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Dr. Ahmed Muhammad Jassim Al-Akidi
Associate Professor, Department of Economics, College of Administration and Economics, University of Fallujah, Iraq

Corresponding Author:
Dr. Ahmed Muhammad Jassim Al-Akidi
Associate Professor, Department of Economics, College of Administration and Economics, University of Fallujah, Iraq

Analysis of the reality of sustainable development in Iraq during the Period (2004-2021)

Ahmed Muhammad Jassim Al-Akidi

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Abstract
This research aims to study and analyze the reality of sustainable development by measuring and analyzing some of its indicators and examining the state of the Iraqi economy during the study period (2004-2021). The purpose is to identify the positive and negative aspects of sustainable development in the country to strengthen the positive elements and address the negative ones, primarily by diversifying public revenues and reducing reliance on oil revenues characterized by sharp price fluctuations. The study reached several conclusions, the most important of which was the decline in sustainable development indicators, such as Gross Domestic Product (GDP), unemployment rate, total cultivated area, and the number of individuals engaged in research and development during the research period, thereby confirming the validity of the research hypothesis. The study recommended that the Iraqi government seriously combat financial and administrative corruption and eliminate bureaucratic procedures. It also emphasized diversifying national income sources by revitalizing productive sectors and private investment to correct structural imbalances in the production sectors. This would reduce dependency on oil revenues, which are directly linked to global economic fluctuations, and provide new sources to develop sustainable development sectors.

Keywords: Gross Domestic Product (GDP), cultivated land, unemployment, number of workers in research and development, sustainable development

Introduction

Chapter One: Research Methodology

This chapter is dedicated to presenting and discussing the research methodology through the following sections:

First: Research Problem

The research problem lies in the country's current state of sustainable development and the surrounding variables that limit its ability to achieve it fully. This issue arises due to the country's reliance on certain internal resources, particularly oil sector revenues, without attempting to reduce this dependency in the present and future. Additionally, the state's lack of effort to explore alternative revenue sources threatens sustainable development, given that oil revenues are tied to global oil prices, which are characterized by volatility and instability.

Second: Research Significance

The research is significant because achieving sustainable development in the country can enhance the economy, enable it to withstand potential crises, and leverage opportunities to advance economic development in more progressive directions.

Third: Research Hypothesis

The research is based on the hypothesis that analyzing the reality of sustainable development and identifying its elements and components in the country can help determine its strengths and weaknesses. This, in turn, facilitates reinforcing its strengths and addressing its shortcomings.

Fourth: Research Objectives

The research aims to achieve the following:

1. Analyze Iraq's sustainable development state by examining its fundamental components.
2. Identify the elements that directly and significantly impact sustainable development in the country.

Fifth: Research Methodology

The study adopted a combined descriptive and analytical approach to achieve the research objectives and validate its hypothesis. This methodology was used to examine the theoretical framework of sustainable development and analyze its variables.

Sixth: Temporal and Spatial dimensions of the research

1. **Spatial Dimension:** The Iraqi economy.
2. **Temporal Dimension:** Analyzing sustainable development indicators during the period 2004-2021.

Chapter Two: Theoretical Framework of the Research

First: The concept of sustainable development and the reasons behind its emergence

Sustainable development has gained significant importance on a global scale, particularly following the Earth Summit held in Brazil in 1992. This summit resulted in the adoption of Agenda 21, which serves as a global blueprint for achieving sustainable development. It led to the establishment of the United Nations Commission on Sustainable Development. Sustainable development attracts increasing attention from countries, international and regional economic organizations, and research centers. Sustainability was initially used in biology and ecology but has since evolved into a broader concept encompassing various fields and disciplines. In ecological science (Ecology), sustainability refers to the formation and evolution of dynamic systems that are subject to changes due to their inherent dynamism, leading to alterations in their characteristics, elements, and the relationships between these elements and the living organisms within these systems (Naji, 2013, p. 53) [13]. Linguistically, sustainability means continuity, derived from the Arabic verb "dawama" (to continue). It also refers to endurance and perpetuation, implying the ability to sustain and endure while highlighting the intergenerational links. Sustainability is further defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs. Several definitions have been provided by thinkers and international organizations, reflecting sustainability's diverse meanings and implications. William House, Director of the U.S. Environmental Protection Agency, defines sustainability as a process that acknowledges the necessity of achieving economic growth in harmony with environmental capacities, emphasizing that economic development and environmental conservation are complementary rather than contradictory processes. Similarly, Herman Daly and John Cobb describe sustainability as the right of each generation to inherit a set of productive and natural assets from the preceding generation, as they inherited from previous human generations (Naji, 2013, p. 39) [13]. Edward Barbier, the first to use the term "sustainable development," defines it as economic activity that enhances social welfare with maximum utilization of natural resources and minimal environmental harm (Abdel Khalek, 2014, p. 242) [10]. On the level of international organizations, the Food and Agriculture Organization (FAO) defines sustainable development as managing and protecting natural resources while directing technological and institutional changes to ensure the fulfillment of human needs for current and future generations. FAO emphasizes that sustainable development in agriculture, forestry, and fisheries safeguards land, water, plant, and animal genetic resources and does not harm the environment. It is characterized by being technically feasible, economically viable, and socially acceptable (Romano, 2003, p. 56) [19].

The World Bank defines sustainable development as a process concerned with achieving continuous equity, ensuring that the same developmental opportunities available to the current generation are provided to future generations. This is achieved by maintaining or continuously increasing comprehensive capital over time.

Second: Challenges to the emergence of sustainable development

The emergence of sustainable development as a concept has been shaped by several challenges that the world, particularly developing countries, faces. These challenges include.

1. Economic Disparity Challenges

The world is divided into a wealthy and advanced North and a poor and increasingly impoverished South. Northern countries possess the means and resources for power, industrial and technological advancement, and high development rates, whereas Southern countries suffer from poverty, backwardness, and low development rates. Northern countries control about 90% of global industrial output and consume resources at multiple levels compared to the South. The average per capita income in the North is approximately 20 times higher than in the South, even though Northern countries constitute only about 25% of the global population (Badawi, 2012, p. 17) [4].

2. Population Growth Challenges

Population growth, particularly in the South, has been significant. Statistics and UN reports indicate that 1950 the global population was around 2.5 billion. By 2050, the population is expected to surge to 9.2 billion, compared to 6.5 billion. Most of this growth will occur in the South, particularly in countries unable to provide adequate shelter, food, jobs, and living conditions for their populations. Although food production has increased to meet the needs of this explosive population growth, population pressures and environmental degradation weaken agriculture and its future potential. While agricultural production has improved in some areas, especially in developed countries (the North), other regions will continue to face genuine declines in this sector (Sheikh, 2002, p. 6) [9].

3. Biodiversity Challenges

Humanity faces a severe reduction in biodiversity due to the overexploitation of global soil resources and tropical forests. This trend began 150 years ago with the spread of capitalist production, colonial expansion, and excessive land and forest exploitation across continents. This colonial exploitation deprived communities of the biodiversity within their local agriculture, shifting focus to export-oriented cultivation rather than meeting local needs. During

the second half of the 20th century, approximately 11% of the land with vegetative cover globally deteriorated to the point where its original biological functions were destroyed. Restoring such land has become either exorbitantly expensive or impossible in some cases. Over the past two centuries, the destruction of green areas has posed unparalleled risks to biodiversity and ecosystems.

4. Environmental Challenges

Industrial and technological advancements have had negative effects on the environment. Emissions of gases, waste dumping, and industrial pollution have degraded the environment, sometimes rendering it uninhabitable. This has led to the emergence of a new term, "environmental refugees," with their numbers estimated at 25 million. Most refugees are farmers forced to leave their lands due to soil degradation and water scarcity (Ahmed, 2011, p. 7) [2]. Moreover, industrial countries' refusal to adhere to UN calls to reduce harmful emissions, including greenhouse gases, has exacerbated the problem, potentially causing diseases, melting polar ice caps, and resulting floods. Deforestation for industrial or urban expansion increases carbon dioxide levels in the air, reduces agricultural production, forces migration of birds and insects, and leads to desertification. The lack of recycling of natural resources further depletes them, threatening future generations' needs and causing various types of pollution.

5. Water Challenges

Water issues have garnered significant attention due to their impact on daily human life and essential needs. Water is one of the most vital natural resources, with rivers and freshwater lakes being essential sources for sustaining humans, animals, and plants. Industrial and technological advancements since the early 20th century have polluted water with petroleum products, chemicals, industrial waste, radioactive materials, and sewage. This has had dire consequences for humans, animals, plants, and the natural environment, compromising future generations' rights to a sustainable life. UN reports show that in 1990, approximately 1.3 billion people lacked access to safe drinking water, which continues to rise annually. Additionally, 1.8 billion people lacked access to sanitation, and 2 billion were at risk of waterborne diseases, resulting in 4 million deaths annually (Najafi, 2004, p. 10) [14].

6. Consumption Challenges

Global resource depletion occurs on two levels: depletion due to wealth and depletion due to poverty. The former is driven by increased industrialization in developing countries possessing raw materials and energy resources (e.g., oil). Competitive pressures among Northern countries have pushed them to acquire as many raw materials and energy resources as possible to secure their future dominance. This has been achieved through direct foreign investments in Southern countries, which often involves transferring environmentally harmful industries to the South while maintaining advanced technologies in the North.

7. Energy Challenges

Wealthy Northern countries, representing 20% of the global population, consume half of the world's energy. This results in a per capita energy consumption rate 10 times higher than that of low-income countries like those in the South. Energy services are a fundamental pillar of sustainable development, extending far beyond direct uses such as heating, cooking, and lighting. For instance, electrical lighting in schools and homes enables students to study beyond daylight hours or in areas with limited natural light. Electricity is also essential for operating factories, machinery, and various industrial facilities (Al-Zahrani, 2016, p. 37) [8].

Third: Dimensions of Sustainable Development

The key dimensions of sustainable development can be outlined as follows:

First Dimension: Environmental Aspect

The environmental dimension emphasizes the preservation and rational use of natural resources on a continuous and sustainable basis while planning for precautionary and preventive measures. This dimension of sustainable development aims to achieve two primary objectives:

1. Rationalizing using renewable and non-renewable local environmental resources in production processes to prevent resource depletion.
2. Maintaining the carrying capacity of ecosystems, which refers to their ability to regenerate.

The philosophy of sustainable development rests on the critical principle that the depletion of natural environmental resources essential for any economic activity harms overall growth and the economy. Therefore, sustainable development aims to balance financial and ecological systems without depleting natural resources while ensuring environmental security (Ioannis, 2009, p. 18) [17].

The environmental dimension requires adhering to ecological limits, as each ecosystem has specific thresholds for consumption and exploitation. Exceeding these limits leads to ecosystem degradation. Thus, it is essential to set boundaries on consumption, population growth, pollution, unsustainable production patterns, water depletion, deforestation, and soil erosion.

Second Dimension: Economic Aspect

The economic dimension of sustainability focuses on ensuring and maximizing economic well-being over the most extended possible timeframe by providing the best quality of life essentials, such as food, transportation, housing, and healthcare. This dimension emphasizes sustaining growth by focusing on its quality. Growth should not rely on environmental destruction or resource depletion. Sustainable growth should create more job opportunities and reduce wealth concentration that impoverishes large segments of society. It should also avoid economic problems such as high inflation or unemployment rates. Sustainable growth depends more on human capabilities and skills than on the intensive use of natural resources. Therefore, sustainable growth promotes economic efficiency within intergenerational and intergenerational equity.

Third Dimension: Social Aspect

The social dimension, representing the human capital of sustainable development, focuses on providing material and qualitative requirements for individuals' lives. It builds individual capacities by enhancing healthcare, education, poverty reduction, and equitable income distribution while

reducing population growth rates. It also emphasizes broadening basic freedoms, participation, and respect for human dignity. Achieving these goals requires ensuring food security, adequate housing, and access to healthcare and education for all. Effective planning and resource conservation are also essential. This dimension highlights that sustainable development is not only about individual capacity building but also about community capacity building. Social sustainability requires creating a cohesive society where individuals are willing and ready to contribute to the community. This necessitates fostering a sense of belonging and social solidarity through equality, equal opportunities, freedom, democracy, and respect for cultural, social, and political differences. These factors improve individuals' attitudes toward nature, enhancing environmental quality. The social dimension places humans at the heart of development, focusing on social justice, poverty eradication, and equitable access to social services. This was emphasized in the 1993 Human Development Report by the UN Development Programme, which stated that development is for people, by people, and with people.

Fourth Dimension: Institutional Aspect

Public administrations and institutions serve as the executive arm of the state, responsible for shaping and implementing social, economic, and environmental development policies. These institutions also provide services and benefits to citizens. Achieving sustainable development, advancing societies, enhancing individuals' quality of life, safeguarding their human rights, and ensuring their adherence to societal and state obligations all depend on the effectiveness and success of these institutions in fulfilling their roles (Reci, 2014, p. 23) [18].

Chapter Three: The Applied Framework of the Research

Sustainable development indicators reflect economic, social, environmental, and institutional realities, which are interconnected and interdependent. Any change in one aspect impacts the others. These indicators have been developed to align with advancements in developmental policies. This chapter focuses on analyzing the critical sustainable development indicators to assess whether they meet desired levels and to identify the reasons behind any shortcomings, as detailed below:

Analysis of economic indicators

Economic indicators of sustainable development include the following:

Per Capita GDP

The per capita Gross Domestic Product (GDP) is one of the primary indicators of sustainable development. It highlights individual and societal welfare levels by measuring total production and magnitude. This indicator reflects individuals' purchasing power and demonstrates the strength of the national economy. It is calculated by dividing the GDP by the total population.

Table 1: Evolution of GDP and Per Capita GDP in Iraq (2004-2021) in Current Prices

Year	GDP (Billion IQD)	Population (Thousands)	Per Capita GDP (Million IQD)	GDP Growth Rate (%)
2004	53,235.558	27,139,000	1.961	---
2005	73,533.598	27,963,000	2.629	38.0
2006	95,587.954	28,810,000	3.274	29.9
2007	111,518.531	29,682,000	3.754	16.6
2008	157,026.061	30,577,000	5.135	40.9
2009	130,643.200	31,664,000	4.423	-16.8
2010	162,064.566	32,481,000	4.988	24.0
2011	217,327.107	33,320,000	6.518	34.0
2012	254,225.491	34,208,000	7.431	16.9
2013	273,587.529	35,095,000	7.795	7.6
2014	266,332.655	30,630,000	7.649	2.6
2015	194,680.972	36,933,000	5.528	-25.0
2016	196,924.142	37,889,000	5.444	2.0
2017	221,665.709	38,854,000	5.968	10.8
2018	254,870.184	39,253,000	6.586	11.2
2019	262,917.150	39,925,000	6.718	4.6
2020	198,774.325	40,222,000	4.967	-24.4
2021	203,942.457	41,354,000	5.097	2.6

From the table, it is evident that the per capita GDP reached its peak during the years 2012-2014. However, even during this period, it remained low, not exceeding 8 million IQD per individual, a modest figure that does not reflect the aspirations of the Iraqi population for a decent standard of living. The table also shows that the lowest per capita GDP value during the study period was recorded in 2004, amounting to 1.961 million IQD. The period from 2005 to 2008 witnessed a continuous rise in per capita GDP, with positive growth rates of 38%, 29.9%, 16.6%, and 40.9%, respectively. However, a significant decline occurred in 2009, with per capita GDP dropping to 4.423 million IQD and a negative growth rate of -16.8%. This decline was attributed to the global financial crisis, specifically the subprime mortgage crisis, and the drop in oil prices. Subsequently, the per capita GDP rebounded during the 2010-2014 period, reaching its highest value during the study period 2013, at 7.795 million IQD, with a positive growth rate of 7.6%. However, it declined again in 2015 and 2016, recording values of 5.528 million IQD and 5.444 million IQD, respectively. This decline was due to the loss of government control over some provinces as a result of terrorist operations and the presence of militant groups, in addition to falling oil prices. Afterwards, the per capita GDP resumed its upward trend during the 2017-2019 period.

To analyze the overall government expenditure in Iraq, especially after 2004, it is observed that the fiscal policy adopted was expansionary. This policy focused primarily on

increasing current expenditures at the expense of investment expenditures. Government expenditure rose significantly, placing a burden on the state budget due to the inclusion of additional items such as increased salaries and wages, social protection networks, and security provisions for officials. These factors constrained the capacity for expanding investment expenditures.

Table 2: Total Government Expenditure in Iraq and Growth Rates (2004-2021)

Year	Total Expenditure (1)	Annual Growth Rate (2)%	Investment Expenditure (3)	Share of Investment in Total Expenditure (4)%	Current Expenditure (5)	Share of Current in Total Expenditure (6)
2004	32,117.491	---	3,014.733	9.4	29,102.758	90.6
2005	26,375.175	-19.7	4,572.018	17.3	21,803.157	82.7
2006	38,806.679	47.1	6,027.680	15.5	32,778.999	84.5
2007	39,031.232	57.8	7,723.044	19.8	31,308.188	80.2
2008	59,403.375	52.0	11,880.675	20.0	47,522.700	80.0
2009	52,567.025	-12.0	10,513.405	20.0	42,053.620	80.0
2010	70,134.201	33.4	16,103.866	23.1	54,003.334	76.9
2011	78,757.667	12.2	17,832.113	22.6	60,925.554	77.4
2012	105,139.575	33.4	29,350.952	27.9	75,788.623	72.1
2013	119,127.556	13.3	40,380.750	33.9	78,746.806	66.1
2014	113,473.517	-4.7	36,731.844	32.4	76,741.673	67.6
2015	70,397.515	-47.2	18,584.676	26.4	51,832.839	73.6
2016	67,067.437	-4.7	15,894.009	23.7	51,173.428	76.3
2017	75,490.115	12.5	16,464.461	21.8	59,025.654	78.2
2018	80,873.189	7.1	13,820.189	17.1	67,053.000	82.9
2019	111,723.523	38.1	24,422.523	21.9	87,301.000	78.1
2020	76,082.443	-31.9	15,216.488	20.0	60,865.955	80.0
2021	119,993.847	41.47	11,450.589	9.5	95,421.762	90.5
Overall average relative importance%				22		88

Table 2 shows that investment expenditure was less important during the study period than operational (current) expenditure. The average share of investment expenditure was 22%, while the average share of operational expenditure reached 88%. This imbalance stems from Iraq's reliance on oil exports, the need for economic diversification, and the underutilization of private investment in financial activities. Additionally, expanding public-sector employment increased operational expenditure while leaving little room for investment expenditure. The existence of substantial disguised unemployment in state departments further compounded this issue. To address this problem, the study recommends activating and encouraging the role of foreign direct investment and optimizing the use of loans and aid for productive purposes to offset the shortfall in investment expenditure.

Government spending in Iraq during 2004 and 2005 was particularly low, amounting to 32,117,491 million IQD in 2004 and 26,375,175 million IQD in 2005, respectively. The year 2005 recorded the lowest expenditure during the study period. This decline resulted from the presence of U.S. forces in Iraq, the destruction of critical sectors during the war, and falling oil prices, which negatively impacted the general budget and reduced public spending. Between 2006 and 2008, government expenditure increased steadily, reaching 38,806,679, 39,031,232, and 59,403,375 million IQD, respectively, with positive growth rates of 47.13%, 57.8%, and 52.19%. The rise in spending was attributed to the reinstatement of politically dismissed employees, the integration of armed groups into civil employment, and the payment of their financial entitlements. Additionally, increased oil revenues, as the primary source of public spending, played a crucial role. In 2009, government spending fell to 52,567,025 million IQD, with a negative growth rate of -12%, due to the global financial crisis. This crisis was marked by economic stagnation and a decrease in public spending. Total government expenditure increased significantly during 2010-2013, reaching 70,134,201, 78,757,667, 105,139,575, and 119,127,556 million IQD, respectively. This growth was driven by rising global oil prices and increased oil revenues, supported by improved export levels. Government spending declined during 2014 and 2015 to 113,473,517 and 70,397,515 million IQD, with negative growth rates of -5% and -47.2%, respectively. This was due to several Iraqi provinces falling under terrorist control, resulting in wars and significant destruction. Additionally, declining oil revenues negatively impacted public expenditure. Government spending gradually increased, reaching 111,723,523 million IQD in 2019, with a positive annual growth rate of 38%. This recovery was due to improved security conditions, the reclamation of provinces affected by military operations, and the reactivation of oil production facilities, which boosted exports and revenues. In 2020, government spending dropped to 76,082,443 million IQD, with a negative growth rate of -31%. This decline was attributed to the global economic downturn caused by the COVID-19 pandemic. Government spending rebounded in 2021, reaching 119,993,847 million IQD. This recovery was facilitated by the partial lifting of restrictions in most countries, the resumption of oil exports, and an approved budget based on an estimated oil price of 45 USD per barrel and an exchange rate of 1,450 IQD per dollar. The study concludes that Iraq's government spending is directly tied to oil prices due to its rentier economy. Oil exports and their revenues remain the primary source of public spending. Consequently, the expansion or contraction of government expenditure is closely linked to global oil prices and the stability of global markets, making the economy highly vulnerable to crises.

Value of Iraqi Exports

Table 3 illustrates the development of Iraqi exports during the study period. In 2004, exports were valued at 29,956,020 billion IQD. The period 2005-2008 witnessed a continuous

increase in export values, reaching 39,963,945, 48,780,391, 51,158,039, and 79,028,559 billion IQD, respectively, with positive annual growth rates of 33.4%, 22%, 21.3%, and 54.4%. This increase was attributed to trade liberalization following the U.S. occupation, a higher rate of oil exports, and growing global demand for oil. In 2009, exports significantly declined, amounting to 51,473,565 billion IQD, with a negative growth rate of -34.8%. This drop was due to the global economic downturn caused by the subprime mortgage crisis, which negatively impacted global oil demand and consequently reduced Iraqi exports. During the period 2010-2014, exports showed an apparent increase, with values of 63,880,713, 96,531,318, 113,151,788, 108,514,489, and 1,033,714,534 billion IQD, respectively. This rise was driven by growing global demand for oil and higher oil prices. The year 2012 recorded the highest export value during the study period, amounting to 113,151,788 billion IQD, with a positive growth rate of 17.2%. In 2015 and 2016, export values decreased, recording 67,192,476 and 55,352,469 billion IQD, with negative growth rates of -35.2% and -17.6%, respectively. This decline was due to terrorist attacks, the control of some provinces by armed groups, and the lack of security and stability. In 2017 and 2018, oil exports rose again, reaching 75,180,883 and 109,726,006 billion IQD, with positive growth rates of 35.8% and 45.9%, respectively. However, exports declined again in 2019 and 2020, recording 105,083,228 and 60,229,946 billion IQD, with negative growth rates of -4.2% and -42.2%, respectively. This decline was attributed to the COVID-19 pandemic and reduced global demand for oil, which led to a drop in Iraq's exports. In 2021, exports recovered, reaching 109,988,384 billion IQD. This increase was due to higher global demand for oil, improved security in Iraq during this period, and rising global oil prices.

Table 3: Developments in the structure of Iraqi exports during the study period

Year	Total Exports (Billion IQD)	Annual Growth Rate (%)
2004	29,956,020	---
2005	39,963,945	33.4
2006	48,780,391	22.0
2007	51,158,039	21.3
2008	79,028,559	54.4
2009	51,473,565	-34.8
2010	63,880,713	24.1
2011	96,531,318	51.1
2012	113,151,788	17.2
2013	108,514,489	-4.0
2014	103,371,4534	-4.4
2015	67,192,476	-35.2
2016	55,352,469	-17.6
2017	75,180,283	35.8
2018	109,726,006	45.9
2019	105,083,228	-4.2
2020	60,229,946	-42.2
2021	109,988,384	---

From the above, it is evident that Iraq has yet to effectively achieve the eighth goal of sustainable development, as most government expenditures showed negative growth rates. Meanwhile, the per capita GDP growth rate was positive, primarily due to reliance on foreign loans to fund GDP and dependence on oil exports. Therefore, achieving the eighth goal in this context heavily depends on global oil prices. Additionally, the structure of Iraqi exports has yet to achieve the eighth goal either, as it relies on oil exports, reflecting Iraq's rentier economy, which is subject to fluctuations in export levels.

Analysis of Social Indicators of Sustainable Development

Social indicators are used to assess the standard of living and well-being of individuals, reflecting the capacity of human resources and how they are developed and improved to enhance the quality of services provided to individuals and society in the present and future. Among the most important social indicators of sustainable development are:

Population Growth Rate

Achieving the goals of sustainable development is linked to several variables, the most important of which is the population growth rate, which includes the population size, gender composition, and factors influencing development. If human resources are optimally utilized, governments can absorb population increases, enhance the workforce and production capacity, and advance comprehensive development. In Iraq, however, population growth has not been directed toward development but has contributed to increased government expenditure due to several factors, most notably high birth and low mortality rates. From the data in Table 4, Iraq's population in 2004 was 27,139,000, with a population growth rate of 2.6%, the lowest during the study period. This increased to 27,963,000 in 2005, with a growth rate of 3.03%, and continued to rise at relatively consistent rates due to high birth rates and low mortality rates. The population growth rate showed relative stability until 2008 when it recorded its highest value during the study period at 3.29%. In subsequent years, Iraq's population growth rate gradually declined due to relatively lower fertility rates and higher migration rates, as many Iraqis emigrated due to wars and violence in several Iraqi provinces. By 2014, Iraq's population reached 36,060,000, with a growth rate of 2.87%. The population numbers then resumed an upward trend, following a progressive and proportional increase. By 2018, Iraq's population reached 39,253,000, with a population growth rate of 2.79%.

Table 4: Total Population of Iraq (2004-2021)

Year	Total Population (Million)	Population Growth Rate (%)
2004	27,139,000	---
2005	27,963,000	3.03
2006	28,810,000	3.03
2007	29,682,000	3.03
2008	30,577,000	3.29
2009	31,664,000	3.13
2010	32,481,000	3.04
2011	33,320,000	2.98
2012	34,208,000	2.94
2013	35,095,000	2.90
2014	36,063,000	2.87
2015	36,933,000	2.84
2016	37,889,000	2.66
2017	38,854,000	2.68
2018	39,253,000	2.79
2019	39,925,000	2.79
2020	40,222,000	2.74
2021	41,354,000	2.82

Unemployment Rate in Iraq

Unemployment is one of the most significant economic and social challenges facing sustainable development due to its negative repercussions on the reality of Iraqi life. From the data in Table 5, the number of unemployed individuals reached 7,328,000 in 2004, with an annual change rate of 2.7% of Iraq's total population. This was due to the collapse of infrastructure and public institutions, which led to the dismissal of many government employees, the migration of capital, and the cessation of many local industries. The lack of a conducive investment climate also contributed to this high unemployment rate, which was the highest during the study period. In 2005, 2006, and 2007, the unemployment rate declined to 17.9%, 18%, and 12%, respectively, with the number of unemployed individuals recorded at 5,033,000, 5,186,000, and 3,562,000. This decrease was attributed to the Iraqi government's increased employment rates in most ministries, particularly the Ministries of Defense and Interior, and the reinstatement of politically dismissed employees, which reflected positively on reducing unemployment rates. Unemployment rates fluctuated in subsequent years, reaching the lowest rate in 2013, at 10.9%, with 3,860,000 unemployed individuals. This decline was due to rising global oil prices, increased oil revenues, and higher oil production, which led to more significant public-sector employment. However, unemployment rates rose gradually, reaching 13% in 2015, with 4,801,000 unemployed individuals. This increase was due to the repercussions of the war on terrorism, which led to the suspension of many private-sector projects and the dismissal of numerous workers. Additionally, reduced investment inflows, especially in areas with military operations, and the halt of many public-sector projects due to a shift in public spending towards armament and anti-terrorism operations, along with the global decline in oil prices, negatively affected public budget revenues, thereby increasing unemployment rates. In 2016 and 2017, unemployment rates decreased to 11% and 11.9%, respectively, with 4,167,000 and 4,626,000 unemployed individuals. This improvement was due to relative stability in global oil prices and security after the liberation of cities under terrorist control, which led to noticeable economic activity recovery. Unemployment rates rose significantly from 2018 to 2020, reaching 14% in 2020, with 5,631,000 unemployed individuals. This increase was due to the COVID-19 pandemic, which caused a global recession that affected all countries, a sharp decline in oil exports, and comprehensive lockdown measures imposed by the government, suspending numerous public and private projects and activities. In 2021, unemployment rates decreased to 13% due to the partial lifting of restrictions, the resumption of some activities, the restoration of oil exports, and a relative decline in the global recession rate.

Table 5: Number of unemployed individuals and unemployment rates in Iraq during the study period

Year	Number of Unemployed (Thousand)	Unemployment Rate (%)
2004	7,328	27.0
2005	5,033	17.9
2006	5,186	18.0
2007	3,562	12.0
2008	4,587	17.9
2009	4,433	14.0
2010	3,898	12.0
2011	3,666	11.0
2012	4,105	12.0
2013	3,860	10.9
2014	4,328	12.0
2015	4,801	13.0
2016	4,167	11.0
2017	4,626	11.9
2018	5,495	13.9
2019	5,503	13.9
2020	5,631	14.0
2021	5,385	13.0

Analysis of Environmental Indicators

Environmental indicators hold significant importance as they help achieve sustainable development goals by monitoring the changes in the environment and natural resources, whether these changes are positive or negative. Sustainable development emphasizes the optimal utilization of agricultural lands and water resources, ensuring that the relationship between sustainable development and the environment is consistent and integrated. The diversity and development of sustainable development indicators have included environmental issues in the development process. Among the key environmental indicators are the average per capita share of cultivated land**,** the average per capita share

of water**,** and total fish production.

Average per capita share of cultivated land

Among the environmental indicators, the average per capita share of cultivated land is significant, as land serves as a primary source for fulfilling human needs directly, such as food, or indirectly, such as agricultural goods used in food industries. Table (6) shows that the average per capita share in 2005 was 0.48 dunams, with a positive growth rate of 0.6%. However, it declined during the period 2006-2009, recording 0.49, 0.48, 0.46, and 0.36 dunams, with negative growth rates of -7.5%, -2%, -4.1%, and -4.6%, respectively. This decline was due to military operations and neglect of the agricultural sector. In 2010 and 2011, the average per capita share increased, reaching 0.37 and 0.39 dunams, with positive growth rates of 2.7% and 5.4%, respectively. This improvement was driven by rising global oil prices, which positively impacted the state budget and financial allocations directed towards agricultural investments. During the period 2012-2019, the average per capita share of cultivated land fluctuated significantly, alternating between increases and decreases. This instability was primarily due to terrorist attacks in critical agricultural regions such as Salah al-Din, Diyala, and Mosul in 2014, which negatively impacted agricultural productivity and, consequently, the average per capita share. Additionally, the recession caused by the COVID-19 pandemic in 2020 further disrupted agricultural production, especially in the marketing aspect, due to restrictions on inter-governmental transportation. Despite these challenges, some efforts have been made to revitalize agricultural economics in Iraq, such as the agricultural initiative launched in 2008. This initiative aimed to modernize agricultural project infrastructure, support livestock production projects, and enhance agricultural education at all levels, focusing on scholarships and study missions. However, these efforts did not yield the desired results due to the wars on terrorism in 2014, borrowers defaulting on loans, and the misuse of funds intended for agriculture. In 2021, the average per capita share of cultivated land saw a relative increase, recording 0.16 dunams with a positive% growth rate of 60%. This recovery was attributed to the gradual return to normalcy and the resumption of activities halted by COVID-19 restrictions. The decline in the average per capita share of cultivated land is attributed mainly to the government's lack of attention to the agricultural sector, inefficient agricultural initiatives, failure to incorporate technological advancements in modern agricultural methods, and increasing rural-to-urban migration. Additionally, high salinity levels, desertification, and the conversion of agricultural land into residential areas have exacerbated the situation.

Table 6: Average per capita share of cultivated land in Iraq during the study period

Year	Total Cultivated Area (Thousand Dunams)	Population (Million)	Average per capita share of cultivated land (Dunams)	Growth rate of average per capita share (%)
2004	13,689	27.139	0.50	---
2005	13,643	27.963	0.48	0.6
2006	14,701	28.810	0.49	-7.5
2007	14,059	29.682	0.48	-2.0
2008	14,116	30.577	0.46	-4.1
2009	11,523	31.664	0.36	-4.6
2010	12,036	32.481	0.37	2.7
2011	13,023	33.320	0.39	5.4
2012	12,746	42.086	0.37	-5.12
2013	14,055	35.095	0.40	8.1
2014	15,559	36.063	0.43	7.5
2015	6,253	36.552	0.17	-60.0
2016	6,075	37.884	0.16	-5.8
2017	6,433	38.854	0.60	6.2
2018	4,436	39.253	0.11	-35.0
2019	12,047	39.925	0.30	0.0
2020	11,698	40.222	0.29	-9.0
2021	12,324	41.354	0.29	60.0

Analysis of Institutional Indicators

Among the most important institutional indicators is:

Number of Fixed Telephone Lines in Iraq

This indicator measures fixed telephone subscriptions, Voice over Internet Protocol (VoIP) subscriptions, Wireless Local Loop (WLL), and Integrated Services Digital Network (ISDN) voice channels. Table 7 shows that the number of fixed telephone lines at the beginning of the study period in 2004 was 1,198,200, the lowest value during the study period. This decline occurred due to the adoption of wireless systems in Iraq instead of landlines following the occupation. The number gradually increased until 2012, reaching 2,070,400, with a positive annual growth rate of 329%. However, in 2013, the number declined to 2,058,900, with a negative growth rate of -0.55%. This decrease was due to the conditions imposed on wireless telephone licenses to protect the investments of mobile phone companies in Iraq. The number of lines then resumed an upward trajectory, reaching 2,194,000 in 2015, with a positive growth rate of 0.32%, driven by the Iraqi Communications and Media Commission's licensing of wireless phones. The commission granted three national and several local licenses and priced wireless lines at 36 and 46, with a subscription fee of 10,000 IQD. Subsequently, the number decreased to 1,984,400 in 2016, with a negative growth rate of -8.94%, before increasing steadily in the following years. The highest value during the study period was recorded in 2021, with 2,187,300 lines and a positive growth rate of 2.87%.

Table 7: Number of fixed telephone lines per individual in Iraq

Year	Number of Fixed Lines	Growth Rate (%)
2004	1,198,200	---
2005	1,235,800	3.13
2006	1,278,200	3.43
2007	1,306,100	2.18
2008	1,525,200	16.77
2009	1,650,100	8.18
2010	1,720,500	4.26
2011	2,004,300	16.49
2012	2,070,400	3.29
2013	2,058,900	-0.55
2014	2,172,300	5.50
2015	2,179,400	0.32
2016	1,984,400	-8.94
2017	2,062,400	3.93
2018	2,021,400	-1.98
2019	2,095,200	5.41
2020	2,126,200	1.40
2021	2,187,300	2.87

Researchers and Workers in research and development per million people in Iraq

Scientific research is a cornerstone of human knowledge across most fields of life and measures the progress and development of nations and societies. It forms the foundation for modern technological discoveries and advancements. This indicator includes data on postgraduate students pursuing masters and doctoral degrees participating in research and development activities. From Table 8 and Figure (102), the number of researchers in the field of research and development at the beginning of the study period was 29,307 per million people in 2004. With the increasing demand to lift the ban on scientific research in research and development imposed by the international organization in 1990, the number of researchers in subsequent years gradually increased, reaching 49,146 individuals in 2008, the highest value during the study period, with a positive growth rate of 30.18%. This growth was attributed to increased allocations for the reconstruction of Iraqi universities, the development of research centers, the establishment of new centers, and the creation of the Ministry of Science and Technology and the Ministry of Environment. The values then fluctuated, showing increases and decreases in the number of researchers and workers in research and development. A significant and noticeable decline occurred in 2014, with researchers dropping to 6,957 individuals, marking a negative growth rate of -82.22%. This decrease was due to the loss of most of Iraq's scientists and experts, as a result of killings, displacement, deteriorating security, and political, social, and economic instability. Additionally, the narrow scope of scientific research and the inefficiency of scientific equipment negatively impacted researchers' skills. Subsequently, the number of researchers gradually increased, reaching 13,821 individuals at the end of the study period, with a positive growth rate of 4.55%. The development of modern technology is a significant driver of scientific research, as it is an effective tool for achieving optimal utilization of natural and human resources to achieve sustainable development, provided the research and development outputs are utilized appropriately. However, in Iraq, the situation indicates a lack of scientific and practical utilization of the competencies and scientific outputs from research and development. This mismanagement has negatively affected the achievement of sustainable development in Iraq. This is mainly due to the failure to deploy available human resources in positions that match their expertise and specializations. Iraq's achievement of Goal 9 of the Sustainable Development Goals has been weak, as the growth rate of researchers and workers in research and development has been negative in most years of the study.

Table 8: Researchers and workers in research and development per million people

Year	Number of researchers and workers	Annual growth rate (%)
2004	29,307	---
2005	31,874	8.75
2006	34,166	7.19
2007	37,752	10.49
2008	49,146	30.18
2009	41,583	-15.38
2010	43,202	3.89
2011	44,130	2.14
2012	40,306	-8.66
2013	39,139	2.89
2014	6,957	-82.22
2015	6,581	-5.40
2016	6,476	-1.59
2017	10,592	63.55
2018	11,114	4.92
2019	12,309	10.75
2020	13,219	7.40
2021	13,821	4.55

Chapter Four: Conclusions and Recommendations

Conclusions

Based on the research content, the following key conclusions were drawn:

1. The per capita GDP was consistently low and did not reflect the Iraqi individual's aspirations for a decent standard of living.
2. Investment expenditure was less important during the study than operational expenditure. This was due to Iraq's reliance on oil exports, the need for economic diversification, and the failure to utilize private investment in financial activities. Additionally, the increase in public-sector employment led to higher operational expenditure, with a significant presence of disguised unemployment in state institutions and an inability to raise investment expenditure.
3. Exports experienced a significant decline during the study period, with a negative growth rate. This was attributed to the subprime mortgage crisis, which negatively impacted the global economy, reducing oil demand and Iraqi exports.
4. Iraq could have more effectively achieved Goal 8 of sustainable development. Total government expenditure mainly exhibited negative growth rates, while the per capita GDP showed positive growth, driven by reliance on foreign loans to fund GDP and dependence on oil exports. Achieving Goal 8 in this context relies heavily on global oil prices. Similarly, Iraq's export structure did not meet this goal, as it remained dependent on oil exports, reflecting Iraq’s rentier economy and susceptibility to export fluctuations.
5. The continuous rise in unemployment rates was due to the lack of job opportunities, the absence of a

conducive investment climate, the collapse of most infrastructure, the dismissal of a large number of government employees, and capital flight due to deteriorating security conditions and the cessation of many local industries.

6. Due to the conditions imposed on wireless telephone licenses to protect investments in mobile phone companies in Iraq, growth in the fixed telephone sector was initially negative. However, the number of lines later increased steadily after the Iraqi Communications and Media Commission licensed wireless telephones, granting three national and local licenses.
7. More scientific and practical utilization of competencies and scientific outputs from research and development is needed. This negatively impacted the country's achievement of sustainable development in all its forms, mainly due to the failure to utilize available human resources in positions that match their scientific expertise and specializations.
8. The agricultural sector received insufficient attention, and many cultivated, incredibly fertile lands under terrorist control were neglected. Additionally, state-provided loans for agricultural investment could have been utilized more effectively and appropriately.
9. The direct impact of security and political stability on the number of workers in research and development was evident. Deteriorating security conditions negatively affected this indicator, hindering the utilization of scientific competencies and outputs and adversely affecting the achievement of sustainable development in Iraq.

Recommendations

Based on the applied aspect of the study and the conclusions reached, the following recommendations are proposed to address the issues and enhance sustainable development in Iraq:

1. **Diversify Sources of National Income:** Efforts should be made to stimulate productive sectors and private investments to correct the structural imbalance in production sectors. This would reduce reliance on oil revenues directly tied to global economic fluctuations and provide new resources while developing sustainable development sectors.
2. **Identify and Finance Developmental Sectors:** Through all its ministries, the Iraqi government should identify key developmental sectors that require funding to improve sustainable development and work on providing the necessary resources for their growth.
3. **Create an Attractive Investment Environment:** This can be achieved by combating financial corruption, providing banking and economic facilities, eliminating administrative bureaucracy, and ensuring the protection of investors.
4. **Direct International Aid to Those in Need:** Efforts should ensure that international assistance reaches the most vulnerable populations, providing them with necessities, mainly displaced families and those affected by military operations. Additionally, priority should be given to rebuilding and rehabilitating cities devastated by these operations.
5. **Reduce Dependence on International Loans:** To minimize reliance on international loans during economic crises and seek alternative solutions, steps should be taken. This would allow Iraq to avoid the restrictive conditions attached to these loans, which hinder the implementation of sustainable development programs.
6. **Develop and Support the Agricultural Sector**: Greater attention should be paid to the agricultural sector by providing loans and integrating advanced technology into agricultural practices. The revenues generated by this sector could help improve specific sustainable development indicators, such as unemployment. Generally, during the current phase, it is advisable to support productive sectors to enable them to generate internal funding for sustainable development in case of reduced external funding inflows.

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