com
Received: 17-07-2025
Accepted: 21-08-2025

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Impact of the green economy on sustainable development in selected gulf countries with reference to Iraq for the period (2004-2022)

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DOI: https://www.doi.org/10.33545/26179210.2025.v8.i2.613

Abstract
The Autoregressive Distributed Lag (ARDL) model will be used in this study to examine how macroeconomic factors affect per capita income in Saudi Arabia and the United Arab Emirates. Four primary factors were examined: carbon dioxide emissions, per capita renewable energy, taxes and levies, and natural capital.
The study aimed to evaluate the association between macroeconomic factors and per capita income, investigate the influence of taxes and fees, natural capital, per capita renewable energy, and carbon emissions on per capita income, and analyze the correlations between these variables in the short and long run.
For better study applicability, annual data from 2004 to 2022 were used and transformed to quarterly data.
All variables were non-stationary at the level but became stationary after initial differencing, according to the findings of the unit root tests. This complies with the conditions needed to use the ARDL model.
Per capita income and the macroeconomic variables showed a cointegrating connection, according to cointegration studies conducted in Saudi Arabia and the United Arab Emirates. There was a cointegrating connection in the UAE since the F-statistic value was higher than the upper bound of the crucial values. A comparable outcome was noted in Saudi Arabia, where the F-statistic was higher than the upper bound of the critical values.

Keywords: Green economy, sustainable development, per capita income, natural capital, taxes and fees

Introduction
The green economy and its impact on development are a key focus of current discussions about achieving sustainable economic development while preserving nature.
This introduction reviews how the transition to the economy can contribute to enhancing long-term development, through policies that support investment in green infrastructure and innovations in renewable energy matters, as well as the efficient use of resources.
This requires global cooperation and coordination between countries, companies and associations to ensure the achievement of sustainable development goals and the preservation of nature for the next generation.
It also includes allocating investments to environmental sectors and promoting education and awareness of the importance of the green economy.
The transition to the economy can contribute to achieving broad benefits at the economic, social and environmental levels, such as providing new jobs in renewable energy and environmental technology departments, and enhancing social justice.
The study emphasizes the importance of applying these concepts in Saudi Arabia, the Emirates and Iraq, where the transition to the economy can contribute to achieving development and increasing prosperity in the future.

Chapter One: Research Methodology
First. Research problem
The problem is that the increase in emissions resulting from industrial activities based on

non-renewable energy resources such as coal, oil and fossil fuels has led to an increase in harmful carbon effects and also a threat to these scarce resources by depletion in the near term. As a result, the search for alternative resources for industry and investment began, represented by renewable energy resources such as solar and wind and new sources of energy such as natural gas and tidal energy.

Also, achieving sustainable processes and high growth rates indefinitely has become one of the desired goals globally and locally, as all countries of the world are now seeking to achieve comprehensive development in all aspects (economic, social, environmental, political, technical). Some Gulf countries and Iraq are considered among the countries that seek to achieve sustainable development, according to the recommendations of the United Nations Development Program and the International Monetary Fund. Therefore, our study tends to study the experiences of other countries that have applied the green economy to achieve development for the purpose of application to the Gulf countries.

Second. Research objectives:

- Developing the intellectual framework for the study topics by studying the relevant theories and concepts.
- Finding strong ways and plans to implement the green economy in the Gulf countries and Iraq to achieve development.
- Encouraging investment and reducing the gap between the rich and the poor to ensure a decent life for all.
- Identifying the best ways to help achieve development using clean energy and adopting the principles of the green economy.
- Analyzing all trends that affect the application of the green economy and development in the Gulf countries and Iraq.
- Measuring the impact of implementing green economy strategies on all aspects in these countries.

Third. The importance of the research

It is that it addresses one of the important topics in the twenty-first century, which is the relationship between the green economy and development, in addition to measuring the role of the green economy in achieving economic growth.

Fourth. Research hypothesis

There is a positive relationship between the green economy and sustainable development in the long term.

Fifth. Research boundaries

- **Spatial boundaries:** Saudi Arabia, the Emirates, Iraq.
- **And time boundaries:** 2004 - 2022.

Sixth. Research methodology

Clarifying the relationship by relying on some sources and references to describe the standard model to reach the results through the practical applied study that addressed the impact of the green economy on sustainable development in some Gulf countries, with reference to Iraq. The researcher also adopted the inductive approach by identifying indicators specific to the green economy and sustainable development.

Seventh. Research Structure

The research consists of a set of chapters

The first chapter is entitled: "The Conceptual Framework for the Green Economy and Sustainable Development", and includes (3) topics, topic (1) deals with the concept and importance of the green economy, and topic (2) focuses on the concept and dimensions of development, while topic (3) discusses the relationship between the green economy and development.

As for the second chapter, it is entitled: "Analysis of Green Economy and Development Trends", and includes three topics, as topic (1) talks about analyzing these trends in Saudi Arabia, while topic (2) deals with analyzing them in the Emirates, and topic (3) concludes with analyzing them in Iraq.

The third chapter is entitled: Measuring the Impact of the Green Economy on Development in the Emirates, Saudi Arabia and Iraq, and includes three topics as well, as topic (1) was entitled "Describing the Model for Saudi Arabia", topic (2) was entitled "Results of the Model in the Emirates", and topic (3) was entitled "Results of the Model in Iraq."

The second section: The conceptual framework of the green economy and sustainable development

First requirement: The concept of the green economy

This concept appeared in 1989 in one of the studies prepared by the London Center for Environmental Economics (LEEC) under the title Blueprint for a Green Economy, which linked the concept of the economy and the environment as a means to achieve and understand sustainable development.

This report provided a definition of it as a tool to achieve sustainable development through the use of economic and financial tools, and did not consider it a new or different concept from sustainable growth. The report linked the economy and development, defining the green economy as a means of development through economic and financial policies (Najati, 2017, 41) [46].

However, this concept did not receive international attention at that time, for the term to appear again in 2008 following the global financial crises and their negative economic and social impacts, as a result of many individuals losing their jobs and sources of income. In addition to the global food crisis in 2008-2009 resulting On the rise in prices of basic food commodities, which exposed about a billion people to the risk of hunger and malnutrition, and finally the climate crisis.

The United Nations Development Program supported the idea of the green economy as a means of confronting global crises while maintaining sustainability. The latter called for holding a conference on development under the title "Green Economy" in 2012 (UNDP, 2011, 27).

The green economy was defined by the program as an economic system that aims to support human well-being and social justice and reduce environmental risks and scarcity of natural resources, with an emphasis on the importance of economic expansion, social equity and sustainability (Hussam Abu Alian, 2017, 8) [2]

Green Economy Principles

Many international organizations have prepared a set of principles that help decision-makers implement green

economy policies. These principles are (United Nations Program, 2008, 58)

- The green economy is a means, not an end, to achieve development and aims to achieve efficiency in the use of resources and energy.
- The green economy must create decent work and green jobs and respect environmental limits.
- The green economy uses an integrated decision-making process.
- The green economy measures progress in gross domestic product using appropriate indicators.
- The green economy aims to achieve justice between countries and between generations.
- The green economy helps reduce poverty, improve the standard of living, enable access to basic services, and absorb external factors.
- The green economy contributes to improving governance and the rule of law and creating transparent and stable participatory democratic systems. (Hind Al-Barbari, 2017, 41) [25]

Some trends of the United Nations organizations towards providing the requirements of the green economy:

The United Nations Environment Organization is working to allocate approximately $ 9.9 billion over the next forty years to extract green technologies to combat the effects of climate change, while ensuring that the demand for energy and water is reduced and carbon is reduced in the production of goods and services.

There are also several options, but the most important is the focus on the agricultural economy, which produces about 70% of global food production. It also cares about the value of natural resources and the importance of including them in economic calculations and setting rules for these calculations. (Emilio Godoy, 2015, 29) [47]

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Fourth. Some trends of the United Nations organizations towards providing the requirements of the green economy:

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Fifth. Civil society's objection to the application of the green economy

In contrast to the trends of the United Nations organizations - especially the United Nations Environment Organization, some civil society organizations in some countries such as Latin America and the Caribbean are working to unite their forces to confront the international trend towards internationalizing the green economy because it limits the ability of developed countries to achieve development, as only large companies will benefit from it. Opponents of the green economy summarize their reasons for objection as follows (Emilio Godoy, 2017, 36) [47]

1. Although the "Earth Summit" resulted in a number of international treaties based on emphasizing development through the participation of all individuals, bodies, governments, institutions and non-governmental organizations in every field that affects the environment in one way or another, yet - after about two decades since this summit - the shift towards sustainable development is still very weak as there is still an increase in environmental degradation, and there is still a clear and very severe misuse of natural resources.
2. Those who oppose the green economy also believe that setting an economic cost for nature - or as it is called in some writings the price of nature or natural resources - is not the ideal solution because nature is not a commodity. Also, the application of the green economy should not change or disperse the basic principles of sustainable development that humans and nature are the main center of sustainable development

First. The origin and development of sustainable development

1. The term sustainable dates back to a long time ago, as the origins of the term date back to the 18th and 19th centuries. However, the increasing interest in development did not occur until after World War II, when this concept entered the development of underdeveloped countries. In the period from 1950-1990, the development process was considered a series of successive growth stages that all countries must go through. Therefore, the economic theory of development saw that the basis and origin is in the combination of the amount of savings, investment, and foreign aid to enable Third World countries to follow the path of economic growth followed by developed countries. According to historical events, economic development has become synonymous with economic growth (Todaro & Stephen C. Smith, Economic Development, 2017, 41) [11]
2. **United Nations Conference on the Human Environment - Stockholm Declaration 1972):** With the beginning of the seventies, the concept of

development witnessed a major development. In 1972, for the first time, this term was introduced to the international arena. At the United Nations Conference on the Environment in Stockholm, the challenges facing the preservation of sustainability were raised through the context of the term economic growth and development (United Nations, 1972, 51)

3. Document "Global Development Strategy" 1980• In 1980, the United Nations issued a document entitled "Global Development Strategy", and this document was an important starting point for the concept of sustainability. This document aimed to address development challenges at the global level and to enhance international cooperation to achieve economic and social development in developing countries. (United Nations. (1980). World Strategy for Development. United Nations Publications. (Brundtland Report []36 (1987 Brundtland Report In 1984, the United Nations established a separate group of 22 specialists selected from member states from both developing and developed countries, with the aim of determining long-term environmental strategies for the international community. In 1987, the World Conference on Environment and Development issued a general report, which is considered the most famous in the field of sustainable development, entitled Our Common Future, which was called the Brundtland Report because it was chaired by the then Prime Minister of Norway, Gro Harlem Brundtland. Earth Summit in Rio 1992 In 1992, the United Nations Conference on Development and Environment, the Earth Summit, was held in Rio de Janeiro, Brazil. Later known as the Rio Conference, it was the largest international conference to date, with over 170 countries, 2,500 other NGOs and 8,000 accredited journalists represented (Adams 2001) [48]. Its main objective was to define the principles of a future development agenda. The challenge was seen as requiring consensus at the highest level

United Nations Conference on Sustainable Development 2012 (Rio+20)

This triple vision of sustainability was reaffirmed on the twentieth anniversary of the Rio Summit through the Rio+20 Summit in 2012 under the title "The Future We Want". During this summit, sustainable development goals were set that focus on promoting sustainable and inclusive economic growth, creating greater opportunities for all, reducing disparities, and raising basic living standards. Fair and inclusive social development was also promoted, as well as the integrated and sustainable management of natural resources and ecosystems, to support economic, social and human development, while preserving and renewing ecosystems and enhancing their resilience to face new and emerging challenges. (General Assembly, 66th Session. 2012, para. 4)

Second. The importance and goals of development

1. The concept of development

It is considered a bridge between generations, aiming to ensure a decent life for all generations by achieving a balance between resource exploitation and environmental protection. It seeks to reduce the gap between countries of all kinds, improve the standard of living, and increase national income, through a clear strategic vision

2. Development goals. (Basyouni Amal, 2020, 40) [12]

- **Improving the quality of life:** Focusing on the balance between human activities and the environment to ensure a better life.
- **Increasing environmental awareness:** Enhancing individuals' understanding of environmental problems and urging them to find solutions.
- **Respecting the natural environment:** Managing resources in sustainable ways to ensure their continuity.
- **Rational use of resources:** Preventing the depletion of resources and employing them effectively.
- **Employing technology:** Using modern technologies to achieve development goals.
- **Achieving sustainable economic growth:** Developing institutions and infrastructure to ensure the sustainability of resources and achieving justice between generations

Fourth. Characteristics of sustainable development: (Maher Abu Al-Maati: 2017, 150) [2]

Define the characteristics of sustainable development as follows:

1. Economic development shows a more interventionist and complex character compared to development in general, especially with regard to the differences between natural and social aspects. In addition, economic development shows a spiritual and cultural aspect related to preserving the civilizational identity of societies.
2. It aims primarily to meet the needs of the poorest groups in society, and seeks to reduce the exacerbation of poverty worldwide by achieving a balance between the environment and economic and social aspects, and enhancing social welfare (Maher Abu Al-Maati, 2017, 150) [2].
3. Its elements cannot be separated and its indicators measured due to the overlap of the quantitative and qualitative dimensions it includes.
4. The idea will be based on achieving justice between individuals, generations and peoples, with a focus on the importance of civil society and its organizations, and all segments of society, especially women and children, in development activities, which contributes to improving the standard of living of members of society.
5. This institution has devoted its efforts to resources, whether human, environmental or social, and seeks through its activities to raise awareness of the importance of preserving and exploiting them, especially in the context of human development. The continuity of development depends on the choices of individuals, so the focus must be on empowering people, educating them and coordinating their efforts (Al-Jawarni, 2017, 63) [26]
6. The time dimension is an important aspect, as sustainable development depends on analyzing the potential of the present while taking into account the rights of future generations to available or potentially created resources. It also depends on coordination and integration between resource exploitation, investment trends and institutional structures.

Fifth: Elements of Sustainable Development

Sustainable development is today the main pillar of modern policies, as it is a theory that aims to achieve development of all kinds with a focus on the human being as a central element. It is not limited to promoting economic growth alone, but also seeks to distribute its fruits fairly. Its goals focus on improving the quality of life and enabling individuals to live a better and longer life.

Not all human needs are material only, but also include moral and social needs, such as education and culture, in addition to providing opportunities to practice creative activities, the right to participate in public decision-making, the right to expression, and preserving the environment for future generations,

The relationship between the green economy and sustainable development

Environmental economics and development represent two interconnected patterns of comprehensive development, as they seek to reach a balance between economic growth, environmental protection, and promoting social justice in the long term. Environmental economics focuses on promoting economic growth by improving the efficiency of resource use and developing clean technology, while development aims to achieve a balance between all aspects of comprehensive development. On the other hand, the environmental economy is considered a strategy that seeks to enhance economic and social expansion by reducing pollution and environmental degradation and increasing the efficiency of natural resource use. This includes directing production towards environmentally friendly industries and adopting renewable energy technologies, which contributes to reducing harmful emissions and improving environmental quality (Qahham and Waheeba, 2018, 162) [6].

The importance of integration between the environmental economy and development is evident in achieving the basic goals that the international community seeks to achieve, such as reducing climate change, reducing poverty, and enhancing economic and social stability.

First. The importance of the economy in achieving sustainable development

1. Protecting the environment and reducing pollution

The environmental economy promotes the use of clean technologies and renewable energy sources such as solar energy, wind energy, and bioenergy.

These technologies help reduce carbon emissions and environmental pollution, which enhances efforts to combat climate change and preserves environmental health. By motivating industries to follow environmentally friendly practices, industrial pollution can be reduced and air and water quality can be improved. For example, improving energy efficiency in factories and reducing chemical waste can significantly improve environmental conditions.

2. Conserving natural resources

The economy contributes to the conservation of natural resources by improving their use efficiency. Techniques such as recycling and reuse help reduce the rapid depletion of resources, thus ensuring their availability for future generations (E. T. L. James, 2019, 28) [49].

3. Improving quality of life and public health

Improving environmental quality has a positive impact on human health and well-being. Clean air and clean water reduce pollution-related diseases, such as respiratory and gastrointestinal diseases. A healthy environment also promotes physical activity and recreation, which helps improve public health and psychological well-being. (Ian Griggs, 2019, 36) [50]

Second. The relationship between indicators for the green economy and sustainable development

1. Natural capital (agriculture) as a tool for linking the green economy and development

Natural capital includes environmental resources used by economic activities, such as soil, water, air, plants and animals. Natural capital is the foundation of economic activities, providing the foundations for agricultural, mining, construction, and other industries. In the green economy, natural capital is viewed as an asset that must be preserved and managed sustainably to ensure the continuity of life and economic growth. (Khanfar Ayed, 2014, 27) [12]

2. The role of sustainable agriculture in the green economy

Sustainable agriculture aims to improve land productivity in ways that maintain balance and reduce damage caused by agricultural activities. Sustainable agriculture practices include:

- **Organic farming:** Using natural agricultural methods that avoid harmful chemicals and enhance biodiversity.
- **Effective water management:** Using techniques such as drip irrigation to reduce water waste.
- **Biodiversity:** Growing a variety of crops to support agricultural ecosystems.
- **Practical example:** Applying organic farming methods on farms can reduce the use of chemical fertilizers. (Raslan, 2022, 17) [51]

3. The relationship with sustainable development

Sustainable agriculture supports this dimension by protecting resources, the economic dimension by improving land productivity and enhancing food security, and the social dimension by providing job opportunities and supporting rural communities. (Al-Zubaidi Ghani, 2021, 39) [30]

- **Environmental dimension:** Sustainable agriculture helps reduce pollution.
- **Economic dimension:** By improving production and reducing environmental costs associated with agriculture.
- **Social dimension:** By improving the living conditions of farmers and increasing jobs in rural communities**.**

4. The importance of reducing carbon dioxide emissions

It is one of the heat-trapping gases that contribute to the phenomenon of climate change. Reducing emissions of this gas is one of the main goals of the green economy, as it aims to achieve development by reducing negative environmental impacts.

Green economy strategies to reduce emissions (Zahra Abbas, 2019, 48) [29]

- **Enhancing energy efficiency:** improving the efficiency of devices and buildings in using energy.

- **Expanding renewable energy:** using energy sources such as solar and wind.
- **Environmental dimension:** reducing environmental pollution and contributing to combating climate change.
- **Economic dimension:** reducing energy-related costs by using more efficient energy methods.
- **Social dimension:** improving air quality and health by reducing environmental pollution.

Analysis of indicators of the green economy and sustainable development in Saudi Arabia (2004-2022)

The Kingdom of Saudi Arabia is witnessing a strategic change towards environmental sustainability, as specified in Vision 2030, which aims to achieve comprehensive and sustainable development in the long term.

This transformation aims to diversify sources of income and reduce dependence on oil, as well as address global challenges related to climate change and resource conservation. The analysis of trends from 2004 to 2022 shows developments in government policies and private initiatives related to the environmental economy.

Efforts included promoting reliance on renewable energy, developing sustainable infrastructure, and supporting technological innovation.

Saudi Arabia also addressed issues of comprehensive development by improving the urban environment and promoting sustainable sectors, while achieving a balance between economic growth and protecting natural resources. This analysis aims to explore Saudi Arabia's achievements and current challenges on its path towards environmental sustainability, and provides recommendations to enhance this transformation in the future.

First. Some economic features of the Saudi economy

Saudi Arabia is one of the most important economies in the Middle East, as it relies heavily on the oil and natural gas sector thanks to its huge reserves and large production.

The population of the Kingdom of Saudi Arabia is estimated at about 34 million, making it one of the most densely populated countries in the region.

Saudi Arabia is the world's largest oil exporter, in addition to being the center of the Two Holy Mosques in Mecca and Medina, making it a major destination for Muslims from all over the world. However, the Kingdom seeks, through Saudi Vision 2030, to diversify resources and reduce dependence on oil. This vision seeks to develop other sectors and enhance the role of the private sector, with the aim of achieving sustainable economic growth and improving the quality of life for citizens. These efforts include addressing the challenges associated with oil price fluctuations and reducing dependence on foreign labor.

In addition to oil, the Kingdom stands out in a number of other areas such as religious tourism, as it attracts millions of visitors annually to perform Hajj and Umrah. Saudi Arabia is also working to develop other sectors such as mining, industry, entertainment, logistics, technology, and renewable energy. These efforts aim to create an attractive investment environment, stimulate innovation, and enhance global competitiveness.

Saudi Vision 2030 also aims to enhance education and vocational training to improve the efficiency of the local workforce and increase employment opportunities for Saudi citizens. In addition, the Kingdom seeks to improve infrastructure through mega projects such as the NEOM and Red Sea projects, which seek to transform parts of the Kingdom into global tourism and technology centers (Abdullah bin Muhammad, 2019, 47) [14].

Green Economy Indicators in Saudi Arabia

1. **Continuous increase in gross fixed capital formation:** In general, it is noted that there is a significant increase from 185.872 billion in 2004 to 1024.264 dollars in 2022, reflecting a significant increase in investments in the sector.
2. **Fluctuations in growth rates:** There is a significant variation in annual growth rates, as some years witnessed significant increases, such as 2005 by 27.88% and 2022 by 28.59%. While other years witnessed declines, such as 2009 by -6.76% and 2016 by -13.22%.
3. **Highest growth rates:** The years 2005, 2007 and 2022 witnessed the highest growth rates in fixed capital formation, which may indicate positive economic factors or significant changes in government policies during these periods.
4. **Negative impacts on growth:** Periods of declining growth rates indicate potential negative impacts, such as economic crises, changes in tax policies, or other challenges that may have affected investments.

Sustainable Development Indicators in Saudi Arabia 2004-2022

The table below represents development indicators in Saudi Arabia for the period (2004-2022), and includes three main indicators: the economic indicator average per capita income, the social indicator total population, and the environmental indicator.

1. Economic indicator (average per capita income)

The average per capita income started in 2004 at 10,935,016 US dollars and witnessed an increase to 30,447,883 US dollars in 2022.

This noticeable increase over the years indicates an improvement in economic performance in the Kingdom, and an increase in national wealth that translates into an increase in per capita income.

Between 2004 and 2008, per capita income rose significantly from $10,935,016 to $18,944,857, reflecting periods of strong economic growth. (Saudi Arabia Annual Economic Report, World Bank, 2022)

In 2009, per capita income fell to $15,064,631 due to the effects of the global financial crisis, and from 2010 to 2014, it continued to rise to $23,862,801, driven by improved oil prices and economic recovery. From 2015 to 2019, there were some fluctuations, but the overall trend was largely stable, with a value of $23,405,706 in 2019.

In recent years, especially from 2020 to 2022, per capita income has seen significant increases again, exceeding $30,000 in 2022.

2. Social Index (Total Population)

Saudi Arabia has seen a continuous increase in the number of individuals from 23,661,808 in 2004 to 36,408,820 in 2022. This population growth reflects multiple factors, including increased birth rates, improved health care, and increased immigration.

While the annual population growth rate was relatively constant, as the population increased at a continuous rate every year, in 2004 to 2014, the population increased from 23,661,808 to 32,125,564, indicating a significant increase

in the first decade of the period studied. In 2015-2022, the population continued to grow at an accelerated rate, as the population increased from 32,749,848 to 36,408,820. (Saudi Arabia Annual Economic Report, World Bank, 2022) .
Environmental indicator (agricultural land area).

3. The agricultural land area remained relatively stable throughout the period studied, with slight fluctuations.
The data indicate that the agricultural land area ranged around 1,737,000 hectares throughout the period, reflecting the stability of agricultural policies.
Between 2004 and 2009, the agricultural land area was around 1,737,000 hectares, with slight fluctuations. In 2010, the agricultural land area decreased slightly to 1,734,350 hectares, then stabilized again.
From 2011 to 2022, the agricultural land area remained stable around 1,736,000 hectares, with some slight changes, reflecting the sustainability of agricultural use and the lack of significant expansion in this sector. (Saudi Arabia Annual Economic Report, World Bank, 2022)

Analysis of trends in green economy variables and sustainable development in the Emirates (2004-2022)
First. Some features of the UAE economy
With the increasing environmental challenges worldwide, it has become necessary to shift to an environmentally friendly economy and promote sustainable development to ensure the continuity of resources and protect the environment for future generations.
The UAE is committed to achieving the United Nations Sustainable Development Goals and seeks to achieve zero carbon emissions by 2050. It also enhances its efforts in developing sustainable infrastructure, improving waste management, increasing water efficiency, and expanding green spaces.
It also focuses on education and raising awareness about the importance of environmental sustainability through a variety of programs and initiatives targeting all segments of society (Al-Awadhi, 2018, p. 62) [52]

Second. Sustainable development indicators in the UAE
The table below represents the sustainable development indicators in the UAE from 2004 to 2022. The table includes three main indicators of sustainable development: the economic indicator (average per capita income in dollars), the social indicator (total population in millions), and the environmental indicator (agricultural land area in hectares). Below we present a detailed analysis of each of these axes:
1. Economic indicator: Average per capita income in dollars
Table (10) shows that the average per capita income in the UAE has fluctuated over the years. At the beginning of the period, the average per capita income was $37,017.74 in 2004, and it rose significantly to $54,707.98 in 2022. We note that there were significant increases in the average per capita income over the years, such as 2005, which witnessed an increase of 13.97%, and 2008, which witnessed a 2.76% increase. On the other hand, there were some decreases, such as 2009, which witnessed a decrease of 29.69%, and 2020, which witnessed a 19.55% decrease. These changes may reflect fluctuations in the global and local economy, in addition to changes in economic and investment policies in the UAE.

2. Social Index
Total population in millions Table (10) shows that the total population in the UAE has been steadily increasing over the period from 2004 to 2022. The number started at 3,993,339 million in 2004, and rose to 9,441,129 million in 2022. This period was characterized by a significant increase in the population, with increasing population growth rates, especially in recent years, such as 2019, which witnessed an increase of 1.09%, and 2022 by 1.69%. This population growth reflects the expansion of economic opportunities, increasing attractiveness as an investment hub, and improving the quality of life in the UAE. (UAE Annual Economic Report, World Bank, 2022)

3. Environmental Indicator
Agricultural Land Area in Hectares The table data indicates that the agricultural land area in the UAE has witnessed some fluctuations over the years. The area started at 5,540 hectares in 2004, and reached 3,915 hectares in 2022. We note that despite some minor changes, the general trend shows relative stability in the agricultural land area. For example, the agricultural land area witnessed a slight decrease in some years, such as 2007, which recorded a decrease to 5,386 hectares, and in 2013 to 3,767 hectares. While some years, such as 2015 and 2016, witnessed relative stability in the area. Changes in this indicator may reflect the environmental and economic challenges related to agriculture in a desert environment.
The UAE has made significant progress in many sustainable development indicators over the years. Increases in average per capita income indicate an improvement in economic well-being, while continued population growth reflects an expansion in economic opportunities. On the other hand, changes in the area of agricultural land reflect environmental challenges and opportunities to improve the sustainability of agriculture in the country. Changes in these indicators reflect the impact of government policies, economic changes, and environmental challenges on the development process in the UAE. (UAE Annual Economic Report, World Bank, 2022)

Analysis of trends in green economy variables and sustainable development in Iraq (2004-2022)
First. Some features of the Iraqi economy
The issues of green economy and sustainable development have become central to the strategic plans of many countries, including Iraq. The period from 2004 to 2022 reflects a critical stage in Iraq's journey towards achieving sustainable development amid complex economic and environmental challenges. During these years, Iraq has witnessed major transformations at the political and economic levels, prompting policymakers to adopt new strategies aimed at achieving balance.
Iraq has a population of about 40 million people, and is distinguished by its strategic geographical location in the heart of the Middle East. Iraq is considered one of the richest countries in natural resources, especially oil, which forms the backbone of its economy. However, Iraq seeks to diversify its economy and reduce its dependence on oil by adopting green economy strategies (Fatima Abbas, 2018, 27) [53]
In this era, Iraq began to realize the importance of the green economy as a basic tool to stimulate sustainable development. This development model promotes the

efficient use of resources, encourages investment in renewable energy, and aims to reduce the environmental impact of economic development. In this context, environmental strategies such as improving natural resource management, reducing carbon emissions, and enhancing energy efficiency have become the core of national policies.
Strategies include supporting small and medium enterprises focused on clean technology, promoting sustainable agriculture, and improving water management to address water scarcity. Iraq is also working to improve environmental infrastructure and develop sustainable public transportation to reduce pollution and improve air quality in major cities (Ismail Hamadi, 2020, p. 38) [54].

Second. Green Economy Indicators in Iraq

1- Analysis of the trend of natural capital (agriculture) in Iraq (2004-2022)

Table (11) shows that there are severe fluctuations in natural capital over the years, reflecting the significant impacts of political and economic events on the agricultural sector in Iraq.
We start from 2004, when natural capital in the agricultural sector amounted to $17.531 billion. The sector witnessed a significant increase in 2005 by 78.99%, rising to $31.379 billion. However, this increase was followed by significant declines, such as 2006, which witnessed a sharp decline of -86.40%, and 2007, when natural capital recorded a negative value of -27.684 billion dollars, reflecting a severe crisis in the agricultural sector.
Despite the significant declines in the sector in subsequent years, such as 2008 by -49.78%, there were also some periods of significant recovery, such as 2010, which saw an increase of 279.67%, and 2015 by 1732.20%. This indicates that there were efforts to improve agricultural conditions in some periods, despite ongoing challenges. In recent years, such as 2019, which saw an increase of 22.56%, and 2022 by 61.82%, we see signs of relative stability and improvement in the agricultural sector. These increases may be linked to new initiatives to develop agriculture and the agricultural environment in Iraq. (Iraq Annual Economic Report, World Bank, 2022)

Second. Sustainable Development Indicators in Iraq

The table below represents development indicators in Iraq from 2004 to 2022. The table includes three main indicators of sustainable development: the economic indicator (average per capita income in dollars), the social indicator (total population in millions), and the environmental indicator (area of agricultural land in hectares). Below we present a detailed analysis of each of these axes to assess sustainable development trends in Iraq during this period.
Economic indicator: Measured by average per capita income in US dollars. We note that there are fluctuations in the average per capita income over the years, as it increased from $1,391 in 2004 to $5,937 in 2022. However, some years witnessed clear fluctuations, such as 2005, where the average per capita income increased by 32.95% compared to 2004, and 2008, where it increased by 144.64% compared to 2007. We also noted a decrease in per capita income in some years, such as 2015, which witnessed a decrease of 24.24% compared to 2014. Social index: The total population is expressed in millions of people. The table shows a steady increase in the population over the years, from 27.86 million people in 2004 to 44.50 million people in 2022. This continuous increase reflects population growth that can have significant impacts on social and economic policies in Iraq. (Iraq Annual Economic Report, World Bank, 2022)
Environmental indicator: Measured by the area of agricultural land in hectares. The table shows that the area of agricultural land remained relatively stable during the study period, as it remained at about 434,370 hectares from 2004 to 2008, then decreased to 434,128 hectares from 2009 until the end of the study period in 2022. This relative stability reflects stability in the use of agricultural land, but it also indicates the need to review environmental and agricultural policies to ensure the sustainability of natural resources.

Challenges facing the green economy and sustainable development

1 .Economic challenges

Transforming the traditional economy into a green economy requires large investments in infrastructure and technology. These investments may be expensive, which poses a challenge to developing countries and small and medium-sized enterprises. In addition, there may be resistance from traditional sectors that rely on polluting economic activities.
Developing countries face financial and technical challenges in adopting the green economy, as they need financial and technical support from developed countries and international institutions to be able to shift to a more sustainable economic model.

2 .Social challenges

Among the social challenges facing the green economy and sustainable development is achieving a fair and comprehensive transition that ensures that no group is left behind. Change in traditional industries may lead to job losses in some sectors, which requires transitional policies to support workers and provide training and new job opportunities in environmentally friendly sectors.
The transition to a green economy requires changing lifestyles and consumption habits, which may face resistance from some groups. Therefore, awareness of the importance of sustainability must be raised through education and awareness campaigns.

3. Environmental challenges

Despite the efforts made to achieve sustainable development, there remain major environmental challenges such as climate change, desertification, and loss of biodiversity. These challenges require international coordination and joint efforts to address them effectively.
Climate change imposes great pressure on natural resources and infrastructure, which requires rapid adaptation and flexible strategies to deal with its effects. Desertification and loss of biodiversity are also major environmental problems that require measures to protect and manage resources sustainably.

Conclusions

1. Integration between the green economy and sustainable development: The green economy and sustainable development are closely linked, as each contributes to achieving the goals of the other. The green economy aims to enhance the efficiency of resource use and reduce pollution, which contributes to achieving the

environmental goals of sustainable development. At the same time, sustainable development enhances social justice and improves the quality of life, which supports the social and economic aspects of the green economy.

2. The role of clean technology and renewable energy sources: Clean technology and renewable energy sources are among the main pillars promoted by the green economy to achieve sustainable development. These technologies reduce harmful emissions and conserve natural resources, which contributes to achieving an environmental, economic and social balance.

3. The importance of natural capital: Natural capital is one of the main assets that must be preserved and managed sustainably to ensure the continuity of life and economic growth. The green economy supports the conservation of natural resources through techniques such as recycling and reuse, which ensures the availability of these resources for future generations.

4. Improving the quality of life and public health: The green economy enhances the quality of the environment, which leads to improving human health and well-being. Clean air and clean water reduce pollution-related diseases, enhancing public health and psychological well-being.

5. International cooperation and national policies: Achieving the goals of the green economy and sustainable development requires international cooperation and effective national policies. Countries must adopt common strategies and enhance international cooperation to address global environmental challenges.

Saudi Arabia

1. Natural capital (agriculture): Saudi Arabia has experienced fluctuations in natural capital, with some years experiencing significant decreases and others experiencing significant increases. This reflects changes in economic conditions and agricultural and environmental policies.

2. Gross fixed capital formation: Saudi Arabia has experienced significant variation in annual growth rates of gross fixed capital formation, with significant increases in some years and decreases in others.

3. Per capita use of renewable energy: There is an upward trend in investment in renewable energy, with significant increases in recent years.

4. CO2 emissions: Saudi Arabia has experienced a continuous increase in CO2 emissions until 2016, with some fluctuations in recent years, indicating the success of efforts to reduce emissions.

UAE

1. Natural capital (agriculture): Fluctuations in natural capital, with significant increases in recent years.

2. Gross fixed capital formation: Significant fluctuations in gross fixed capital formation, with significant increases in some years and decreases in others.

3. Per capita renewable energy use: Fluctuations in per capita renewable energy use, with significant decreases in some years and increases in recent years.

4. CO2 emissions: Gradual increase in CO2 emissions over the years, with some fluctuations.

Iraq

1. Natural capital (agriculture): Iraq has experienced significant fluctuations in natural capital, reflecting the significant impacts of political and economic events.

2. Gross fixed capital formation: Significant fluctuations in gross fixed capital formation, with significant increases in some years and decreases in others.

3. Per capita renewable energy use: Significant fluctuations in per capita renewable energy use, with significant decreases in some years and increases in recent years.

4. CO2 emissions: Gradual increase in CO2 emissions over the years, with fluctuations in some years.

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