

ALGERIA'S ENERGY POLICIES AND THEIR IMPACT ON ENVIRONMENTAL SECURITY IN LIGHT of GREEN ECONOMY PARADIGMS



Dr/ Meghrabi Nassima

university of blida 02 lounissi ali, (Algeria)

n.meghrabi@univ-blida02.dz

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Abstract:

This research paper aims to examine the efforts of the Algerian government in formulating energy policies that address citizen needs and environmental security concerns. It also explores the imperative to protect future generations' access to both above- and below-ground resources due to the tangible threat posed by environmental pollution in multiple spheres, including health, economy, politics, agriculture, demography, and ecology. In this context, Algeria, akin to numerous other nations, has prioritized the environmental agenda, leading to significant reforms and a heightened focus on renewable energy sources as part of a green economy approach.

Key words: Energy Policies; Environmental Security; Green Economy; Health Threats; Economic Threats; Political Threats; Ecological Threats.

ملخص:

تهدف هذه الورقة البحثية إلى تسليط الضوء على المساعي الحثيثة للدولة الجزائرية لصياغة سياسات طاقوية تلي إحتياجات المواطنين من جهة ، و من جهة أخرى فإنها تسعى أيضاً محاولة لتجاوز معضلة الأمن البيئي للحفاظ على حق الأجيال القادمة في الثروات الكامنة فوق الأرض و تحتها لأن التلوث البيئي يشكل تهديداً فعلياً سواء من النواحي الصحية و الاقتصادية و السياسية و الزراعية و الديمغرافية و الايكولوجية، و في هذا الإطار قامت الجزائر كغيرها من الدول بإدراج الملف البيئي ضمن أهم المواضيع الملحة، لذا بادرت بالعديد من الاصلاحات و إعطاء الأولوية الى الطاقات المتجددة في ظل تبني برنامج الانتقال الطاقوي من خلال مقارنة الاقتصاد الأخضر .

الكلمات المفتاحية: السياسات الطاقوية- الأمن البيئي- الاقتصاد الأخضر- التهديدات الصحية- التهديدات الاقتصادية- التهديدات السياسية- التهديدات الايكولوجية.

Introduction:

Energy holds a crucial position in Algeria due to its significant contribution to the country's economy. The Algerian government prioritizes this sector as a key industry among various others. Historically, energy policies in Algeria have predominantly revolved around the fossil fuel sector, encompassing oil and gas, which are the primary driving forces of the nation's economy. This approach has led to a persistent pursuit of wealth accumulation, often with insufficient regard for environmental conservation standards and sustainable development goals. As a result, there has been a pursuit of a new model aimed at environmental preservation and the attainment of sustainable development goals, commonly known as the green economy. In light of this, we pose the following question: What is the current state of energy policies and environmental security in Algeria within the context of green economy paradigms?

Several subsidiary questions arise from this main question:

- What are the fundamental definitions of energy policies and environmental security?
- What are the main directions of Algerian energy policies?
- What constitutes the most suitable energy alternative to achieve environmental security in Algeria?

Research Hypotheses: To address the posed problem, the following hypotheses have been formulated:

- The SH2030 strategy plays a significant role in shaping Algerian energy policy directions.
- The green economy is a viable energy alternative for achieving environmental security in Algeria.

Objectives

- Understand the relationship between energy policies and environmental security.
- Shed light on the SH2030 strategy by identifying its goals and the results achieved through its implementation.
- Assess the feasibility of achieving environmental security through the green economy.

Research Methodology: Considering the subject matter, the research relies on a descriptive methodology to provide a comprehensive overview of essential concepts. Furthermore, a statistical approach is employed to present various statistics pertaining to Algeria's diverse energy reserves.

Structure of the Research: The study is structured into three main sections as follows:

- Energy Policies and Environmental Security: A General Introduction.
- General Directions of Algerian Energy Policies through the SH2030 Strategy.
- Green Economy as an Energy Alternative for Achieving Environmental Security in Algeria.

Energy Policies and Environmental Security: A General Introduction.

This section delves into the realm of energy policies in Algeria, acknowledging their pivotal role in the national economy. The fossil fuel sector, responsible for 57% of the gross value added, assumes particular significance, with gas and petroleum exports constituting 98% of total exports. Furthermore, there has been an increase in local energy consumption rates, accompanied by a growing demand for various energy sources, thereby placing a burden on the environment. Accordingly, the following elements will be addressed :

1. The concept of energy policies.
2. The evolution of energy policies in Algeria.
3. The relationship between energy policies and environmental security in Algeria.

The Concept of Energy Policy: Energy is a fundamental component for advanced societies, serving as a requisite for daily life, industrial processes, transportation, and various other sectors (Zaghbi, 2012, p. 09). It is important to note that energy does not confine itself to a specific substance; rather, it manifests in any vital source capable of generating motion to transfer material objects (Baziz, 2018, p. 07). Energy encompasses a range of forms, including heat, light, sound, mechanical energy from machines, and energy resulting from chemical reactions. This energy is adaptable, transforming from one form to another, such as converting chemical energy to nuclear or electrical energy to kinetic energy (Al-Jundi, 2015, p. 06). The primary categorization of energy sources distinguishes between conventional (non-renewable) and renewable (non-depletable) energy sources.

Energy policy falls within the domain of public policy and encompasses government programs and ensuing measures for energy sector management. It deals with supply concerns, both domestic and international, marketing, revenue generation, and extends beyond economic boundaries to influence a nation's

foreign policy, using energy as a lever on other nations, be they producers or consumers (Rekik, (2019-2020)., p. 10).

Evolution of Energy Policies in Algeria: When tracing the evolution of energy policies in Algeria, it becomes evident that this sector has drawn significant government attention for several compelling reasons:

- The energy sector's sensitivity and its substantial contribution, which amounts to 85% of the national economy.
- Algeria's substantial energy reserves, particularly concentrated in the southern region.
- The foundational role played by the energy sector in the economic policies of successive governments since the country's independence in 1962.

The evolution of energy policies in Algeria has unfolded across three distinct phases, which are as follows:

1. **National Independence to Nationalization (1962-1971):** During this period, policy makers prioritized several key objectives:
 - Reclaiming natural resources and developing national investment in them through a nationalization project initiated by President Houari Boumediene on February 24, 1971. This project was further supported by the Fundamental Law of Hydrocarbons, enacted on April 11, 1971, defining the regulatory framework for activities of foreign companies in hydrocarbon exploration. This step ensured that Algeria held a majority share of 51% of the benefits from French companies operating in the southern region.
 - Expanding the petroleum industry to cover all its facets and sectors comprehensively (Chikhi, 2016, pp. 18-19).
 - Coordinating the petroleum industry with other related and complementary sectors, integrating the oil sector into the national economy. This strategy established the conditions necessary for petroleum industries to become central to development planning.
 - Founding the Sonatrach Group for Petroleum on December 31, 1963, under Decree No. 63-491. As an Algerian company, it was responsible for petroleum transportation and marketing, with authority for exploration and production activities. The company's scope expanded on September 22, 1966, when it was rebranded as the National Company for Exploration, Transport, and Marketing of Petroleum (Dachana, 2017, pp. 53-54).
 - Strategically increasing the national reserves of petroleum wealth by broadening exploration activities and developing existing petroleum

fields. These endeavors were undertaken in the most favorable conditions for Algeria in terms of trade balance, payments, and treasury imports.

- Ensuring the domestic market's energy needs were met efficiently and securely.
- Strengthening national human resources through a combination of theoretical education and practical training, with a strong focus on hands-on experience. This approach was carried out in collaboration with friendly nations to enhance Algeria's negotiation capacity and facilitate coordinated efforts toward shared interests and objectives.

2. Review of Previous Energy Policy: The reevaluation of prior energy policies stemmed from economic imbalances in the 1970s. These imbalances were due to concentrated sector-specific investments and heightened petroleum market volatility, which depleted national reserves. In response, Algerian policymakers in that period adopted enduring energy policies with the following principles (Chikhi, 2016, pp. 19-20):

- The hydrocarbon export sector was given a key role in financing national development plans.
- A diversified and integrated national economy was established to reduce reliance on foreign resources.
- The range of energy reserves was expanded by exploring and managing alternative sources.

Within this framework, Algeria restructured Sonatrach and established 17 subsidiary firms in 1981. This coincided with the enactment of the Hydrocarbons Law in 1986 (Law 86-14), subsequently amended via Law 91-21. Contracts with foreign companies were also executed to strengthen the long-term energy strategy. Sonatrach emerged as a global contender and the nation's primary economic powerhouse (Dachana, 2017, p. 54). The establishment of Sonelgaz, a key player in electricity and gas supply, dates back to 1969. Simultaneously, the National Agency for Monitoring and Regulation of Hydrocarbon Activities was established to enforce internationally recognized standards and regulatory measures. The creation of the National Agency for Hydrocarbon Valorization aimed to stimulate investments in hydrocarbon exploration and development. This included issuing exploration permits and collecting and allocating fees and taxes to the national treasury. Algeria's extended collaborations with foreign entities included defining contractual terms, investment programs, and selecting international partners (Baziz, 2018, pp. 30-31).

3. New Millennium and Profound National and International Transformations: In this phase, Algeria initiated structural reforms to align with the conditions of a competitive free-market economy. The goal

was to reinstate the Algerian state in its roles as sector proprietor, driving force behind investments, and protector of public interests. The core objective was to boost and expedite the private sector's involvement in the energy sector, emphasizing the acquisition of technology, expertise, and foreign market access. This transition involved introducing new legal and institutional frameworks with these aims:

- Deregulating the electricity sector and public gas distribution network.
- Facilitating competition in electricity production and distribution with equitable grid access.
- Upholding the commitment to public service.
- Establishing an open and investment-friendly hydrocarbon sector.
- Enhancing state revenues through a new tax system (Ministry of Energy and Mines, (2000-2005)., p. 06).

The Relationship Between Energy Policies and Environmental Security in Algeria

Environmental security pertains to a set of positive behaviors aimed at averting adverse environmental effects, such as pollution, degradation, or impairment of environmental components. These actions can disrupt the ecological balance at local, regional, or global levels (Baziz, 2018, p. 21). Since Algeria's independence, the country has exhibited a substantial commitment to environmental matters. An early indication of this commitment was Algeria's signing of the Maritime Pollution Agreement through Decree No. 344_63 on September 11, 1963, reflecting its aspiration to bolster its global presence.

Throughout the 1970s, Algeria engaged in numerous international agreements and protocols. During this period, the National Committee for the Environment (CNE) was established, functioning as a national entity responsible for formulating environmental policies, promoting sustainable development, and fostering economic and social advancement (Djamila).

Algeria also emerged as an early adopter of a legal framework for environmental safeguarding. Notably, Law No. 03_83, enacted on February 5, 1983, signifies a legislative milestone in this endeavor. Further, Algeria fortified its domestic commitment to environmental protection by enacting Law No. 03_10, which predominantly centers on the concept of sustainable development. This law squarely addresses the issue of environmental degradation by implementing preventive and corrective measures intended to align with the principles of environmental preservation within the framework of sustainable development.

The preventive measures to protect the environment encompass legal instruments empowering the administrative authorities to uphold environmental integrity. These measures involve mechanisms like Licensing system, prohibition system, and compliance and planning system.

Conversely, the corrective measures intended for environmental protection embrace penalties assigned to actions that culminate in harm or impairment to the environment. Such penalties can take the form of criminal sanctions directed at curtailing activities detrimental to the environment. In some instances, they may adopt a civil punitive approach that involves compensation for environmental harm. An intriguing element is found in Article 87, reiterated within Law No. 03_10, which prescribes the most severe punitive action, the death penalty, for offenses involving aggression against the oceans (Penal,code, July 8, 1966.).

In the scope of Articles 81 through 111, misdemeanor penalties can span a duration from three months to five years. Conversely, financial penalties typically manifest in the form of monetary fines remitted to the national treasury (Law 03_10 on Environmental Protection within the Framework of Sustainable Development.).

In addition to the legal framework governing environmental protection, a set of institutional bodies with demonstrable efficacy has been established to oversee environmental preservation. These institutions operate at both central and local levels and are dedicated to the prevention of environmental pollution.

In 1996, the State Secretariat for the Environment was inaugurated via Presidential Decree No. 96_01. This governing body underwent a transformation in 2013, emerging as the Ministry of Urban Planning and the Environment. The ministry plays a pivotal role in crafting environmental development strategies, promoting the environmental economy, and deterring activities that do not align with the principles of sustainable development. This collaborative effort extends to engagement with other sectors, such as public health and the enhancement of the living environment (Executive Decree 16_88 on Environmental Protection within the Framework of Sustainable Development.).

Concurrently, civil society organizations serve as crucial civic agents. They actively raise awareness about environmental hazards, encourage citizen participation, and inculcate respect for the environment and the ecosystem in forthcoming generations. These organizations collaborate with the private sector to bolster environmentally-conscious development projects in Algeria (Medien, 2014, p. 12).

General Directions of Algerian Energy Policies through the SH2030 Strategy

This analysis centers on Algeria's energy policies, as outlined in the "SH2030" strategy. The discussion encompasses two main areas:

Overview of the "SH2030" Strategy: The "SH2030" strategy represents the culmination of a collaborative effort, involving more than 200 working sessions with the participation of over 50 experts and 1000 contributors, in conjunction with the state-owned energy company, Sonatrach. Launched in 2017, this medium-term plan aims to generate over 68 billion additional dollars by 2030. Half of this revenue is earmarked to contribute to the national wealth, while the other half is designated for investment in augmenting reserves, production capacity, skill development, and expertise enhancement. Additionally, this strategy seeks to position Sonatrach among the top five global petroleum companies by 2030 (Sonatrach, juin 2019, p. 37).

Objectives of the "SH2030" Strategy: The "SH2030" strategy outlines several core objectives (Belatash, 2020-2021, pp. 126-132):

- **Expansion of Exploration and Production Activities:** This objective entails a twofold increase in annual discovery volumes, reaching six wells annually within the development framework and four wells in the exploration phase. Achieving this goal necessitates stringent oversight of project plans and costs, along with enhancing performance to reach an annual production of 2 million tons of crude oil equivalent. Notably, strategic partnerships were initiated between Sonatrach and five public institutions (GTP, GCB, ENAC, COSIDER, and INFRATEL) in December 2017 for the development of the Tinhert (Illizi) field through the interconnection of 50 productive gas wells. This initiative extends the field's exploitation until 2040, with a projected production capacity of approximately 27 million cubic meters per day and 10 billion cubic meters annually by 2025. Furthermore, during the same month, a strategic exploration agreement was formalized between Sonatrach, the National Agency for Hydrocarbon Resource Valuation, the renowned French corporation Total, and the Spanish energy giant Cepsa. This agreement focused on the development of the Timimoun gas field, which is projected to yield an approximate daily production capacity of 5 million cubic meters.

Subsequent to this development, the gas transport infrastructure known as GR5 was inaugurated, located over 700 kilometers from the Reggane

region. This extensive infrastructure boasts an annual production capacity of approximately 60 billion cubic meters. Furthermore, significant investments, totaling \$10 billion annually, were earmarked for enhancing shale gas production. The ambitious aim is to reach production levels of 20 billion cubic meters by 2030 and an even more 70 billion cubic meters by 2040.

Additionally, Algeria has entered into a series of consequential agreements and contracts within this sphere. Notable among these is the collaboration with the oil trading entity, Vitol, for the offshore refining of Algerian crude oil. In a pivotal move, Algeria inked a momentous contract with Total in June 2018. This landmark agreement pertains to the establishment of a petrochemical facility in Arziw, primarily focused on the separation of hydrogen from propane and the production of polypropylene.

- **Utilization of Renewable Energy Resources and Energy Transition Preparation:** The "SH2030" strategy emphasizes the importance of reinforcing the role of renewable energies in preparing for the energy transition. This involves a gradual, long-term investment in renewable energies. However, despite this focus, significant progress in this area has been limited since 2011, attributed to several factors, including a lack of genuine political will, inadequate planning, and insufficient financial mechanisms.
- **Final Stages and Marketing:** Algeria, through the "SH2030" strategy, aims to maintain traditional partnerships while entering new markets to increase its revenues and secure long-term importers. In light of intensifying competition in European gas markets from global suppliers, including Russia, Australia, Nigeria, and Qatar, and concerns about Algeria's ability to meet export commitments due to rising domestic consumption and declining production, Sonatrach, in line with its "SH2030" strategy, focuses on two resolutions (Roulami, 2020, pp. 230-246):
 - The first resolution involves generating electricity through renewable energies to supply the local market with 22,000 megawatts by 2030 and exporting 10,000 megawatts. This transition is projected to reduce national fossil energy consumption by over 9% by 2030, saving approximately 240 billion cubic meters of natural gas, equivalent to a \$63 billion economy over 20 years. Nonetheless, it's worth noting that only 536 megawatts were achieved between 2011 and 2016, compared to the planned capacity. This renders the realization of this resolution challenging, particularly given

fluctuating fuel prices, the primary source for funding such projects.

- The second resolution involves developing unconventional gas resources, particularly shale gas, and producing electricity from renewable energies as the best approach to meet rising domestic consumption, fulfill export commitments, and gain the trust of importers.

In conclusion, with regard to the "SH2030" strategy's implementation, the realized outcomes do not fully reflect Algeria's genuine intent to transition. The nation lags in developing and utilizing renewable energies and has yet to formulate an energy consumption model that could determine the optimal energy mix. Thus, the tangible realization of the "SH2030" strategy depends on multiple considerations, with political determination to reduce dependence on traditional resources being the most critical.

Green Economy as an Energy Alternative for Achieving Environmental Security in Algeria

This section delves into the green economy concept as an alternative energy approach in Algeria to promote environmental security. Key aspects to be discussed include:

The Notion of a Green Economy and Its Core Characteristics: The concept of a green economy has emerged as a response to the imperative of curbing environmental degradation resulting from unsustainable production and consumption patterns. As defined by the United Nations Environment Programme, a green economy aims to enhance human well-being, foster social equity, and mitigate risks associated with ecological deterioration and resource scarcity (Saadat, 2020-2021, p. 17). Essential characteristics of green economy encompass the following (Saudi Economic Association, 2022, p. 07):

- Green economy is not a substitute for sustainable development; instead, it serves as a means to realize it.
- It emphasizes the integration of the three dimensions of sustainable development: environmental, social, and economic.
- It recognizes national sovereignty over natural resources.
- Green economy refrains from imposing trade restrictions, conditions on aid, or environmentally detrimental subsidies.
- Embracing the principle of shared responsibilities among relevant government agencies is pivotal.

- It hinges on resource efficiency and the adoption of sustainable production and consumption practices.

Objectives of the Green Economy: Several studies and reports have underscored the manifold benefits of transitioning to a green economy. The 2011 report by the United Nations Environment Programme has highlighted the environmental, economic, and social advantages of such a shift, succinctly summarized as follows (Ben Amran, 2021, p. 127):

- Addressing environmental challenges by reducing carbon emissions stemming from energy production and consumption.
- Galvanizing economic growth through the establishment of a novel economic development model reliant on green investments across diverse sectors, including renewable energy, eco-friendly construction, sustainable transportation, water management, waste handling, and sustainable agriculture.
- Mitigating poverty and creating employment opportunities by generating more jobs and higher incomes. It also assists in poverty alleviation, particularly in rural areas, by safeguarding natural resources and optimizing their utilization.

Algeria's Experience in Transitioning to a Green Economy: The Algerian government, as outlined in the "National Regional Development Plan," underscores that sustainable development represents a fundamental aspect of the plan's directives. The primary directive, focused on resource sustainability, encompasses three regional action programs pertaining to the green economy: ensuring water resource sustainability, conserving soil, combating desertification, and safeguarding ecological systems.

The implementation of the "National Regional Development Plan" has led to the introduction of a range of general measures aligned with the green economy framework. Public institutions have been established to support the formulation and implementation of sustainable development policies. These institutions include the National Observatory for Environment and Sustainable Development, the National Center for Biological Resource Development, the National Waste Management Agency, the National Environmental Training Center, the National Center for Cleaner Production Technology, and the Air Quality Monitoring Network.

In the domain of water, Algeria has made significant strides by establishing pivotal institutions. These include the Water Basin Agency, the National Office for Sanitation, the National Office for Irrigation and Drainage, and ADE. These entities have been instrumental in regulating and enhancing water-related activities in the country.

a pricing system for drinking and industrial water usage has been established, along with support for consumption-oriented green initiatives, promoting efficient techniques such as drip irrigation.

Simultaneously, green economy has created employment opportunities for young individuals. As per a study conducted by the Algerian Ministry of Regional Planning and Environment, it is estimated that 1,421,619 jobs can be generated in the green economy sector between 2011 and 2025. This stands in contrast to the 273,000 jobs available in 2010 in environmentally-related fields such as waste recycling and renewable energy.

Furthermore, Algeria has achieved significant milestones in its green economy endeavors. Key accomplishments include:

- **The Hybrid Center (Solar and Gas Energy in Hassi R'Mel):** This marks the first hybrid energy station in Algeria, combining solar and gas energy production and featuring the largest gas field in Africa. Covering 130 hectares, it has an energy production capacity of 150 megawatts, with 120 megawatts generated from gas and 30 megawatts from solar power. This project aligns with Algeria's National Renewable Energy Program, which aims to increase the share of clean energy in the national electricity production to 40% by 2030.
- **Cement Factories with Filter Bags:** A comprehensive program, spearheaded by the Ministry of the Environment and the Association of Cement Factories, aimed at modernizing pollution control equipment. In 2010, a bag filter system was introduced in the Chlef cement factory, signifying a momentous stride in environmental protection and public health in Algeria. Subsequently, the installation of bag filters was undertaken, bringing the total number of cement factories in the country to 10 out of the 12 existing ones.
- **Beni Haroun Dam:** A pivotal hydraulic complex with a storage capacity of 960 million cubic meters. It provides potable water to around four million people across five provinces (Jijel, Constantine, Oum El bouaghi, Batna, Khenchela) and facilitates irrigation on more than 400,000 hectares of land in various regions (Telaghma, Remila, Ouled Fadhel, Chemora, Natna and Ain Touta).
- **Large-Scale Water Transport in Ain Salah/Tamanrasset:** The project involving the large-scale hydraulic transfer of water from Ain Salah to Tamanrasset stands as a significant and transformative endeavor. Often coined as the "Project of the Century," this initiative plays a critical role in ensuring an uninterrupted, around-the-clock supply of potable water to the region, benefiting a populace exceeding 90,000 individuals.

- **Smart Architectural Design:** Modern architectural design adeptly merges the tenets of environmental sustainability and occupant comfort within intelligent buildings, as exemplified by structures such as the Cyberparc garden in Sidi Abdellah. This astute architectural design ensures a seamless and well-coordinated management system encompassing elements like water distribution, energy efficiency oversight, security monitoring, and other integral components (Gaham, 2016, pp. 449-453). This aligns harmoniously with the realization of several projects, including:
 - The implementation of 1169 master plans governing household waste management.
 - The establishment of 120 technical landfill centers.
 - The deployment of 83 waste management units.

Conclusion:

Given the profound role the hydrocarbon sector plays in underpinning Algeria's economy, the national energy strategy places a clear emphasis on augmenting hydrocarbon production to meet the demands of economic development and fulfill international commitments. However, the deleterious environmental consequences of conventional energy sources, which exert a direct, adverse influence on the environment and public health, have prompted Algeria to pivot towards a green economy.

Green economy is founded upon three pivotal dimensions: economic imperatives, social equity, and the sustainable stewardship of natural resources. The overarching objective is to harness these resources judiciously. Notwithstanding commendable endeavors, Algeria is confronted with a series of challenges and predicaments, succinctly summarized as follows:

- The paucity of cross-sectoral coordination, coupled with a disregard for the environment as a foundational consideration in the formulation of developmental blueprints. This deficiency exists in conjunction with a lack of environmental awareness among citizens and an absence of potent regulatory mechanisms for environmental protection.
- Inadequate environmental data repositories and the absence of well-defined sectoral policies to counteract the environmental ramifications of antecedent planning practices, which have unmistakably engendered harm.
- The energy pricing policy, typified by the reduction of prices for petroleum derivatives, fails to reflect the actual cost due to state subsidies. This phenomenon dissuades citizens from modifying their consumption habits.

- Achieving an environmentally sustainable energy paradigm in the short term through the expansion of renewable energies and the promotion of energy efficiency, which is inherently more cost-effective, remains a challenge. This is especially pertinent given Algeria's favorable attributes that could bolster the success of renewable energy sources. This challenge persists amid the proliferation of energy-intensive technologies in the industrial sector.
- The legal framework governing environmental protection and sustainability remains nascent, often reactive in nature as it responds to environmental damages rather than proactively formulating a forward-looking vision. Moreover, these laws suffer from lackluster enforcement owing to the absence of efficacious authorities among pertinent stakeholders, encompassing political and economic domains.

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