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ARTICLE

An Economic Analysis of Iraq's Role in International Climate Change Agreements Using SWOT Analysis

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ABSTRACT

The research aims to analyze the most important contributions made by Iraq and its role in global conferences and agreements that dealt with climate change, using SWOT analysis for the purpose of determining Iraq's vision in confronting climate change until the year 2030. In addition to learning about the legal steps taken by Iraq to confront climate change through legal issuances and legislation that guarantee the protection of the Iraqi environment. Through SWOT analysis, the research found that the areas of strength were represented by 23 points, the most important of which were its contributions to signing international agreements to reduce climate impacts, strengthening environmental investment methods in waste management. The weaknesses were represented by 16 points, the most important of which were the decrease in vegetation areas, high temperatures, and low awareness of climate change. Iraq faces many opportunities represented by 8 opportunities to improve the response to climate change, the most important of which is the environmental location that characterizes Iraq, as well as the renewal of damaged agricultural lands. While there were 21 threats, the most serious of which were desertification, dust storms, and dust. The research recommends taking advantage of areas of strength and opportunities to reduce weaknesses and threats, for the purpose of determining the future steps of the strategic plans for Iraq.

Keywords: SWOT Analysis; Climate Change; Sustainability; Environmental Investment

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1. Introduction

The phenomenon of climate change and its consequent effects that threaten life and the surrounding environment are expected in the coming years if it is not dealt with seriously by limiting the activities that cause the acceleration of the negative impact of the climate, such as the factors that affect various environmental variables and their direct contribution to scarcity or abundance. The abundance of water, the change in temperature, and the extension of the phenomenon of desertification, affect agricultural production and food security. Developed and developing countries have faced climate change because of its clear effects on various sectors, the most important of which is the agricultural sector, as it is affected directly or indirectly. International efforts have begun to take more positive stances to address these dangers through effective contributions to international organizations and international conferences with the aim of concluding international agreements that limit the negative effects of climate deterioration and mitigate its harmful effects to the lowest possible degree. International efforts have joined hand in hand to address environmental problems for the purpose of protecting the environment and reducing climate impacts. These efforts resulted in finding scientific solutions that help protect the climate, reduce the volume of toxic gas emissions, and reduce average Earth temperatures. The efforts of the international community were directed towards formulating an international legal mechanism to confront the effects of climate change. These efforts resulted in the signing of the United Nations Framework Convention on Climate Change in 1992, followed by the Kyoto Protocol of 1997, then the Paris Climate Agreement in 2015, and then supporting all international efforts to maintain environmental security and confront climate change.

The year 1992 witnessed in the Brazilian capital the establishment of the United Nations Convention on Climate Change, which is now held periodically within the framework of the United Nations Convention (UNFCCC) to limit the effects of greenhouse gases that arise from human activity, and the Conferences of the Parties to the Convention (COPs) began their official meetings annually since 1995, but due to the spread of the coronavirus, COP 26 was postponed for one year. Nearly 26 conferences on climate change have been held up to the year 2021. The first Conference of the Parties to the United Nations Framework Convention on Climate Change was held from March 28 to April 7, 1995, in Berlin, Germany. While the Second Conference of the Parties was held from July 8 to 19 1996, in Geneva, Switzerland, the Third Conference of the Parties was held in December 1997 in Kyoto, Japan, and the Kyoto Convention was adopted after intense negotiations. The Fourth Conference of the Parties was held in November 1998 in Buenos Aires, Argentina. The Fifth Conference of the Parties was held from October 25 to November 5, 1999, in Bonn, Germany. The Sixth Conference of the Parties was held from 13 to 25 November 2000, in The Hague, Netherlands.

The research aims to analyze the role of Iraq and its contribution to the international agreements concluded to confront climate change through the use of SWOT analysis and then identify areas of strength, weakness, opportunities and threats in an attempt to establish a balance between the elements of internal strength and weakness and the opportunities and threats present in the external environment and work to distinguish all factors and variables. relevant within this classification, in addition to presenting the strategic decision in light of four dimensions of strategic directives, which depend on the results of internal and external environmental analysis.

Due to the importance of SWOT analysis, many scientific fields and specializations have addressed it, and this flexibility in its versatility reveals its ability to solve many of the problems facing departments and determine strategies for formulating project policy and how to manage them.

The study aimed to review the last decade of SWOT use in academic literature and to classify levels and types of applications for further analysis and guidance as well as to assist in subsequent theory building[1]. The integrative approach has helped review literature on SWOT in five main areas: public administration, academia, education, marketing, social media, healthcare, as well as agriculture. The procedure used in SWOT studies was also critically reviewed and discussed[2].

The study by Phadermrod, B. dealt with the concept of SWOT analysis as a form of brainstorming, in addition to the fact that SWOT factors are not arranged according to their importance, which may lead to inappropriate strategic action. By using IPA based SWOT analysis, it is expected that the organization will be able to formulate its strategic planning efficiently, The SWOT factors that should be maintained

or improved can be clearly identified based on customer opinions. The application of IPA-based SWOT analysis is illustrated and evaluated through a case study of higher education institutions in Thailand. The evaluation results showed that the analysis used accurately reflects the organizations' positions, which supports the validity of this study [3].

As for Ghazinoory's study, it dealt with following the fuzzy approach to internal and external factors to solve some problems, by setting priorities and extracting the most important strategies depending on the severity of the impact. Although the research attempted to deduce strategies based on the fuzzy approach, it was not determined which of the strategies did so. The research has provided solutions to this problem based on extracting ambiguous strategies that are clarified based on the direction of changes [4].

The use of SWOT analysis was not limited to a specific field, but rather extended to other fields. Farrokhnia, M, discussed the use of this analysis to identify the strengths and weaknesses of Chat GPT. Regarding the strengths, an advanced natural language model has been used for the purpose of generating reasonable answers as well as the ability for self-improvement, which gives Chat GPT the ability to access information as well as simplify personal learning and reduce the educational burden. As for the weaknesses, they were represented in the inability to understand deeply and the inability to evaluate the quality of responses, as well as the danger of bias and discrimination. The threats included a lack of understanding of the context, a threat to academic integrity, the perpetuation of discrimination in education, as well as the primacy of democracy over plagiarism, and finally a decline in higher cognitive skills [5].

By using SWOT analysis in strategic planning, Kangas, J indicated that through this analysis it is possible to develop and adopt a strategy that works to find an appropriate fit between both internal and external factors. However, SWOT analysis does not include any means by which we can determine the importance of internal and external factors or evaluate the compatibility between these factors and decision alternatives. AHP's connection to SWOT analysis sets analytical priorities for SWOT factors and makes them measurable. AHP helps in carrying out SWOT analysis more analytically and can prioritize decisions and alternative strategies [6]. As for Gretzky, he pointed out that for the purpose of controlling the analysis of SWOT, a gap analysis should be conducted to determine where the deficiencies exist in the organization's provision of care. These analyzes promote a better understanding of the barriers to change and innovation; transferring knowledge into practice; and improve results; and more efficient allocation of healthcare resources [7]. Awais, M., & Samin, T.'s research addressed the use of SWOT analysis in electronic commerce and what are the SWOT that this commerce faces. He concluded that information technology has enhanced electronic commerce in the world, as it has become easier to enter new markets, and the performance of the product and the company can be evaluated because it reduces expenses and enhances business management [8].

Dyson viewed SWOT analysis as just one input into the planning process, creating a set of factors that led to the emergence of a potential range of strategic initiatives. Factors with high scores were biased toward opportunities and strengths. Dyson viewed SWOT analysis as a motivating process in an ongoing process and not an independent process in itself. It can be concluded that SWOT analysis, although it has an old appearance, has stood the test of time as well as its ability to incorporate ideas from modern methods such as resource-based planning, efficiency and scenario development [9].

As for the effects of climate change that cast their shadows on health, the environment and humans, which have been addressed by research from various aspects, whether through quantitative or descriptive analysis, they are as follows:

Fahim and Tulba discussed the factors associated with climate change and its impact on the food index in Egypt and concluded that climate negatively affects economic growth rates and thus increases poverty rates. The researcher pointed out Egypt's participation in international agreements and that one of the most important strengths is Egypt's presence in the heart of the global solar belt, which allows Egypt the opportunity to benefit from renewable energy systems, in addition to being one of the most important opportunities available to Egypt to benefit from global climate financing. While the researcher pointed out that one of the most important threats facing Egypt is carbon pricing mechanisms, exceeding the Earth's temperature and the water crisis facing Egypt. The researcher recommended the necessity of benefiting from international agreements in technological support and trans-

ferring it to developing countries and providing soft loans to citizens to adapt to climate change [10].

Rafal indicated that since climate change has its effects reflected on the countries of the world, the majority of countries have moved to hold conferences and agreements that reduce climate pollution and help mitigate its current and future effects, including Iraq, which has begun to hold agreements and attend conferences that help it to accelerate the implementation of strategies that achieve the desired purpose [11].

Raheem discussed the importance of solar energy and that it represents a promising option for Iraq to meet its energy needs and enhance its environmental and economic sustainability. With global trends towards renewable energy, investing in solar energy is a necessary step towards a sustainable future. This investment can only be achieved by highlighting Iraq's role by contributing to global climate agreements [12].

In her research, Bneen suggested that in order for Iraq to face environmental and climate challenges, it should invest in modern technologies for irrigation, renewable energy, waste recycling, afforestation, and combating desertification. These technologies can only be available by attracting foreign technology, which will have the incentive to invest in Iraq by deepening Iraq's role in international agreements, which will provide it with the necessary funding [13].

The researcher Emeer concluded that although Iraq has taken some steps to mitigate the effects of climate change, represented by government initiatives and the Central Bank of Iraq, it is noticeable that there is no trend towards building a green financial system in order to transform and move towards an economy that takes into account climate change and mitigates its severity, and climate shocks have become a major challenge facing the global economy in the twenty-first century and represent an obstacle to efforts aimed at achieving sustainable development goals. Green finance markets (green bonds in particular) have witnessed significant growth despite their young age, as statistics indicate that the size of green bonds will reach about $296 billion by 2020. The research reached a number of recommendations, including: the need to work to benefit from the experiences of the sample countries in the field of using and trading green financial products in order to build a low-emission economy and reduce and adapt to climate change. Iraq must also benefit from the opportunity of rising global oil prices over the past two years in order to move forward to achieve economic diversification, reduce dependence on oil, and shift towards renewable energy sources that are free of emissions. The need to work to develop long-term strategies, in cooperation with international organizations and institutions, and benefit from their experiences in order to take appropriate measures to reduce and adapt to climate change [14].

Researcher Lateef pointed out that Iraq is one of the countries affected by climate change, which necessitated radical transformations in human and natural systems by developing climate strategies capable of mitigating climate challenges and reducing the environmental impacts on Iraq. The researcher recommended that a realistic climate reform program could be adopted that is consistent with Iraq's capabilities and ability to implement it by benefiting from other successful experiences, similar to the Egyptian program funded by the United Nations. This means that benefiting from international contributions played a major role in facing climate challenges [15].

Researcher Al Sageer shed light on the development of practical agricultural methods by relying on modern technological techniques and increasing their ability to adapt to climate change and meet the growing demand for food to meet the needs of population growth, which is known as climate-smart agriculture. The term smart agriculture has emerged as one of the results of the fourth technological revolution, as computational techniques, remote sensing devices, robots and other digital tools and technological techniques have been adapted to increase agricultural productivity and combat climate change by using them in managing the agricultural process in all its stages and forms. He pointed out that adopting such technologies requires local and international funding primarily, and here lies the importance of benefiting from global funding represented by international organizations [16].

It is worth noting that the current research is a first attempt to use SWOT analysis to address and analyze Iraq's role in international agreements to combat climate change. We believe that this analysis has helped us greatly in diagnosing strengths and weaknesses and identifying opportunities and challenges facing Iraq in this regard, and then drawing up future plans that would place Iraq on the list of countries that prioritize climate change, thus enabling Iraq to attract

investment opportunities that would advance its economy and make it respected and appreciated among countries, as it would be one of the tools contributing to reducing climate change. This will not be clear except by studying Iraq's role in concluding international agreements on climate. On the other hand, the research found only one study in previous studies that dealt with the use of SWOT analysis and its analysis of the role of international agreements and considered it a strength for the State of Egypt, as it pointed out the most important threats [10]. The remaining researches mostly aimed to study the effects of climate change on the environment, health and humans, and pointed to the importance of international agreements in financing countries, especially developing ones, in transferring modern technologies to overcome climate challenges, while the focus of our research was to study all strengths, weaknesses, opportunities and challenges and analyze them in detail, and this is what distinguishes our research from other researches.

2. Materials and Methods

2.1. The Concept of Environmental Analysis (SWOT)

Environmental analysis is one of the strategic tools that decision makers often use to evaluate projects' resources and potential capabilities with strengths and weaknesses, as well as evaluating and shaping the external environment (opportunities and threats) surrounding those projects. SWOT analysis is a short summary of the words (Strengths, Weaknesses, Opportunities, Threats) [10]. SWOT analysis is a framework for assessing a company's resources and capabilities (strengths and weaknesses) and external market position (opportunities and threats). A number of studies have shown that SWOT analysis is one of the most widely used strategy tools among managers and that SWOT analysis is "used more often than other management techniques in the decision-making process." Furthermore, SWOT analysis is included in The Economist's Guide to Management Ideas and Experts, where it is noted that SWOT analysis is a useful tool to help corporate planners think about strategy [17].

Or it is an important stage of strategic management and aims to provide the necessary information to decision makers about current and potential changes in the external and internal environment in an attempt to identify the opportunities available to enhance, develop and benefit from them, Noting that in order for the project to be able to achieve its goals, it is not only limited to identifying opportunities or threats in the project environment, but it must be sufficiently aware of those opportunities and threats to develop the necessary strategies to invest in the opportunities and reduce or adapt to the threats in a way that ensures achieving the project goals and exploiting the available capabilities [18].

2.2. The Importance of Environmental Analysis

Analyzing the organization's external and internal environment is considered one of the components of strategic management because of its extremely important impact on formulating and designing a strategy for the overall organization. We will discuss the following points in this [19]:

(1) Providing information: These are the most important goals that strategic management seeks to provide by analyzing and scrutinizing it. In light of this information, management can control several activities and direct them according to this information.
(2) Formulating goals: The goals that must be achieved are subject to a study of the external environment that helps to set or modify them according to the results of those studies.
(3) Formulating a resource strategy: Understanding the various environmental variables helps in clarifying the available resources (raw materials, capital, technology, individuals, etc.) and how to benefit from them.

2.3. The Importance of Analyzing the Internal Environment

Studying the internal environment is inevitable because it helps in identifying some of the following points [19]:

(1) It contributes to the assessment of the material and human capabilities and capabilities, so that the institution gets to know itself and thus can be managed scientifically and control the factors of production.
(2) It enables the organization to discover its weak points and thus correct and evaluate them easily.
(3) Take advantage of their strengths and move forward from strong to stronger to eliminate obstacles.
(4) Knowing the strengths and weaknesses (internal anal-

ysis) and linking them to the external analysis enables the organization to seize the largest number of opportunities.

(5) Knowing the efficiency of its organizational structure.
(6) Knowing the strength of relationships between individuals, the cohesion of work groups, and the concern for their organization.
(7) Knowing the organization's reputation and brand name in the market and how the consumer views it.

2.4. SWOT Matrix Analysis

Using SWOT analysis by comparing the internal factors represented by strengths and weaknesses with the internal factors represented by opportunities and threats would lead to arriving at one of the four resulting strategies due to the alignment between the project's internal and external situations. Therefore, determining the strategic position requires integrating the evaluation of the elements of the external environment (opportunities and threats) with internal performance activities (strength and weakness), and in light of the results of the interactions to analyze these elements, multiple strategies emerge, which requires departments to choose or build a strategy that matches the organization's position regarding its goals and competitors [20].

Table 1 of the four-variable matrix (SWOT) shows the aspects of strength, weakness, opportunities, and threats, which helps determine the strategic position in light of integrating the elements of the external environment (opportunities and threats) with the elements of the internal environment (strength and weakness).

The table above indicates that the SWOT analysis aims to diagnose which strategies should be followed in order to reconcile internal and external conditions.

The first cell: Strengths/Opportunities: It means using the organization's strengths and opportunities in terms of foundation and essence. The organization must also seek to maximize its strengths, and by taking advantage of the available opportunities, which makes the organization follow a growth-oriented strategy or offensive strategies to obtain the best position in the market.

The second cell: Weaknesses/Opportunities: This cell shows the organization's weaknesses in tandem with opportunities, that is, the organization's attempt to overcome its weaknesses by exploiting the maximum available opportunities. The organization follows any transformation and change in its positions to address the weaknesses through rotation according to an analysis of the data of its future environment. .

The third cell: Strengths/Threats: This cell shows the organization's strengths, taking threats into account, that is, threats from competitors, for example. Basically, the organization must use its strengths to confront and reduce threats, and search for new opportunities through diversification or... Go to other fields.

The fourth cell: Weaknesses/Threats: This cell shows the worst situations, as it shows the organization's weaknesses compared to the current external threats. Here the strategy must be defensive, and then the organization must address its weaknesses so that they do not turn into threats.

From the above, there must be a connection between the internal analysis (strengths and weaknesses) and the external analysis (areas of opportunities and risks). There is no benefit in identifying environmental opportunities and risks without identifying the points that represent the organization's strength or weakness. If the goal of the analysis is the internal approach to identify the strengths or weaknesses, as this represents the means that leads to seizing marketing opportunities and avoiding or reducing risks.

SWOT analysis mainly aims to make strategic decisions, which depend on the results of the internal and external environmental analysis shown in **Table 2** [21]:

2.5. Reasons for Using SWOT Analysis in Research

As indicated in the theoretical framework, SWOT analysis is an analytical method for evaluating strategies and agreements, and is known as the analysis of the current situation. It identifies the strengths, weaknesses, opportunities and threats facing the organization. It is one of the best tools for drawing up long- or short-term plans. This is done by analyzing the set of variables that affect the internal environment, which include strengths, weaknesses, and opportunities. The variables that affect the external environment include points of opportunity and points of threat. Therefore, using this analysis enables us to study all variables and not just some of them. It studies external and internal variables and the degree of influence of each one of them, while the econometric analysis may be limited to a group of factors without

Table 1. Matrix of the four variables.

Internal Analysis / External Analysis	Strengths	Weaknesses
Opportunities	S/O offensive strategy Exploiting strengths to invest in available opportunities	W/O treatment strategy Addressing weaknesses and investing in available opportunities.
Threats	S/T diversification strategy Use internal strengths to avoid external threats	Defensive strategy W/T Reducing internal weaknesses to avoid threats.

Table 2. SOWT matrix strategies.

Strategies	
Using strengths to maximize available opportunities	(Growth and Expansion) S-O (Strategies of Strength and Opportunities)
Using strengths to reduce existing and expected dangers and threats	T-S (Power and Threat Strategies)
Reduce weaknesses by seizing available opportunities	(Develop and improve) W-O (Weakness and Opportunity strategies)
Reduce weakness and avoid threats	(Contraction) W-T (Weakness and Threat Strategies)

others and does not give a clear picture of the causes of any phenomenon. This is shown by the random variable that expresses the variables that are not included in any econometric model. In addition, the quadratic analysis (SWOT) clarifies the strategy that can be followed, and this is what was clarified in the research, as the research relied on two strategies through studying the axes of the quadratic analysis and the superiority of strengths over weaknesses, while the quantitative analysis, whether mathematical or standard, will be limited by its results, which carry econometric errors that increase or decrease depending on the accuracy of the model estimation.

2.6. Iraq's Role in the International Climate

Iraq is one of the most vulnerable regions to the effects of climate change, as most economic sectors are affected by these changes, most notably the agriculture and water sectors, the tourism sector, the health sector, and the utilities and services sector. This leads to the loss of many natural resources, and then increases poverty rates. Therefore, the state seeks to move forward towards adapting to climate change in accordance with international agreements, to reduce the effects on the national economy, in addition to committing to achieving the goals of sustainable development, the implementation of which is hindered by climate change. The strengths of Iraq lie in its location in the heart of the global solar belt, with an average irradiation of 5.6 kWh m^{-2} per day and over 3,000 hours of sunshine per year. However, a major shift towards renewable energy in Iraq is unlikely in the near future; however, this does not mean that progress cannot be made. The country must take concrete steps by investing in relevant infrastructure, strengthening its policy framework for financing solar projects, and overcoming technical and political barriers. The launch of green bonds, which are issued to finance sustainable projects related to the environment and climate, is a strong step to support adaptation and the transition to clean energy.

National projects, whether in the agricultural or infrastructure sectors, are one of the tools to confront the effects of climate change. While the increase in the rate of greenhouse gases without setting production limits for countries, Iraq's inability to adapt due to weak economic resources, the high value of investment in infrastructure, the weak contribution of international financing, which contributes a significant percentage of the value of adaptation, in addition to the low productivity rates worldwide of strategic crops and the high rates of malnutrition, the high rate of population growth; are the most important weaknesses facing Iraq. The increase in the value of global climate financing, the increase in invest-

ments in adaptation systems and renewable energy, and the increase in employment opportunities in adaptation systems and the green economy; are the most important opportunities available to Iraq. The most important threats facing Iraq are carbon pricing mechanisms (emissions trading and carbon taxes), exceeding the degree of land elevation above the limits stipulated in international agreements, the water crisis facing Iraq, and addressing the issue of agriculture within the framework of adaptation rather than mitigation.

3. Results

This part includes an economic analysis of Iraq's role in international agreements to confront climate change using SWOT analysis, and then determines the strategy that Iraq will follow in order to achieve its goals and how to confront climate change.

3.1. Strengths

(1) Iraq's contributions to conferences: Iraq ratified the Framework Convention on Climate Change and the (Kyoto) Protocol attached to it on 7/28/2009, and it entered into force on 10/26/2009. Also, Iraq participated in the 2015 Paris Climate Change Conference. In addition, the Iraqi government issued many laws after 2003 that aimed to protect the environment, some of which were achievable and others that the security conditions in the country prevented from fully implementing [11].

(2) To achieve its goals of reducing greenhouse gas emissions, Iraq relies on a group of sectors that also contribute to diversifying the sources of its national economy, including the oil, gas, electricity, industry, and trade sectors, as well as the agriculture, transportation, and housing sectors [22].

(3) Iraq worked from an early stage within the framework of the agreement, and its signing of the Paris Agreement, to implement strategic projects and studies aimed at introducing clean and renewable energies, enhancing energy efficiency, sound environmental management of carbon, and increasing green spaces. The implementation of projects related to the use of liquefied petroleum gas (LPG) fuel as vehicle fuel alongside traditional fuels has also begun, and other pioneering projects in these fields for several national sectors. Among these projects is converting the lighting of many main streets in Baghdad to solar energy, in addition to developing future plans to convert some electrical power generation plants into combined cycle plants with the aim of reducing fuel consumption offset by increased production, as well as taking a number of measures and policies to reduce greenhouse gas emissions [22].

(4) Since 2015, Iraq has made a commitment towards achieving a 30% reduction in global methane emissions by 2030, and this is a voluntary commitment from Iraq as a participating country in the global methane reduction pledge. Iraq also plans to increase its contributions to combating climate change by adopting a set of decisions, including the Solid Waste Management Law, which will encourage recycling and energy production, as well as developing integrated waste management systems [23].

(5) Through the housing sector, Iraq seeks to implement the concepts of rationalizing electrical energy consumption and shifting towards low-emission methods based on localizing principles to stimulate the use of renewable energy in the country, employing energy-efficient lighting technologies, launching green building standards and modern technologies for thermal insulation, lighting, and sustainable cities. Employing innovative building design to make the most of lighting and solar energy, applying solar photovoltaic energy technologies to generate distributed electricity in villages and small cities, and a comprehensive design that includes the use of smart meter technology inside buildings [22].

(6) Addressing the main issues that contribute to confronting the effects of climate change caused by burning gas and increasing emissions [24].

(7) The Iraqi government has taken positive steps in its response to the effects of climate change, and these steps are represented by adopting new adaptation and mitigation strategies. All of this was done after the ratification of the Paris Agreement in 2021, and fulfilling the conditions stipulated in this agreement will enable Iraq to obtain climate financing through the Green Climate Fund [25].

(8) In partnership with the United Nations Environment Program (UNEP), Iraq undertook the process of developing a national adaptation plan in 2020, one of the most important goals of which was to reduce exposure to the negative effects caused by climate change [26].

(9) Iraq has promising prospects for optimal investment in renewable energy sources and their partial, gradual replacement instead of using fossil energy sources such as oil and gas by introducing various forms of renewable energy, thus supporting sustainable development and achieving its goals set by the United Nations, of which the State of Iraq is one of its signatories [22].

(10) Iraq has suitable reservoirs for economic investment in wind energy [22].

(11) The Iraqi government, in cooperation with the United Nations Program, was able to develop a document that supports environmental, social, and economic sustainability, as well as identifying target sectors to mitigate the negative effects of climate change in order to submit it to the United Nations Climate Conference [27].

(12) Iraq has a distinct geographical location that allows it to benefit from solar radiation. The average number of sun hours per year is between 3,000 and 4,000 hours, which provides an excellent opportunity to generate solar energy. The agricultural regions, deserts, and mountains of Iraq include ideal areas for developing solar energy projects [12].

(13) The Iraqi environmental reality, like the whole world, has been affected by the Corona pandemic, and because of Iraq's pledge to adhere to the United Nations Climate Convention and the Paris Agreement, the Iraqi Ministry of Environment has updated the current strategy, starting from 2023 until 2028. Updating the environmental strategy means confirming Iraq's commitment to environmental work that is consistent with national and international priorities and nationally determined contributions, and would accelerate Iraq's transformation into a more resilient country toward climate change in the coming years, in its various sectors [28].

(14) UNDP continues to support Iraq's participation in global conferences (COP 29, held in Baku, through its long-standing strategic partnership with the Iraqi government). In this context, a discussion session was organized under the title "Climate Investment Pathways in Iraq. The first transitional phase (2025−2030) during which the results of a study supported by the United States Agency for International Development were presented, which addressed the impact of climate change on the Iraqi economy, and the possibilities of diversifying economic development in a way that enhances the country's climate resilience and consolidates strategic partnerships [29].

(15) The impact of climate change in Iraq, a country that has suffered decades of international conflicts and conflicts, which has created barriers to the country's development, hindering efforts to reduce poverty and unemployment, promoting decent livelihoods, and reducing conflicts over Iraq's natural resources, has led to damage to many of Iraq's natural resources. The productive sectors in the country, such as the agricultural sector, which is considered one of the most important sources of income for farmers in Iraq [30].

(16) To enhance Iraq's ability to mitigate the negative effects of climate change and adapt to their effects, a project has been designed to stimulate climate action for a period of two years. This is done through managing natural resources, developing work in renewable resources, and increasing the ability to confront climate-related risks [31].

(17) Although the United Nations welcomed the commitments made by Iraq at the Glasgow Conference, it stressed the need to take urgent action regarding these commitments to mitigate the negative effects of climate change, the effects of which can be expected on human rights and sustainable development in Iraq [32].

(18) One of the basic tools that Iraq has to confront climate change is the unlimited potential of the sun as an energy source. In a sun-rich country like Iraq, solar energy solutions are an essential part of the transition towards renewable energy and achieving commitments to the Paris Agreement by 2030 [33].

(19) In 2017, Iraq joined the World Bank initiative aimed at stopping gas flaring by 2030. However, the Iraqi government recently raised its ambitions to aim to completely stop flaring by 2027. This move comes within the framework of a broader plan to exploit associated gas to generate electrical power, which reduces

dependence on imported gas [34].

(20) Following COP26 and strengthening its commitment to reducing greenhouse gas emissions, Iraq is taking steps to transition towards a greener economy, including by boosting investment in natural gas and allocating 12 gigawatts of renewable energy. The Government of Iraq, with support from the United Nations Development Programme, has completed the Nationally Determined Contributions (NDC) report, which addresses climate change mitigation and adaptation [35].

(21) For the purpose of following up on the development of national policies and procedures related to confronting climate change, a permanent national committee has been formed, whose most important duties are implementing and following up on these procedures [36].

(22) Iraq is trying to confront environmental challenges through laws such as the Environmental Protection and Improvement Law No. 27 of 2009, which aims to regulate activities that affect the environment, as well as setting standards that ensure optimal and sustainable use of natural resources [13].

(23) Nationally Determined Contribution Report: The Government of Iraq, with support from the United Nations Development Programme, has finalized the Nationally Determined Contribution (NDC) report, which aims to confront and adapt to climate impacts, and its commitment to implementing its nationally determined contributions during the period 2021−2030, which will reduce carbon dioxide emissions by 1−2% and open a window for investments worth $100 billion in the green economy. Iraq focused on nationally determined contributions to promote sustainable development and ensure environmental integrity and transparency [14].

3.2. Weakness

(1) Decrease in vegetation areas: Vegetation cover areas have declined clearly in recent years due to climate change, which has led to a reduction in the areas of land planted with trees as a result of the significant rise in temperatures. Studies have proven a direct relationship between soil quality and climate. Some of these studies indicate that climate change can affect the quality of soil and its ability to provide vegetation, as soil is one of the areas most affected by pollution and temperature changes [15].

(2) Global warming: Climate changes have caused a significant rise in temperatures, which sometimes reach their maximum levels, and heavy rainfall, as well as a rise in sea surface water, in addition to a decline in diversity in biological characteristics. As a result, the means of livelihood will be affected, which will cause a major disruption to food security, including food and drinking water, and all of this leads to a threat to human security [15].

(3) Temperatures: Temperatures have been rising very noticeably since the end of the last century, and at the beginning of the current century, the impact of rising temperatures has become significant and very tangible on citizens. The report issued by the United Nations International Committee on Climate Change indicated that temperatures began to rise clearly between 0.4 and 0.8 degrees annually, while temperatures in Iraq recorded high rates approaching 50 degrees in the summer in recent years [37].

(4) Dependence on oil The Iraqi economy depends heavily on oil, which leads to reducing investments in other areas, such as agriculture and renewable energy [38].

(5) In 2019, Iraq ranked fifth in its degree of exposure to climate change, according to United Nations data which indicates that temperatures will rise more quickly, weather patterns will become more volatile, and human migration will increase at greater rates compared to other countries around the world [39].

(6) As environmental deterioration continues due to human activities related to agriculture, oil production, environmental pollution, and war, the negative effects of these activities are expected to continue. In addition to all this, poor government management and poor education about modern agricultural practices that protect inputs such as soil and water will deepen the negative impacts of climate change [39].

(7) Most countries in the world suffer from the problem of low interest in the environment with regard to the correct handling of solid waste, the method of managing it, how to dispose of it, and the possibility of benefiting from it [40].

(8) Iraq is one of the countries in the world most affected by climate change, as temperatures continue to rise and rainfall rates are constantly declining. Without rapid action, Iraq will see a dramatic decline in its water resources as well as more heat waves, droughts, sandstorms and desertification. The risk to food security is likely to increase, affecting health and livelihoods [41].

(9) A lack of sustainable environmental and economic policies that take into account the challenges of climate change. Despite some initiatives such as joining the Paris Climate Agreement, Iraq suffers from political instability and weak national strategies to address climate change [42].

(10) After 2003, Iraq witnessed climate changes that directly affected poverty in Iraq. These climate changes require public policies to solve the problem of climate change, as climate environmental deterioration can negatively affect production and work, especially its impact on the poorest and most vulnerable segment of the population [43].

(11) Severe environmental deterioration has become an imminent danger to Iraq, in addition to the weak implementation or formulation of legislative decisions regulating environmental management [44].

(12) The decline in water reserves in Iraq, whether from the Tigris and Euphrates rivers or their tributaries, to low levels for many reasons, including the water policies of neighboring countries, as well as the scarcity of rain and the high level of water poverty as a result of evaporation, which amounts to about 8 billion cubic meters. The volume of water reserves in 2019 reached about 58.4 billion cubic meters, after it was about 157 billion cubic meters in previous years [36].

(13) The threats of global warming and the dangers of rising temperatures will not be far from Iraq by 2050, which will carry with it serious repercussions, including reduced rainfall, drought, and famine, which will lead to a threat to food security, social stability, and health, as well as other repercussions [45].

(14) Relying on the factors that led to the growing phenomenon of global warming and environmental pollution, such as not relying on the resources of introducing alternative or renewable energy to replace non-renewable energy, has had a negative impact on health, food and human security [45].

(15) Iraq was classified among the five most vulnerable countries in the world to climate change, according to the sixth report on the outlook for the state of the global environment for the West Asia region for the year 2021. The negative effects of climate change cast a shadow over the sectors of the Iraqi economy, and then have a negative impact on the standard of living in Iraq [14].

(16) Iraq has suffered from many challenges resulting from desertification, low water levels, and radiation resulting from the wars it has fought during the past and current centuries, in addition to the absence of institutional awareness, which has led to high rates of pollution, the spread of diseases, and other effects that have accompanied them. This has required a shift towards environmentally friendly energy, provided that the technology on which the replacement is based is available, which can contribute to achieving sustainable development and achieving the societal and future well-being of Iraq [14].

3.3. Opportunities

(1) Iraq's success in presenting its plans to confront climate change during the United Nations Climate Change Summit "COP 28" held in December 2023, means that it can work to obtain international support to help Iraq make a fair transition towards clean energy in a way that does not conflict with its dependence on fossil fuels in order to achieve the national plans prepared in advance [15].

(2) Iraq has a unique geographical location that allows it to benefit from solar radiation. The average number of sun hours per year is between 3,000 and 4,000 hours, which provides an excellent opportunity to generate solar energy. The agricultural, desert and mountainous areas of Iraq include ideal areas for developing solar energy projects [46].

(3) One of the most important current agricultural systems is the smart agriculture system, which relies on advanced technologies to produce food using clean methods that aim to use resources sustainably, especially water. These systems are characterized by

their reliance on administrative systems and analysis of information and data to reach sound decision-making [16].

(4) Community awareness and environmental education: Non-governmental organizations and civil society associations play a major role in raising community awareness of the importance of environmental protection through awareness campaigns and educational programs targeting various segments of society [13].

(5) Utilizing Iraq's membership in the Paris Climate Agreement Capacity Building Committee, which works to build the capacities of developing countries to confront climate change, in order to provide support for Iraq's plans to provide the requirements for adaptation to climate change [15].

(6) Use of renewable energy: Iraq can benefit from renewable energy sources such as solar and wind energy and develop solar energy projects that are characterized by the availability of sunlight throughout the year [13].

(7) Iraq can adopt reforestation projects using similar techniques to restore degraded lands in areas such as Anbar and Salah al-Din, and Iraq can also benefit from solar energy technologies to operate water pumps in rural areas [13].

(8) Iraq's commitment to implementing its pledges towards confronting climate change (especially after the ratification of the Paris Agreement) has had the greatest impact in making progress with clear steps by adopting adaptation strategies, due to the possibility of obtaining climate financing conditional on Iraq's implementation of international agreements, including the Paris Agreement [47].

3.4. Threats

(1) Desertification: The phenomenon of desertification is one of the most serious environmental challenges that threaten drylands and is directly related to human life, as the problem of desertification and water scarcity is one of the most prominent challenges facing Iraq [13].

(2) Dust and dust storms: Dust and sand storms have increased for several reasons, including climate change in Iraq, because Iraq is one of the countries most vulnerable to climate change and desertification due to increasing drought, with temperatures exceeding fifty degrees Celsius in summer [47].

(3) Energy production sectors in Iraq contribute significantly to air, water, and soil pollution due to increased air emissions, untreated industrial wastewater, and land pollution due to liquid waste spills [47].

(4) In Iraq, the environment and its natural resources face many pressures due to the irrational use of these resources as a result of the unnatural conditions that Iraq went through, as well as the implementation of development plans in all sectors without caring for the environment [47].

(5) High temperatures: Agricultural lands are subject to deterioration, their fertility decreases and they become unsuitable for agriculture, in addition to an increase in forest fires due to high temperatures, which leads to the rapid spread of desertification [14].

(6) Drought: Iraq witnessed dangerous droughts that threatened to lose up to 40% of the water flowing to it as a result of changing rainfall patterns and decreased river flows, which directly affects agriculture and animal husbandry.

(7) Public Health: Increasing climate change is accompanied by an increase in deaths, diseases, and the spread of epidemics, such as cholera [48].

(8) Weak infrastructure: Iraq is facing deterioration in its infrastructure, such as irrigation canals, water treatment plants, and electrical networks, which complicates the management of natural resources in light of climate change [49].

(9) Iraq faces a major shortage in the infrastructure supporting the industrial sector due to the absence of cities and industrial areas in which the infrastructure required to establish different types of industries is located, in addition to the weakness of the infrastructure supporting industry and investment, which has led to the deterioration of this sector. The decline of the comprehensive knowledge infrastructure for communications and information technology networks, as well as the weakness of the infrastructure for standards, standards and quality, along with the lack of efforts to support the private sector to be a primary partner in economic development through effective and advanced programs, has clearly and significantly affected the state of the industrial sector and its ability

to keep pace with global developments [50].

(10) Southern Iraq faces major threats related to climate and environmental degradation, as the country is exposed to severe shifts in weather patterns. For example, Iraq has lost at least approximately 50% of its annual water revenues from the Euphrates River and 40% from the Tigris River during the last forty years [50].

(11) In 2022, the Iraqi government, represented by the Ministry of Water Resources, warned of a decrease in water reserves due to extreme heat waves and low rainfall rates, as well as the continued occurrence of severe dust storms and increased salinity rates, and all of the previous factors led to the loss of 14,400 hectares and 30,000 trees [50].

(12) Iraq ranks tenth among the 10 most polluted countries in the world. Iraq's poor air quality is caused by vehicle emissions and pollution caused by war, the use of generators for power due to poor electrical infrastructure, and fires caused by oil and gas refineries. While Iraq has ratified the Paris Climate Agreement and has laws restricting pollution [51].

(13) The lack of a clearly defined governmental water policy in Iraq to manage the water file and address the crisis resulting from the current water scarcity and what it will lead to in the future [52].

(14) Weak use of modern irrigation technologies and systems in the pastoralist sector, such as sprinkler and drip irrigation, in addition to the absence of the necessary plans to implement water harvesting projects and achieve sustainable development [52].

(15) Water scarcity: Iraq is facing a severe water crisis in terms of quantity and quality, given the decrease in the amount of water from the Tigris and Euphrates rivers flowing across its borders. Iraq's water situation will worsen due to several factors, including the continuous increase in population and climate change, which has made Iraq the fifth country in the world to be negatively affected, according to the United Nations report on the countries most affected by climate change [53].

(16) Iraq is one of the arid and semi-arid geographical areas, which leads to the fragility of the environments and ecosystems, and the elements of biodiversity they contain, which are more vulnerable to the effects of climate change. This is evident through climate phenomena that have not been experienced before, such as low rainfall rates, low water levels in lakes and rivers, and high temperatures at unprecedented rates. The increase in dust storms in their intensity, frequency, and time periods of their occurrence, and the increasing phenomenon of desertification, which has put pressure on ecosystems and the balances they create, has contributed to reducing the spread of many endemic plant species and decreasing their numbers As well as wild animals or their extinction. Despite these pressures, large areas of Iraq remain of global and local importance [47].

(17) The problem of drought and desertification is among the most important challenges that negatively affect the abundance of plant cover, and it can be said that the deterioration of plant cover in arid and semi-arid areas represents the most dangerous factors of desertification. In Iraq, most of the desert, semi-desert or desert areas are classified as pastures of dry and semi-arid areas [47].

(18) The weakness of environmental policies in Iraq had negative repercussions during the previous three years, during which Iraq witnessed serious droughts that threatened to lose up to 40% of the amounts of water flowing to it. These weak policies affected Iraq's water diplomacy, as it was unable to reach real agreements with upstream countries to cooperate in managing water resources. The severe water shortage also caused a decline in livestock in Iraq, as the agriculture and livestock sector depends greatly on the availability of sufficient water to meet its needs [54].

(19) Food shortage: Iraq is exposed to a number of problems, the most important of which is the problem of food shortage, which occurs as a result of the imbalance between the available natural resources on the one hand and the population on the other hand [55].

(20) Climate migration, as a number of regions of Iraq witnessed major climate changes that made them unfit for living, especially in the southern governorates that depend on agriculture and water, such as the marshes in Dhi Qar and Maysan governorates, which prompted the residents of these regions to migrate to areas that

are more suitable for them to provide the necessities of living [37].

(21) Agricultural production is affected by many reasons, the first of which is weak infrastructure and the lack of productive diversity affected by climate change, in addition to other reasons, including monetary instability, administrative corruption, and wars [56].

4. Policy Implications

There are a set of implications surfacing that act as political determinants for economic agents and, more specifically, for investors in economic projects that could be a positive addition to the GDP, which is highly dependent on the oil sector and negatively affected by global conditions and instability in economic markets.

Based on the results of the SWOT analysis, which identified the strengths, weaknesses, opportunities, and threats that Iraq faces in order to build society and the economy.

The results we obtained from the study of strengths contribute positively to Iraq's position towards economic companies, whether local or foreign. In other words, increasing confidence in Iraq's measures to confront climate change by the international community and improving Iraq's position globally. Measures such as Iraq's contribution to concluding agreements or applying the concepts of rationalizing energy use and shifting towards low-energy methods and launching green building standards strengthen Iraq's policy towards the outside world. Iraq's distinguished geographical location provides a positive opportunity to develop solar energy projects, clean energy projects, and to bring in advanced technologies to serve the economic situation and sustainable development.

Iraq's partnerships with international organizations play a role in confirming Iraq's commitment to environmental work that is consistent with national and international priorities, which has supported the positive impacts of these international partnerships. Thanks to the low cost of renewable energy technology, private companies have been encouraged to invest in Iraq, although the initial investment cost in Iraq is about 5 to 7 times higher than in other countries in the Middle East and North Africa.

ACWA POWER has expressed interest in building a large photovoltaic power plant in southern Iraq near the Saudi border. Siemens has signed a contract to implement projects under a $14 billion roadmap that includes the development of a wind atlas in Iraq. In addition, flat-panel solar collectors for water heating are planned for foreign companies, while some smaller companies have recently started manufacturing solar cells. Solar PV is also being used to light many city streets. From the above, we can see that policy applications benefit from the positive aspects of building the Iraqi economy and reducing dependence on the oil sector.

Discovering the positive characteristics of strengths in the economic policies set by the state will have the same effect in investing in opportunities, especially those positive ones that have similar effects to strengths. Changes in government policies or market dynamics can lead to doubts that investors should take into careful consideration. Projects that use innovative technologies (green projects) often include, if the performance of these technologies is weak or face more cost-effective alternatives, this will affect the returns of the projects, and thus this will represent obstacles to investors, which requires government policymakers to enact appropriate laws to stimulate the recruitment of investors to the country.

Building a long-term vision for energy and climate change requires understanding the nature of the structural challenges and their interconnectedness. Policymakers and citizens must be aware of the benefits that renewable resources can provide, and understand how global cost reductions make this technology an interesting alternative to diesel-powered generators. Discovering the negative characteristics of the axis of vulnerabilities and threats will make the picture clear when formulating government policies to confront climate change, especially when allocating funds in the government budget to reduce the effects of climate change. Directing the ministries concerned with this matter to direct their budgets and research towards combating the negative effects of climate change and trying to reduce them by investing in quality projects, in addition to using modern technologies by bringing in foreign investors. From the above, the effects of the policy can be summarized as follows:

(1) Governments have a wide range of national policies and instruments to set the necessary incentives for mitigation. Their application is based on national circumstances and an understanding of their interaction

with each other.

(2) Use four basic criteria to evaluate policies and instruments: environmental efficiency, cost-effectiveness, distributional impacts, including equity, and institutional feasibility.

(3) Climate policies embedded within broader development policies facilitate implementation and the process of overcoming obstacles.

(4) Legislation and standards often confirm emission levels. They may be more effective than other tools if information and other barriers prevent producers and consumers from responding to price signals. But they do not necessarily generate innovation and the emergence of more advanced technologies.

(5) Some companies, regional and local authorities, government organizations, and civil society groups are adopting a wide range of voluntary actions that can reduce greenhouse gas emissions, stimulate innovative policies, and encourage the deployment of new technologies. They have often limited the extent of the impact on emissions at the national and regional levels.

(6) Policies that set an implicit or actual carbon price can create incentives for producers and consumers to invest in technologies, processes and products that reduce greenhouse gas emissions. This type of policy may include economic instruments, government funding and some legislation.

(7) Climate change has future prospects for Iraq, as climate change will lead to an increase in poverty indicators with the continued lack of government response to the climate change crisis and continued deprivation of individuals. In addition, societal thinking can be changed towards the danger of climate change and its impact on poverty cases in Iraq, which may lead to the formation of societal awareness that will positively reflect on government policies to take serious and strict measures to resolve the crisis.

5. Conclusions

From the above, it became clear that Iraq has many strengths thanks to the great potential it possesses, as well as positive factors due to environmental factors and resources. However, these positive factors will not have a significant impact if they are not exploited properly, and the weaknesses may overcome the strengths, which leads to non-exploitation. Available opportunities for Iraq to do its part to confront climate change, the threats facing Iraq become more dangerous and will be an obstacle to Iraq's success in taking its role among the countries of the world and becoming a positive factor, and its efforts will be in vain. For this reason, the research suggests that Iraq's strategy for confronting climate change should be as follows:

- S/O offensive strategy: that is, exploiting strengths to exploit available opportunities. As long as the strengths that Iraq enjoys are available and positively matched by important and numerous opportunities, this strategy will be successful provided that the strengths and opportunities are exploited in a positive manner. If this strategy does not succeed, one can go to the second strategy.
- A remedial strategy W/O, which consists of addressing weaknesses and investing in available opportunities. Iraq can adopt this strategy because of the availability of opportunities in front of it.

It is worth noting that in the future, the research plans to use quantitative analysis in analyzing the climate effects on the Iraqi economy, especially on the food production index, using a set of independent variables based on the ARDL model to reach the results of these climate effects on the Iraqi economy in general and the agricultural sector in particular.

Author Contributions

Z.S.N. prepared the research material and its sources, wrote the theoretical framework, and prepared the initial draft of the research. A.D.K.A.H. reviewed the research, supervised and corrected the scientific material, and the two authors read the final version and approved it.

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Conflicts of Interest

The authors declare no conflict of interest.

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