



# Stock of Capital and Sustainable Development in Egypt: Does it Matter?

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**Abstract:** The current study aims to suggest a mechanism for achieving economic sustainability in Egypt while also considering the environmental consequences. Egypt is an Arab and Islamic country. The study's goal is to revise the traditional system of national accounts, which measures a country's economic performance and identifies all economic changes without accounting for environmental and social costs; as a result, the study introduces a national income account adjustment that assesses the depreciation values of depleted resources on the one hand, and the monetary values of environmental retreat on the other. The study employed descriptive and analytical approaches to evaluate both modern ideas of sustainable development and the Egyptian sustainable development plan. The study indicates that data on natural resources must be acquired in an effective and timely manner to execute the proposed strategy. Finally, the study concludes that adjusting national income accounts and calculating sustainable income on a global scale, particularly for developing countries, will have a significant impact on achieving the Sustainable Development Goals, and that it may lead to a review of national comparison criteria based on sustainable income rather than current income.

**Keywords:** Sustainable development, Capital, National Accounts, Sustainable Income, Egypt.

**JEL Classifications:** E01, E1, E2, E6

## 1. Introduction

After the publication of the Brundtland Commission report "Our Common Future" in 1987, all nations around the world and international organizations became interested in the concept of sustainable development. The Brundtland Commission considered sustainable development to be an essential tool for achieving social justice, environmental protection, and sustainable growth that preserves the rights of all generations while acknowledging that there are limits to the ability to provide resources [1].

Many conferences followed, including the Earth Summit in 1992 and the United Nations Conference in 2015, where the seventeen goals of the 2030 Agenda for Sustainable Development, based on learned experience, were announced as a global development initiative aimed at fundamental changes in the three dimensions of development, namely the economy, society, and environment (2000-2015).

Furthermore, numerous ideas have argued for achieving sustainable development through the conservation of natural resources and the avoidance of environmental damage, such as (the theory of the rights of non-human beings, the pessimistic theory of Malthus). Other theories, such as Marshal's market modification theory, Ronald Coase's theory of property rights, and Hotelling's theory of depleted



resources, advocate for economic priority, while others, like Jones Myrdal's cumulative circular development theory, Hirschman's growth centers theory, and Frank Ramsey's optimal economic growth theory, suggest how to achieve justice in wealth and development distribution.

Both developed and developing countries have worked to implement a sustainable development plan that aims to achieve economic and social justice between generations by achieving development that meets current needs without risking future generations' ability to meet their own. [2]

Long-term development needs the preservation of the overall stock of capital, which involves the stability of the existing value of the stock of capital, whether it be natural resources or factory capital. As a result, it is permissible to deplete environmental assets or resources provided the earnings are invested in new capital assets that provide future generations with the same standard of living and possibilities. [3]

For Vision 2030, the Egyptian government used long-term strategic planning as well as participatory planning, creating its own goals based on the level of ambition, sustainable development goals, and global goals, all while taking into account Egypt's economic, social, and political circumstances. During this time, the strategy was also based on the concepts of inclusive and sustainable growth, as well as regional development that was well-balanced. [4]

This can be accomplished by setting aside a portion of natural resource revenues and developing them through internal and/or external investment to create a long-term alternative source of revenue for the natural resource. This is accomplished by governments who have chosen the path of sustainable development establishing "sovereign wealth funds" or "future generations funds."

As a result, when calculating the amounts given to future generations' budgets and achieving sustainable development, it is vital to consider the impact of both natural resources and pollution when preparing the country's national accounts. This implies extending typical national account asset boundaries and quantifying environmental expenditures.

Kuwait was the first country in the world to establish a sovereign fund in 1953, under the name "The General Investment Authority," followed by the rest of the world, with 46 countries owning sovereign funds, some of which own at least one fund, for a total of 79 funds, and it represents one of the most important investment tools for countries with financial surpluses.

By applying it to Egypt, the current study intends to provide a system for accomplishing sustainable development goals while respecting the rights of future generations. The sub-objectives listed below can assist you in achieving this goal: (a) Identifying new trends and theories in the field of sustainable development to clarify the various aspects of the concept of sustainable development, and then applying this knowledge to expand asset restrictions in traditional national accounts in order to recommend a sustainable development mechanism. (a) Evaluating Egypt's 2030 strategy and vision, which aims to achieve sustainable development goals.

The study uses a descriptive analytical strategy to investigate Egypt's sustainable development plan and its key shortcomings, as well as a historical approach to highlight the many theories and trends of sustainable development. As a result, a framework will be proposed to assist Egypt in achieving sustainable development.

The rest of the study organized as follows, Section two of the paper examines the main theories and current developments in sustainable development. The Egyptian Vision 2030 is discussed in the third section. Section four depicts the recommended strategy for ensuring Egypt's long-term viability. Section five discusses policy implications, followed by the conclusion.



## 2. Theories and modern indicators of sustainable development: An overview

Growth isn't the only aspect of sustainable development. It necessitates a shift in the nature of growth, making it less material and more energy-intensive, as well as more just. These adjustments must be made as part of a broader package of policies aimed at maintaining environmental capital, increasing income distribution, and averting economic crises [5].

However, economists' views on income and wealth have shifted as a result of sustainable development, which aims to preserve the environment's productive capacities. It is no longer possible to focus solely on produced or manufactured capital (Kp) while ignoring other forms of capital such as natural capital (Kn), human capital (Kh), and social capital (Ks) (Ks). As a result, a new definition of sustainable development arose from the perspective of capital. As a result, two approaches emerged: weak sustainability and strong sustainability, both of which strive to meet current demands without risking the ability of future generations to meet their own [6].

The following is a summary of the most important economic theories and indicators in the field of sustainable development that may be utilized to offer a strategy for achieving sustainability in Egypt.

### 2.1 Natural Resource Pricing Theories

Several economists (e.g., Pigou, Ronald Coase, and Marshal) have argued that valuing natural resources used in the production process is unavoidable, which entails taking natural resources into account in the economic process and assessing their effective effects; this necessitates market adjustment. They also advocated the use of economic measures like fees and subsidies, which are compensation paid by authorities for filthy material they dispose, as well as calculating an ideal amount for the fees that each polluter must pay, as long as the revenues are used to address environmental issues.

### 2.2 Depleted resource theory

This theory was developed by economist Harold Hotelling in 1931 with the purpose of researching the characteristics of natural resources in order to anticipate the price of a depleted resource. According to Hotelling, the present value of net revenue per unit of depleted resource must be the same in all periods; otherwise, shifting output from one era to the next would be in their best interests. When it comes to the production of a depleted resource (such as petroleum), the decision to create a barrel of oil today precludes the prospect of future production, as producing implies an opportunity cost, which must be incorporated into the production decision as one of the costs components [7].

### 2.3 Optimum Investment Theory (Hartwick's rule)

Hartwick (1993) uses the theory of depleted resources and the concept of weak sustainability to develop his theory of determining the optimal investment approach for the profits of the depleted resource after extraction and sale. He claims that a society can maintain a constant (not decreasing) level of consumption over time by reinvesting the rent generated by selling a depleted resource (the difference between price and marginal cost) into real capital, which results in sustainable goods (buildings, capital equipment, roads, and an adequate stock of knowledge). This will compensate society for the loss of a depleted resource, ensuring that the standard of living of current and future generations is maintained. Countries who do not invest enough of the rent from decreasing resources now, according to Hartwick, will spend more on individuals in the future. [8]

### 2.4 Green National Income Index

The environmentally adjusted Net National Product is a useful indicator of long-term national income because it reflects the current level of income that may be obtained without lowering future



income. For calculating the adjusted Net National Product (green), Pearce and Atkinson (1993) devised the following formula: [9]

$$gNNP = C + In - \Delta NR (P1-MC1) - \Delta RR (P2-MC2) - V(\Delta S) \quad (1)$$

Where C stands for consumption, and In stands for net investment.  $\Delta NR (P1-MC1)$ : depletion of depleting natural resources, calculated by multiplying the resource's annual production value ( $\Delta NR$ ) by the difference between the resource's price (P1) and its marginal cost (MC1).  $\Delta RR (P2-MC2)$  is a renewable natural resource depreciation that equals the value of annual production minus the value of annual growth ( $\Delta RR$ ), multiplied by the difference between the resource price (P2) and its marginal cost (MC2). and  $V(\Delta S)$  is net environmental degradation, which is calculated by multiplying the magnitude of changes in harmful emissions to the environment (V) by the marginal cost of damage ( $\Delta S$ ).

This indicator suggests combining depleted and renewable resources if each resource has a monetary value in addition to the pollution value. This suggests that an increase in adjusted NNP signifies the achievement of long-term development. To acquire the correct value of gNNP, the price and marginal cost of each resource must be set accordingly. Some economists believe that prices should be set based on perfect competition and resource efficiency, while others believe that prices should be established over time to ensure long-term viability..[10]

Rearranging equation (1), we can have the Genuine Saving which measures the value of the net change in the total capital stock over time

$$Sg = S (2) - DKm - \Delta R (P-MC) - V(\Delta S)$$

Where Sg: is the Genuine Saving, S is the gross saving (GNP-C), DKm : Capital depreciation ,  $\Delta R (P MC)$  natural resources(renewable and depleted) depreciation

If (Sg 0), this indicates that development is not long-term. This could be because the government is subsidizing current consumption at the expense of future consumption, and as a result, sustainable development in terms of justice between generations will not be accomplished [11].

Most prior theories and indicators, as shown above, were concerned with "conserving capital" as a part of the notion of sustainable development, by considering the pace of natural resource consumption on the one hand, and environmental deterioration on the other. Under the proviso that these funds be used to make productive investments that improve the current and future generations' standard of living.

### 3. Strategic Planning and Sustainable Development: Egypt Vision 2030

Egypt's Vision 2030 strategy for sustainable development is focused on long-term strategic planning based on extensive evaluations of previous studies, visions, and strategic plans at the local and international levels. At the municipal level, Egypt's 2017 strategy, the strategic framework for doubling income by 2022, and the urban plan Egypt 2052 were all changed. Other sectoral initiatives, as well as the Population Strategies 2030 and 2050. The goal was to improve existing quality of life while simultaneously safeguarding the rights of future generations to a better life.

This was accomplished by identifying the most significant challenges facing Egypt's development process, which include a scarcity of natural resources such as energy, land, and water, environmental degradation, limited human development resources such as population, health, and education, as well as an ineffective governance system and a lack of innovation and creativity systems. It lays out a set of goals and objectives for turning these components into development accelerators rather than major roadblocks.



As a result, according to Egypt's Vision 2030, "the new Egypt will have a competitive, balanced, and diversified economy based on innovation and knowledge, based on justice, social integration, and participation, with a balanced and diverse ecosystem, investing the genius of place and people to achieve sustainable development and to improve Egyptians' quality of life" [22].

Economic development, energy, innovation and scientific research, transparency, and the effectiveness of government institutions were all included in the strategy's ten axes, which were all defined within the three basic pillars of sustainable development. All of these issues, including social justice, education and training, health and culture, the environment, and urban growth, must be addressed.

Providing the necessary funding for various projects and programs, as well as relying on innovative and diverse means and tools in financing and implementing major projects and targeted programs - the most important of which is the development of the Suez Canal axis, as well as the reconstruction and investment in the northwest Gulf of Suez region, North Sinai, and the Northwest Coast - will transform Egypt. These methods include issuing new financial instruments such as sukuk to fund infrastructure and development projects, expanding the investor base by attracting more individual investors and non-bank financial institutions, supporting the usufruct system, and providing incentives and facilities to encourage investment. Foreign direct investment can assist optimize the impact of foreign aid from international donors by providing long-term capital in the form of stocks and bonds in domestic and international markets.

After reviewing Egypt's sustainable development strategy, particularly its economic and environmental development policies, it was discovered that assessing the environmental impact of depleted resources and pollution was not one of the goals, and it was also not mentioned in the proposed economic development investment policies, the mechanism for using depleted resource returns, and how to calculate it as one of the sources of financing various investment projects.

#### **4. The proposed mechanism to ensure sustainability**

##### **4.1 Steps of the proposed mechanism**

The proposed mechanism employs a strategic planning approach to identify available natural resources (size and locations), as well as to calculate the cost of the current environmental situation using numerical indicators; next, development goals for using those resources, as well as the environmental burdens that result, are defined. This is part of a larger effort to develop systems for efficiently utilizing these resources, whether in industrial operations, exporting them abroad, or calculating their depreciation rate and the cost of environmental damage.

The money raised from environmental degradation would be utilized to address factory and company environmental effects (such as rubbish and odors), as well as cases of pollution-related diseases, and expenses and compensations for health and death cases.

It might be done by activating the environmental economic accounts system, which accounts for the costs of using natural resources in production and final consumption, as well as the environmental effects (emissions) of pollution generated by production and consumption activities. This is a departure from the standard national accounting system in that it establishes a uniform framework for quantifying the environment's contribution to the economy as well as the economy's impact on the environment. As stated in table 1, this goal necessitates the creation of four different types of accounts. The outcomes of which are used to forecast long-term income and/or actual savings.

**Table 1: Effect of Economy on Environment Accounts**

<p><b><u>Natural Resource Asset Accounts</u></b> These accounts record the origins and changes in natural resources such as soil, fish, forests, water, and mineral wealth.</p>	<p><b><u>Pollution flow, energy, and resources accounts</u></b> It offers data on the use of energy and resources as inputs to production, as well as the generation of pollutants and solid waste, at the sectoral level.</p>
<p><b><u>Expense accounts for environmental conservation and resource management</u></b> It tracks how much money corporations, governments, and individuals spend to protect the environment and manage natural resources.</p>	<p><b><u>Estimating non-market flows and environmental adjusted gross values Accounts</u></b> It shows non-market estimation techniques and their applicability, and it considers the adjustments for so-called defense expenditures.</p>

Natural resources are valued based on their market value, which is determined by the average world price. This gives natural assets and their fluctuations a monetary value. Without a global price, natural resources can be given a rough estimate (shadow price) that is higher than the cost of extraction.

It is possible to quantify the value of environmental degradation using the method of response relationships to pollution amounts, which is based on the correlations between pollution exposure and health effects.

Sums collected from natural resource consumption and environmental degradation can be said to be the main source of sovereign funds seeking to build other assets that generate income for future generations to compensate for the depletion of current assets and the exploitation of their revenues by the current generation in order to achieve generational justice.

#### 4.2 Including the environmental assets in the System of National Accounts

The distinction between economic and environmental assets is critical in environmental accounting because it identifies extra environmental data that should be included in expanded accounts. As a result, the most practical way to implement an integrated environmental and economic accounting system is to increase the asset limit while maintaining the production and consumption limits, allowing for the introduction of natural resources as well as changes in both the assets and production accounts. This can be done by following the methods outlined below:

- Assets are transferred from the environment to the economy and are recorded as “other changes in volume” in the asset accounts; the production and income accounts are unaffected in this situation.
- Calculating the cost of depletion or permanent deterioration of economic assets and carrying depletion and deterioration values forward from traditional asset accounts’ “other changes in volume” to production and income accounts as natural capital consumption.
- When calculating non-economic or environmental asset balances, only use natural expressions, and include a cost assessment of irreversible loss of environmental functions to absorb waste and other environmental services.

The System of Integrated Environmental and Economic Accounting can be built by extending the Egyptian System of National Accounts’ traditional asset and flows (supply and use) accounts, as shown in Figure 1. (See Appendix). By combining the environmental assets and changes in the assets, the environmental components are listed in the darkened vertical column of the asset accounts. Natural resource depletion and loss of environmental quality, on the other hand, appear as additional environmental expenses in consumption accounting (shown in the shaded row of natural asset use).



Environmental costs are recorded in both asset and flow accounts because they show how natural capital is used. As a social response to environmental concerns, environmental protection spending occurs as “branches” of traditional aggregates. It is possible to build environmentally modified aggregates by adding rows and columns to national accounts, which may then be displayed as totals for the collection process and as features of the following accounting characteristics:

- *Supply-Use Side*

$$O+M= (IC+EC) + C+ (CF-EC)+X \quad (2)$$

The previous equation shows that the total supply of goods and services produced (O) and imported (M) is equal to their use in intermediate consumption (IC), final consumption (C), capital formation (CF) and exports (X). It should be emphasized that, the environmental costs (EC) are added to the intermediate consumption (IC) as an additional cost and subtracted from the environmentally adjusted capital formation; to preserve the Supply-use side.

- *Value added (environmentally adjusted) for industry i*

$$EVA_i = O_i - IC_i - CC_i - EC_i = VA_i - EC_i \quad (3)$$

This illustrates that the difference between output ( $O_i$ ) and cost is the value added generated by industry ( $EVA_i$ ), which includes intermediate consumption ( $IC_i$ ), fixed capital consumption ( $CC_i$ ), and environmental depletion and degradation ( $EC_i$ ).

- *Net National Product (environmentally adjusted) of the aggregate economy:*

$$EDP = \sum EVA_i - \sum ECh = NDP - EC = C + (CF - CC - EC) + NX \quad (4)$$

The preceding equation indicates that the environmentally modified net product (EDP) is the total of the environmentally adjusted value contributed by companies, less or equal to the environmental costs generated by households (ECh). Aside from net exports ( $NX=X-M$ ), the value of environmentally modified net output can be computed as the sum of final uses of consumption (C) and net head formation Environmentally Adjusted Money ( $ECF=CF-CC-EC$ ), which considers the effects of inflation (the provision for natural resource depreciation and environmental degradation). As a result, the environmentally adjusted net capital creation can be used to assess whether economic success is long-term.

#### 4.3 Incentives for putting the mechanism into action

Several factors contribute to the adoption of the suggested mechanism, including:

- Modern technology advancements and the satellite age, particularly remote sensing satellites that can inventory natural resources and their stock sizes, monitor agricultural crops, monitor desertification, and land degradation, safeguard the environment, and locate pollution sources. Many countries around the world, including Morocco, Canada, France, and Egypt, have used these satellites to find natural resources and estimate stock sizes.
- Data’s increasing importance in sustainable development and value creation, as it directly contributes to the construction of information and knowledge assemblies and economies, the Internet of Things, digital economic development, and data-driven sustainable economies.
- Big data and open data, which are data of huge scale, diversity, and multiplicity of sources and resources in a way that necessitates new forms of management and processing to enable them to serve decision-makers and any other objectives, have promising potential for supporting development [4].
  - Because most depleting natural resources (such as oil, gold, copper, zinc, and others) circulate

through global markets, the price of each resource can be determined based on supply and demand in the global market.

- Develop methods for quantifying environmental deterioration so that the state may reflect the economic cost sustained by the state because of environmental degradation and irrational resource use in monetary terms.
- Many companies (voluntarily) move toward environmental accounting disclosure by notifying the company's management and related parties of the amount of natural resource depletion resulting from the company's activities, as well as the extent of environmental damage resulting from that; this provides decision makers, governments, and corporate management with a future picture of the size of the financial impact of the companies' engagement of their activities on the current environment.

### **5. Policy implications**

The following are the policy implications that should be enacted to achieve the suggested mechanism:

- Natural resource data must be obtained in a scientific and specific manner for use in the indicators chosen. Because the suggested vision for achieving the Sustainable Development Goals is dynamic, the national statistical system's outputs must be effective and timely in order to provide the planner with a realistic picture; this necessitates -Aligning statistical concepts, terminology, and measurement methodologies across the national statistical system's components.
- Adopting a system for integrating new sources inside official sources to fill data gaps in sectors like natural resources and pollution, as well as a process for conducting surveys to collect this data.
- Assisting with the financial resources needed to undertake specialized surveys on sustainable development indicators.
- there are so many different sorts of natural resources, big data is created, which usually consists of a data set that is larger than the present programs' capabilities. With this challenge, new platforms of "big data" solutions to cope with the numerous features of these massive amounts of data are required. and
- Finalizing the national strategy for developing Egypt's statistical system, which includes a framework for partnership and cooperation with all aspects of the statistical system to speed up and codify the monitoring of sustainable development indicators.

### **6. Conclusion**

The goal of this study is to establish the nature of sustainable development and analyse Egypt's Vision 2030 in order to offer a technique for assuring Egypt's long-term growth. From the standpoint of the capital, the implementation of this system may enable Egypt to achieve the requirements for long-term development. As money collected from natural resource consumption and environmental degradation could be one of the main sources of sovereign funds, which are working to build other assets that generate income for future generations to compensate for the depletion of current assets on the one hand, and the exploitation of its revenues by the current generation on the other, which achieves justice between generations.

Adapting the proposed mechanism will help create a database of sustainable development policies that integrate development issues into major policies and monitor environmental changes caused by





economic activities; it could thus serve as the foundation for integrated environmental and economic policies. This goal may be achieved if we can investigate the impact of direct and indirect environmental economic use on economic activity; this will aid in the construction of comprehensive economic models that include both economic and environmental factors.

Finally, it can be argued that amending national accounts and then sustainable income in order to generalize its assessment across the globe, particularly in developing countries, will have a wide range of consequences in the achievement of sustainable development goals. On the one hand, if the comparison is based on the sustainable income criterion, it may lead to the provision of multiple income measurements as well as a reconsideration of the standards of comparison across nations.

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