

A Study of the Impact of Global Oil Price Fluctuations on Iraq's Sustainable Development Indicators for the Period 2008-2024

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Abstract

The aim of this study is to examine the consequences of global oil price volatility on the three dimensions of sustainable development (economic, social, and environmental) in Iraq in the period (2008-2024). This study uses descriptive, analytical and quantitative methods in which the secondary data sources used are official international and national sources. The findings demonstrate that there are strong positive relationships between oil prices and economic growth indicators, and negative relationships between poverty and unemployment indicators and oil prices, with the structural unemployment indicators showing weak relationships. The results also indicate a negative environmental impact which can be observed in the form of temporarily elevated carbon emissions and gas flaring during times of price increases, and a dramatic reduction in environmental spending during times of price shocks. The reason of this impact is attributed to the structure of Iraqi economy which suffers from serious structural imbalances, as it is a rentier economy. The study findings highlight that oil price volatility severely undermines Iraq's efforts to achieve the Sustainable Development Goals (SDGs) and that measures to diversify the economy, develop a sovereign wealth fund and include the environmental element in the development policies should be taken.

Keywords: *Sustainable development, oil prices, sustainable development indicators in Iraq*

Introduction:

In Iraq, oil is the almost exclusive source of public revenue, accounting for more than 90% of the total government revenue (Iraqi Ministry of Finance, 2018). Iraq has the fourth largest proven oil reserves of 143.219 billion barrels in 2018 (OPEC, 2018), but the sector's economy suffers from significant structural imbalances, such as excessive reliance on the oil rents and the corresponding reduction in contribution of non-oil productive sectors (both goods and services). There is a term for this phenomenon in the political economy literature, "Dutch Disease," which was coined by Abdul-Ridha (2017, p. 267).

The complex combination of economic, political and geopolitical factors drives sharp increases and sharp decreases in global oil prices. The price of an oil barrel has varied since the summer of 2008, when it hit a high of more than \$140, to below \$35 in 2016 (Al-Saadi, 2021, p. 62). The changes not only affect the flow of oil revenue but also have a direct impact on the macro-economic structure and the government's ability to finance the Sustainable Development Goals set by Iraq in its future plans (United Nations, 2015, for 2030). As a result, the way to sustainable development depends on the future dynamics of energy markets in the world that in turn endangers the country's stability in the medium and long term.

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This research is important because it examines the relationship between oil price fluctuations and the attainment of sustainable development goals in a rentier state such as Iraq which is an interactive one. Players in the academic discussion on development issues in resource-poor nations benefit from it and can use it to inform decision-making processes that will improve oil resource management in a sustainable manner.

Research Problem and Questions: The Iraqi economy is characterized by high reliance on oil revenues; therefore, it is very sensitive towards oil shocks. The study problem is formulated in the following broad question: In what degree do fluctuations in the global oil price influence the sustainable development indicators in their economic, social and environmental aspects in Iraq in the period 2008-2024?

The following sub-questions stem from this main question:

- How do oil price fluctuations affect economic growth rates and the structure of the gross domestic product?
- What is the nature of the relationship between these fluctuations and indicators of poverty, unemployment, and spending on basic services?
- How are oil price shocks reflected in environmental performance indicators, particularly associated gas flaring and carbon emissions? What policies can mitigate these impacts and promote sustainability?

The importance of this research stems from its examination of the interactive relationship between oil price fluctuations and the achievement of sustainable development goals in a rentier state like Iraq. It contributes to deepening the academic debate on development challenges in resource-dependent countries and offers recommendations to support decision-making processes aimed at enhancing oil resource management in a way that serves sustainability.

Research Objectives and Hypotheses

This research aims to:

1. Analyze the impact of oil price fluctuations on economic development indicators in Iraq.
2. Demonstrate the impact of these fluctuations on government spending, poverty rates, and unemployment.
3. Examine the impact of oil dependency on environmental and social sustainability.
4. Propose alternative policies and strategies to reduce oil dependency and promote sustainable development.

The research tests the following main hypothesis: "There is a statistically and economically significant relationship between global oil price fluctuations and the decline in sustainable development indicators in Iraq, through oil revenue channels, government spending, and structural imbalances."

Research Problem and Questions: The Iraqi economy suffers from excessive dependence on oil revenues, making it highly sensitive to external shocks to oil prices. The research problem is encapsulated in the following main question: To what extent do global oil price fluctuations affect sustainable development indicators in their economic, social, and environmental dimensions in Iraq during the period 2008-2024?

The following sub-questions stem from this main question:

- How do oil price fluctuations affect economic growth rates and the structure of the gross domestic product?
- What is the nature of the relationship between these fluctuations and indicators of poverty, unemployment, and spending on basic services?
- How are oil price shocks reflected in environmental performance indicators, particularly associated gas flaring and carbon emissions? What policies can mitigate these impacts and promote sustainability?

First Sector: Theoretical Framework and Previous Studies

First: Sustainable Development and its Dimensions in Rentier States

The World Commission on Environment and Development (WCED, 1987) adopted a definition of sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." This concept integrates three dimensions:

- Economic Dimension: Achieving sustained economic growth based on efficient resource use, increased overall productivity, and investment in human capital.
- Social Dimension: Ensuring social justice, improving living standards, and providing basic services such as education, health, and clean water (Al-Abadi, 2018, p. 48).
- Environmental Dimension: Protecting natural resources, reducing pollution, and promoting the use of clean and renewable energy. Iraq has adopted the seventeen Sustainable Development Goals (SDGs) within its national plans (Ministry of Planning, 2024), but sharp fluctuations in oil revenues constitute a major obstacle to achieving them, which is embodied in the "resource curse" hypothesis, which states that an abundance of natural resources may turn into an impediment to development if they are not well managed (Al-Hakim, 2022).

Second: Oil Price Fluctuations – Determinants and Explanatory Theories

Oil price fluctuations are defined as recurring instability in oil markets, characterized by sharp price swings, both upward and downward, over varying time periods (Al-Saadi, 2022, p. 62). Three main factors contribute to explaining these fluctuations:

- Economic factors: such as global economic growth rates, energy demand, and production and inventory levels.
- Political factors: such as the policies of producing countries, OPEC decisions, and production quotas.
- Geopolitical factors: such as the outbreak of regional conflicts, the imposition of economic sanctions, and security disturbances in production areas (Al-Saadi, 2021, p. 62).

Third: Rentier state

The Iraqi economy is often described as a "Rentier state," characterized by the dominance of oil revenues in public revenues and GDP, with a weak correlation between growth and real productive sectors. The "Dutch Disease" mechanism helps explain this phenomenon: the influx of oil revenues leads to a rise in the real exchange rate, a contraction of tradable sectors (such as agriculture and industry), and a concentration of resources in the oil sector and non-tradable services. This results in structural distortions that weaken the economy's resilience to shocks (Abdul-Ridha, 2017, p. 267).

Fourth: Previous Studies and Research Gap Analysis

1. Al-Shammari (2019): He studied the impact of oil price volatility on economic growth in Iraq (2004-2018) and concluded that lower prices lead to a sharp decline in public and private investment, thus deepening the imbalances of a Rentier state (Al-Shammari, 2019, p. 1577).
2. Al-Saadi (2020): He analyzed the relationship between oil price volatility and sustainable development in OPEC countries and showed that excessive reliance on oil revenues weakens the prospects for long-term sustainability (Al-Saadi, 2020, p. 58).
3. The United Nations Development Programme (UNDP, 2021) report indicated that sustainable development in Iraq is directly affected by fluctuations in oil revenues, leading to disparities in government spending on health, education, and social services (UNDP, 2021, p. 73).
3. Al-Abadi (2018) provided an economic assessment of oil licensing contracts and their impact on the Iraqi economy, highlighting their limited contribution to economic diversification.
4. Abdul-Ridha (2016, 2017, 2019) published a series of studies examining the Iraqi economy, energy policies, and licensing contracts, offering a critical analysis of the Rentier state structure.

Research Gap: Despite previous efforts, the literature lacks:

- Studies that address the three dimensions of sustainable development (economic, social, and environmental) in an integrated and simultaneous manner within the Iraqi context.
- Recent quantitative analyses covering post-2020 shocks (the COVID-19 pandemic, the Ukrainian war, and changes in OPEC+ policies).
- Linking environmental performance indicators to associated gas flaring and carbon emissions, along with an analysis of direct impact channels.
- Practical and detailed proposals for reducing oil dependency within the Iraqi institutional context.

Research Methodology and Data

The study adopted a descriptive-analytical approach supported by quantitative analysis, through the collection and analysis of secondary data derived from:

- Central Bank of Iraq (Annual Reports 2008-2023)
- Iraqi Ministry of Oil and Official Reports (2023)
- Ministry of Planning – Central Statistical Organization and Statistics and Geographic Information Systems Authority (2024)
- Iraqi Ministry of Finance (Budget Data 2008-2023)
- Iraqi Ministry of Environment (Annual Reports 2008-2023)
- OPEC (OPEC Annual Statistical Bulletins, 2008-2023)
- World Bank (Global Gas Flaring Tracker, 2022-2023)
- United Nations Development Programme (UNDP, 2021, 2023)
- International Energy Agency (IEA, 2023)

The analysis sample covered the period 2008-2024, a period marked by significant price shocks. Major: The global financial crisis (2008), the price collapse shock (2014-2016), the coronavirus pandemic (2020), and the Russian-Ukrainian war and its repercussions (2022-2024).

Second Sector: Applied Analysis: The Impact of Oil Price Fluctuations on Sustainable Development Indicators

First: Economic Indicators

Table (1): Development of Oil Prices and Economic Growth Indicators in Iraq (2008-2024).

year	Oil Sector to GDP Ratio (%)	Real GDP Growth Rate (%)	Oil Revenue (Billion USD)	Average Oil Price (USD/barrel)
2008	55.7	9.5	87.5	94.5
2009	43.3	4.2	56.4	61.0
2010	45.4	5.9	73.6	77.5
2011	47.9	8.6	119.9	111.0
2012	48.4	13.9	127.7	109.5
2013	46.7	6.7	126.8	108.7
2014	44.0	0.2	116.2	96.3
2015	35.3	-2.4	62.0	52.4
2016	32.3	13.1	42.7	43.7
2017	41.4	-2.5	60.8	54.3
2018	45.4	1.2	88.3	71.4
2019	43.4	5.9	78.5	64.3
2020	35.3	-10.4	41.6	41.7
2021	46.2	2.8	75.9	69.9
2022	52.1	7.3	115.6	100.1

2023	48.6	4.1	98.3	82.5
2024	39.0	-1.5	95.5	77.6

Sources: Oil Prices and Oil Revenues: (OPEC, 2008-2024) Growth and ratio of the oil sector: Central Bank of Iraq (Annual Reports 2008-2023).

Figure 1 illustrates the relationship between changes in oil prices and Iraqi oil revenues with Iraq’s GDP growth rates between 2008 and 2024.

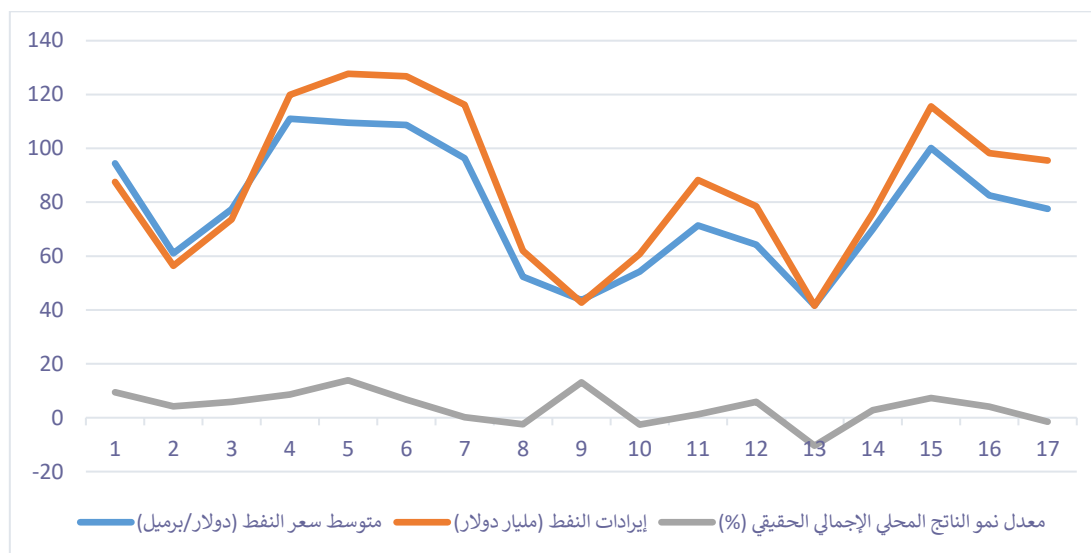


Figure 1: The relationship between oil prices and Iraqi GDP growth rates between 2008-2024.

The data in Table 1 reveals a clear direct correlation between oil prices and economic growth rates. The highest growth rates (13.9% in 2012 and 9.5% in 2008) coincided with peak oil prices, while the economy contracted by 10.4% in 2020 and 2.5% in 2017 as a result of the shocks of collapsing oil revenues. This demonstrates that growth in Iraq is dependent on rentier revenues and does not reflect a structural transformation in production (Al-Abadi, 2018, p. 48).

It is interesting to note that oil revenues dropped more than 67% from \$127.7bn in 2012 to \$41.6bn in 2020. This dramatic drop is due to the state's diminishing capacity to fund their budgets (Abdul-Ridha, 2019, p. 44). The impact of the oil industry on GDP is highest during boom years (52.1% in 2022), but falls in relative terms during times of oil shock, not because the impact of other sectors on GDP increases, but because oil revenues shrink. This highlights the rentier economy, which is clearly focused on rentier extraction (Abdul-Ridha, 2017, p. 267). The rebound in oil output that followed the liberation of areas from the ISIS control is cited as the reason for the apparent exception in 2016 when growth was 13.1% despite low prices. This is a good example of how overall growth indicators may conceal deep-seated structural imbalance.

Second: Social Indicators

Table (2): Development of Social Indicators in Iraq (2008-2024)

Year	Youth unemployment rate (15-24 years) (%)	Percentage of population with access to safe drinking water (%)	Human Development Index (HDI)	Poverty rate (%)	Current expenditure on health and education (trillion dinars)
2008	16.9	75	0.623	19.8	8.5
2009	16.8	76	0.632	21.0	10.3
2010	16.6	78	0.642	22.0	12.5

2011	16.5	80	0.654	20.5	16.8
2012	16.1	81	0.665	18.9	20.3
2013	17.9	81	0.666	19.2	21.2
2014	19.9	81	0.694	19.5	19.8
2015	21.4	79	0.654	22.5	12.5
2016	22.4	76	0.645	30.0	11.5
2017	25.3	77	0.654	27.5	13.8
2018	27.3	78	0.657	25.0	16.2
2019	29.3	79	0.664	23.0	16.8
2020	34.4	75	0.638	31.0	14.8
2021	35.7	77	0.650	28.0	17.5
2022	31.8	80	0.673	24.5	22.3
2023	32.0	82	0.695	23.2	24.1
2024	32.1	88	0.712	17.5	26.0

Sources: Spending: Ministry of Finance (Budget Data 2008-2023); Iraqi Statistics and Geographic Information Systems Authority.

Figure 2 shows the relationship between oil prices and some social indicators in Iraq between 2008-2024.

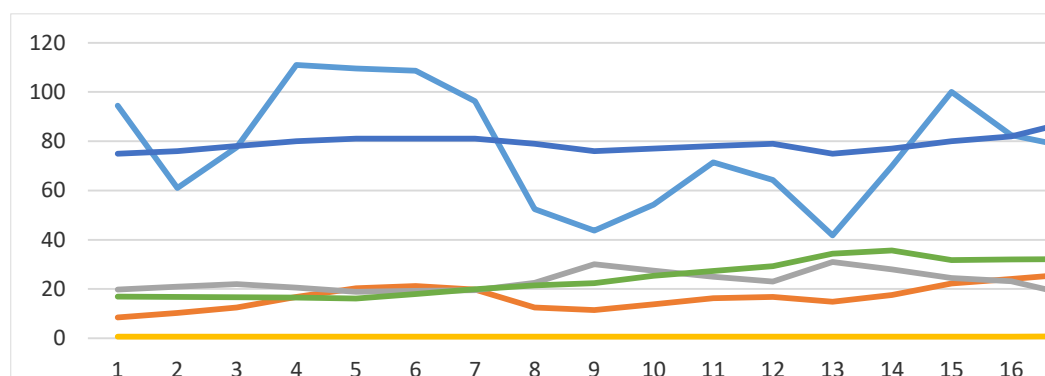


Table 2 indicates that the oil revenue cycle has a direct impact on current expenditure on health and education. Expenditure in 2012 was 20.3 trillion dinars, but in 2016 it fell to 11.5 trillion dinars, resulting in poor quality of basic services and a reduction in human development gains (UNDP, 2021, p. 73). This is why there is a variation in the Human Development Index, which dropped from 0.667 in 2014 to 0.638 in 2020. The poverty rate is also highly responsive to oil prices; it increased by over 12 percentage points, from 18.9% in 2012 to 31.0% in 2020, in less than a decade (Ministry of Planning, 2024, pp. 20–21). In addition, an examination of the data shows that the youth unemployment rate increases quickly during the low price phase (28% in 2020), but not as fast as when prices rise. This is due to a structural (as opposed to cyclical) unemployment stemming from the inability of the rentier economy to generate sustainable employment opportunities in the productive sectors (Al-Abadi, 2018, p. 56).

Third: Environmental Indicators

Table (3): Development of Environmental Indicators in Iraq (2008-2023)

Year	Environmental Protection Spending (Billion Dinars)	Excessive Gas Flaring (%)	Share of Renewable Energy in the Energy Mix (%)	CO ₂ Emissions from the Energy Sector (Million Tons)	Associated Gas Flaring (Billion Cubic Feet)
2008	35	42	0.1	145	530
2009	40	41	0.1	148	540

2010	45	40	0.1	150	550
2011	50	39	0.1	158	575
2012	52	38	0.1	165	600
2013	48	39	0.1	170	610
2014	40	39	0.2	168	590
2015	30	37	0.2	154	520
2016	20	35	0.2	148	480
2017	25	37	0.2	155	530
2018	35	37	0.3	172	570
2019	32	36	0.4	168	550
2020	22	32	0.5	152	500
2021	25	33	0.6	172	560
2022	28	34	0.8	185	620
2023	32	31	1.2	175	580
2024	38	28	1.6	238	569

Sources: Gas Flaring and CO₂ Emissions: World Bank (Global Gas Flaring Tracker, 2022-2023) and IEA (2023); Renewable Energy: Ministry of Electricity and IRENA (2023); Environmental Spending: Iraqi Ministry of Environment (Annual Reports 2008-2023).

Figure 3 shows the relationship between the price of a barrel of oil and some environmental indicators in Iraq between 2008-2024:

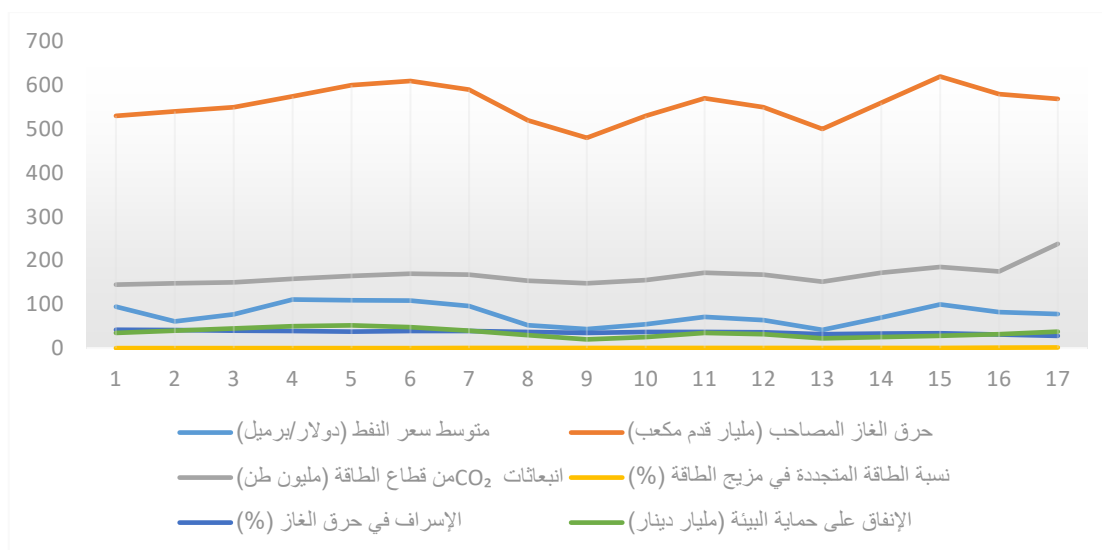


Figure 3: The relationship between the price of a barrel of oil and some environmental indicators in Iraq between 2008 and 2024.

Table 3 shows that Iraq's environmental performance is moving in the opposite direction to sustainability requirements. During periods of high oil prices, oil production increases, leading to a rise in associated gas flaring and carbon emissions. The volume of gas flared reached 620 billion cubic feet in 2022, making Iraq one of the world's largest gas flaring countries, with approximately 40% of the gas produced being lost due to a lack of investment (World Bank, 2022).

Although commitments have been made at an international level, the amount of renewable energy in the energy mix is still very small, almost negligible (1,2% in 2023). The environmental dimension is not considered of priority in public policies, with weak environmental spending, which has dropped from 52 billion dinars in 2012 to 20 billion

dinars in 2016, and is directly proportional to the oil revenue cycle (Ministry of Environment, 2018, p.38). It underlines the lack of anti-cyclical environmental policies.

Third Sector: Discussion of Results

The study's primary hypothesis is confirmed by the quantitative indicators, which show that the oil price fluctuations have a negative and deep effect on sustainable development indicators in Iraq via three main channels:

1. The Revenue and Public Expenditure Channel: Price shocks mean that investment and current expenditure are reduced or increased, which in turn reduces the state's capacity to plan medium and long term development.
2. Structural Distortions Channel: Temporary revenue boosts further the "Dutch Disease" effect and reduces the motivation for growth of other productive activities, thus aggravating labour market imbalances and structural unemployment.
3. Environmental Neglect Channel: In production increases, environmental degradation increases; in financial crises, environmental budgets further decrease – the environment is the most vulnerable variable in production booms and financial crises.

Moreover, the lack of financial institutions with financial stability (for example, a sovereign wealth fund) that can absorb shocks is the reason for the sharp effect on poverty and unemployment rates.

Conclusions:

1. Rentier Dependency Hypothesis: Economic growth in Iraq is oil rent dependent rather than a reflection of a structural transformation and has a high level of volatility and unsustainability.
2. Social Vulnerability: Poverty and unemployment will go in the opposite direction with oil prices, but structural unemployment takes time to adjust to increases in prices, suggesting a growing social divide.
3. Compound Environmental Failure: If, during periods of oil booms, negative environmental indicators get worse, and during periods of contraction, they do not improve, and if there are not proactive policies and adequate investments in clean energy, then the environment is the "permanent loser.
4. Absence of Financial Safety Valves: The absence of an effective sovereign wealth fund or countercyclical fiscal policies in Iraq increases the effect of the shocks, and jeopardizes the sustainability of the development goals.

Recommendations

The need to solve the structural issues created by over-reliance on oil revenues is fundamental to the need to implement a package of policies that incorporates economic pathways with their social, environmental, and institutional aspects. The economic side should begin with rethinking the role of the government in relation to oil resources, using a "balanced oil price" as the basis for a fiscal base. This would help to prevent current spending decisions from being affected by fluctuations in revenue and promote precautionary saving. This should be complemented by the creation of a sovereign wealth fund, and its funding from surpluses generated during price surges, with governance clearly defined and transparent. This fund can buffer against shocks and finance budget deficits when prices are low, and can help to safeguard the development trajectory from the vicious circle of primary commodity dependence. Fiscal consolidation is not the only one of the national strategies that is strongly needed, there is also a need for a diversification strategy for the production base, especially for agriculture, manufacturing and tourism. This strategy should also be backed by alluring investment incentives that will gradually decrease the contribution of the oil sector in GDP. The economic engineering cannot be fruitful without a revolutionary change in oil governance itself, with increased transparency and anti-corruption efforts in the contract management and supply chain process. This will make hydrocarbon revenues a real pillar of development and not a playground for waste.

Economic reform, in turn, has a ripple effect on the social level, where the oil funds are diverted from consumption to long-term investment in human resources. This includes redirecting investments into education, health, and scientific research, and identifying financial flows as impacts on developmental performance, rather than by individual

expenditure line items. This type of distributive justice requires an increase in social protection mechanisms through the implementation of conditional cash transfer programs for the poorest and the widest possible insurance coverage. Such programmes should ensure that they automatically increase in size in times of economic crisis, without relying on a later political decision. Labor-intensive employment programs are also very critical, especially for young people in the Governorates that were most affected by the economic downturn. Such programmes should include a component of short-term relief as well as identify and develop productive community assets that will enable the emergency situation to be turned into an opportunity to build infrastructure and services that increase the quality of life and create sustainable local economic cycles.

The environmental dimension is an essential element in the sustainability of the whole development model. This requires action – specifically total elimination of gas flaring associated to oil production. This can be done by mandating that oil companies recover and use this gas for electricity production and petrochemical plants and by imposing strict and increasing penalties for noncompliance. Limitedly connected to this is the national plan for renewables where the ambition was set of increasing the share of renewables to 20 per cent by 2030. This will be done through support for solar and wind power investment, which will help to cut the reliance of the domestic energy sector on fossil fuels and increase the supply of oil to the world. It is proposed to incorporate the environmental dimension in the general budget structure by establishing a national environmental protection fund with a fixed percentage of oil revenues, so as to make environmental efforts sustainable and not be subjected to austerity policy when revenues are low. The allocation of this fund will be protected from the periodic budget reductions, and continue to provide funding for investment in environmental rehabilitation and green transition, as a constant priority.

Success in these changes will not come without an institutional system to measure impact and hold accountability of stakeholders. The effective activation of the Supreme National Committee for Sustainable Development is the key for implementation of the 2030 Agenda. This committee would not only handle reports but also become the one to intervene and coordinate policies with sustainability pathways for resources allocation, going beyond just reporting. This requires a complete restructuring of the statistical information system, which will allow the Central Statistical Organization to generate accurate and periodic information on all the indicators of the SDGs. This data would then be a means of public surveillance and political accountability. This leads finally to the development of independent monitoring mechanisms, which also periodically assess the efficiency of the use of oil revenues and the development effect of public expenditure, thus closing the feedback loop between planning, expenditure and results; all within a system that makes good governance a certainty for transforming oil rent from a passing curse to a lasting asset for generations.

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