



Regional cooperation to address the effects of climate change: Algeria's role in North Africa

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Abstract

This paper analyzes the crucial importance of Algeria in promoting regional cooperation to mitigate climate change impacts in North Africa. Climate change threatens this region through processes such as desertification, water scarcity, and extreme weather events, simply because of a lack of adequate cooperation at the multilateral level. Therefore, the study seeks to highlight what Algeria has done regarding climate change mitigation and adaptation, paying much attention to its legislation aimed at sustainable development. Key findings reveal that Algeria's geopolitical context positions it uniquely to lead collaborative efforts among neighboring countries, advocating for integrated approaches to enhance resilience against climate threats. Finally, the paper calls for the integration of cohesive regional strategies into environmental sustainability and security in North Africa.

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1. *Introduction*

Climate change is a significant contributor to the vulnerabilities faced by North Africa and poses potential obstacles to effective regional cooperation among countries in this area. The Arab nations, despite their relatively low levels of greenhouse gas emissions, are recognized as among the most vulnerable to the impacts of climate change. As we look into the future, it is expected that instances of extreme temperature events will not only rise in intensity but also in frequency. Moreover, annual precipitation within this region could decrease by as much as 20%. The Maghreb region stands out as one of the world's areas most susceptible to the serious and progressive threat of desertification, with numerous studies indicating that this phenomenon is likely to escalate, particularly with projections suggesting that even a 50% reduction in annual precipitation could exacerbate this issue.

Furthermore, North Africa has already experienced a loss exceeding 20% of its surface water resources, driven by a combination of factors including early snow melting, declining groundwater levels, and increased evaporation rates in response to climate change. A significant majority of countries in the region recognize that climate change serves to intensify existing stresses within their water and energy systems, which in turn has detrimental effects on economic activities, public health, and patterns of migration. In light of a variety of existing regional cooperation initiatives, the paper contends that the issue of climate change is

still not adequately addressed at a multilateral level, which would demand a cohesive regional strategy that transcends national borders in the pursuit of sustainable development solutions.

In this context, Algeria's geopolitical situation can be viewed as a microcosm illustrating these complex and high-stakes global challenges. Algeria finds itself in a unique position, observing closely the evolving dynamics of geopolitics while grappling with the need to balance its commitments under international climate agreements alongside the competing demands dictated by power and profit-driven global climatopolitics. The paper contains three main sections that follow the initial introduction; the first delves into the limitations and challenges of regional cooperation within the Mediterranean context, contrasting it against the wealth of collaborative efforts under the African Union framework. Additionally, it reexamines the significance of soft security through the lens of the GECARI initiative, and finally, the paper culminates in an analysis focused specifically on the implications of climate change for Algeria.

Research problem : "How can Algeria leverage its unique geopolitical position and environmental initiatives to foster effective regional cooperation in North Africa, addressing the shared challenges of climate change and ensuring sustainable development?"

1. **Background on climate change and regional cooperation**

This paper takes stock of the multiple environmental challenges of climate change in Algeria and North Africa with a view to identifying the potential role of

regional cooperation in addressing them. At the macro level, climate change manifests itself in a Sahelian drought that is pushing southwards, which makes it imperative to consider the political implications of such a climatic duality. In the southern part of the country, climate records show warming trends in maximum and minimum temperatures and prolonged periods of drought intermixed with floods. In terms of precipitation at the country level, northeastern Algeria is experiencing increased rainfall over time. In the Saharan regions, climate records show a prolonged period of drought terminated by an increased period of rainfall over the last two decades. (Zeggane et al.2021)

The emergence of a cross-cutting problem such as the need to address the effects of climate change creates a political platform on which North African countries can engage towards cooperation. The political determinants of unequal vulnerability are embedded in developed greenhouse gas emissions, their interests in trade and other competition-related issues, and the medium to long-term threats on the condition of life in these countries. The geographic proximity of the Algiers meeting was thus instrumental in discussing the mechanisms of cooperation and civil protection, but also initiated projects to work across Western, Maghreb, and Sahelian diplomatic silos. It is in this evolving context that the serious North Africa desertification followed by a prolonged Sahel drought preceding the conference first shook the conservative status quo in Sahelian partnerships developed with expatriate elites. (Stranadko2022)

2. Algeria's Environmental Geographical features and climate challenges:

2 1.Algeria's Environmental Context

The environmental context in which Algeria finds itself is undeniable given the country's geographical location and economic activity. The territory spreads over 2,381,741 square kilometers and has 1,200 kilometers of coastline along the Mediterranean Sea. Across this vast area, Algeria features beautiful coastal areas, mountainous landscapes, and expanses covered with sand. Specifically, this varying geography accounts for markedly different climates, including Mediterranean semi-arid coastal areas, mountains with cold to mild oceanic habitats, and vast desert regions. The deserts in the country range from the northern semi-arid region with dunes of limited extent and high-density vegetation to the southern arid region with a more typical desert that stretches beyond the limits of the country. (Agoubi, 2021)

In terms of environmental stressors, a combination of the desert, semi-desert, and mountainous areas has led to significant climatic difficulties. Rainfall has shown a downward trend since 2010; this development has worsened the frequency and intensity of drought periods, as evidenced by the drought phenomenon observed in all four agroecological zones in recent years. More generally, the shortage of water resources is notable. The annual volume of water resources is decreasing as around 90% of resources are already exploited and two-thirds of hydro-agricultural perimeters are experiencing

water stress. Algeria is also faced with the gradual desertification of land resources, with ongoing degradation of around 119,000 hectares of land per year. Considering local farmers and herders who use agriculture and breeding as a source of income, this type of environmental degradation exposes the whole region to issues of food security, water scarcity, and scarce vegetation necessary for animal herd feeding. However, the socio-economic implications of environmental degradation do not stop at food security; climate change potentially contributes to security issues and greatly complicates alternative economic activities in a context where agricultural and pastoral activities are threatened. (Bouklikha et al., 2021)

2.2. Geographical features and climate challenges

Over a thousand miles of its beautiful northern coastline stretch majestically along the breathtaking Mediterranean Sea, which has captivated many over time. Algeria also boasts long, rugged, and picturesque beaches that are composed of various sediments alongside rocky cliffs that descend dramatically into the sparkling sea. This expansive northern coastal zone is characterized by a relatively mild and enjoyable climate, which showcases stable Mediterranean climatic conditions throughout the year. As one moves southward from the coast, the depth of the continental region increases significantly, with the vibrant city of Algiers revealing very hilly and varied terrain, accompanied by more open areas and fertile plains that spread across the entire region. The climate and topography gradually undergo transformation as one journeys further south, away from the welcoming coast,

until finally reaching the edge of the vast Sahara Desert, where one can find numerous enchanting oases that provide respite in the harsh landscape. These significant river basins flow gracefully from the majestic Atlas mountain range, which is situated in the far north of the expansive Saharan region. The long, narrow coastal strips along the Mediterranean coast, which are crucial in feeding most of the fresh water supplies, are, however, not primarily responsible for the higher share of the local population engaged in various agricultural activities within the region. (Mastrocicco & Colombani, 2021)

Thus, the main agricultural area is primarily situated in the central and southern parts of the nation, extending inward towards the expansive Sahara, where there are extensive stretches of vast and infinite deserted land, which cover about 80% of the entire Algerian territory. One of the most significant challenges in the Saharan region, in addition to the formidable obstacles posed by the landscape and the harsh environment, includes a large and sparse rural settlement pattern, creating a greater distance between homes and farmlands which complicates access. Both the southern desert region and the rugged coastline are particularly vulnerable to the adverse impacts of climate change. Climate change in the Saharan and desert areas, characterized by increased temperatures and ongoing desertification, has been a central aspect of climate discussions and considerations in Algeria. In contrast, the changes observable in the coastal zone are distinctly different, encompassing higher sea levels and an increase in the frequency of severe

storms. Groundwater resource distribution is also significantly influenced by these spatial geographical differences that arise from the low levels of annual rainfall and the existence of dissipated aquifers. Climate change further complicates the situation by affecting various areas unevenly, thereby making it imperative to adopt diverse and tailored mitigation strategies that consider local conditions. (Tuel et al., 2021)

3. Algeria's Initiatives in Climate Change Mitigation and Adaptation

In recent years, Algeria has been actively engaging in a diverse range of initiatives at the national level, aiming to showcase its firm commitment to not only mitigating the effects of climate change but also preparing for its various impacts. The country has developed an extensive list of legislative and regulatory texts, all designed to significantly reduce greenhouse gas emissions while simultaneously increasing the share of renewable energies within the national energy mix. This strategic move underscores Algeria's proactive stance toward environmental responsibility. Furthermore, Algeria has strategically integrated climate matters into the framework of its energy and environmental policies, which it has pledged to uphold, all while remaining steadfastly committed to the principles of sustainable development and ecological balance. In alignment with these goals, Algeria has made considerable investments in enhancing energy efficiency and has revitalized large-scale afforestation programs aimed at restoring and preserving its vital green areas. Additionally, it has taken important steps to implement national disaster risk reduction strategies

and has adopted critical adaptation measures specifically tailored for both the agricultural and construction sectors.

In response to the challenges presented by the Arab Spring and the repercussions of the global financial crisis, the country has initiated a comprehensive approach to implementing measures designed to systematically reduce energy subsidies, thereby fostering a more sustainable economic environment while also tackling climate change head-on (Atmani2024).

Algeria has consistently and steadily developed increasingly robust and solid strategies aimed at effectively reducing its greenhouse gas emissions, while also better planning for its necessary adaptation to the ongoing challenges presented by climate change. Indeed, from the very outset of this journey, Algeria has consciously placed social equity right at the core of its climate policy framework, thus significantly emphasizing the importance of justice – or perhaps even more accurately, the critical aspect of social justice – in relation to climate issues. The country's express wish is to transcend the traditional and often narrow approach that boxes Algeria into the category of oil-producing OPEC states, thereby seeking to reposition the nation as a genuine and committed guardian of both the environment and the climate. To fulfill this ambitious aim, Algeria took the proactive step to convene the North Africa Environmental Governance Symposium, which has proven to be an important gathering of minds focused on environmental stewardship. This was followed by an equally significant dedicated training program specifically tailored for the advancement of renewable

energy sources and effective energy management practices. (Bergougui, 2024)

3.1 National policies and strategies

As a complement to the legislative framework governing the protection of the environment and management of natural resources and to promote the concept of sustainability in present and future strategies and plans, the following national policies and strategies were provided in Algeria: - The Act of 1983 on the protection of the environment and the conservation of natural resources; the Land Law; the Investment Code; the Forestry Code; the Water Law; the National Plan on Environmental Policy; the National Rural Development Strategy 2025; the National Energy and Mines Development Plan; the Renewable Energy and Energy Efficiency Development Plan; the National Climate Plan; and the Sustainable Development Strategy: 2030 Horizon. The combined effect of those texts consists of constituting the legislative and regulatory framework and national policy dedicated to integrated water resources management. The Ministry of Environment and Renewable Energy is the sectoral body responsible for coordinating both the monitoring of the implementation of international environmental conventions and the development of related national legislation, policies, and strategies concerned.

It houses the National Agency for the Protection of the Environment and the Control of Industrial Risks, civil society, and all the stakeholders for the application of environmental legislation and international obligations in this field. Assurance of compliance with the national commitment within multimodal and multisectoral legal provisions and political

measures with the provisions taken at the regional and international levels. The actual level of CO₂ emissions per capita being three times below the average at the world level, we are continuing four strategic programming missions carried out in line with this emerging concept of efficiency: Editorial, information, communication, and prevention. Economy; for the environment; Regulatory; for energy for GHGs. Thus, other measures and actions necessary for a committed responsibility, including the development of coherent, efficient, economic, and accepted action paths, bear first on general and cross-cutting measures, mainly concerning the development of systems based on the articulation of writing, information, communication crisis, and prevention, hoping that the planned coordination actions will enable the operationalization of the mission entrusted to the Ministry mentioned above. (Bergougui, 2024)

4. Algeria's Role in North African Regional Cooperation

Algeria has significant incentives to actively foster and promote regional cooperation among North African countries in order to effectively address the urgent concerns pertaining to climate change, which affects the entire region. Recent discussions focusing on the design and implementation of Tunisia's National Adaptation Plan provided numerous valuable insights into how neighboring countries could work together and collaborate on various shared climate issues. Experts outline compelling reasons to believe that Algeria could assume a central role in promoting and facilitating such cooperation among its neighbors. For

many years, Algeria has demonstrated its commitment by actively engaging in regional environmental cooperation efforts. From the late 1970s up until approximately 2011, Algeria has consistently been a key actor in numerous regional initiatives, all within the framework of important organizations and treaties such as the Arab Maghreb Union, the African Union, the Environment Action Program, and the Barcelona Convention. Environmental sustainability is recognized widely as a crucial sector that has been identified as the most strategic for advancing regional integration and collaboration within North Africa. This illustrates the critical importance of collective action in the face of climate challenges. (Saidi et al., 2024)

The North African region is composed of five countries—Algeria, Libya, Mauritania, Morocco, and Tunisia—and there are many political and economic connections among them. Algeria is centrally located in the region. In driving regional cooperation, Algeria has also emphasized challenges of security and radicalization, calling for an “overall approach at North African and Sahel levels” that is not purely felt “at national levels.” Algeria could lead in terms of extractive industry conflicts if it sought improvements to resource sharing in multilateral negotiations. Both pragmatic and principled motivations are present in the Algerian discourse. Resource sharing and the Gulf of Gabes project are also aspects of UMA’s cooperation. Overall, it seems that regional cooperation is driven by Algeria, while outcomes might be impeded by various factors hampering

cooperation between Algeria and its neighbors. Despite such challenges, Algeria’s leadership has fostered North African cooperation in various fields through initiatives, and over time, has been able to create many fora for North-South collaboration to tackle shared climate issues. (Hadjer, 2023)

4.1 Existing regional partnerships and collaborations

Through its national and transboundary efforts, Algeria is helping to establish regional partnerships among North African countries and to develop the capacity of NENA governments to adapt to climate change. Outside of the UNFCCC process, Algeria has been involved in a number of initiatives, jointly agreed among neighboring Saharan countries, that directly address its wishes for regional environmental cooperation in the NENA region. Most significantly, in October 1989, Algeria and Mauritania signed the Convention Concerning the Regime of Navigation, Canalization, Distribution and Utilization of the Waters of the Senegal River, which entered into force on 25 September 2002 and included Senegal just prior to the Convention taking effect. (Africa)

Algeria and its regional neighbors have been founding members and partners in a range of water and energy cooperation projects linked to the natural environment and climate change adaptation. The program for the conservation and sustainable use of water and ecosystems in the Sahara and Sahel has involved Mauritania, Algeria, Mali, Niger, Chad, Tunisia, and Morocco since 1986. Collaboration in the fields of environment,

water, and energy resources continued into the 1990s and 2000s. By 2008, the Africa-European Union Strategic Partnership made reference to the countries of North Africa as being in the same 'neighborhood' with similar threats, including climate change. Positive signs of cooperation in this field include: (a) the Programme of Work of the Permanent Conference of Maritime Affairs in the Western Mediterranean; and (b) the Convention for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources. Both of these agreements are signaled as being motivated by climate change, hydrological and environmental change, and the instability it has brought about. In 2008, a four-year project was established to facilitate and support cooperation between Arab countries in the region. (Naylor, 2024)

5. Challenges and Opportunities for Enhanced Cooperation

Though there may be ample motivation for regional cooperation in the domain of climate change in North Africa, several barriers to enhancing the level of exchange and dialogue exist. These include vast political differences and territorial disputes, economic constraints, and severe social disparities within the region. Beyond the careful political and strategic interest in promoting cooperation or maintaining the status quo, several gaps may obstruct dialogue in this domain at the regional level. Information barriers such as incomplete or shifting data within countries, or country-specific methodologies for quantifying scenarios, can lead to a lack of coherence and a general misunderstanding of the diverse national visions and constraints associated

with each country's adaptation and mitigation strategy. Barriers might also be structural, related to the complex administrative methods of each country, as well as to the overlapping mandates and initiatives of the numerous climate-related institutions and ministries in the region. Such a fragmented approach has the potential to lead to premature steps and a waste of resources in terms of duplicating rather than building synergies in policy responses. (Alharbi & Csala, 2021)

Though there might be several challenges, there are also strong incentives for countries in the region to cooperate in the context of climate change. The potential for technology transfer is particularly high in a number of domains that are of shared interest to the countries of the region, including wind, solar, and hydro energy. Enormous gains can be made in replicating best practices in terms of water management, green belt development, and coastal and flood management. Building upon the existing structure of regional and subregional dialogues in the Sahara and Sahel, regional bodies could play a critical role in regrouping the concerned countries and providing adequate support for dialogue and exchange. Finally, and arguably more importantly, dialogue at the regional level can contribute to the establishment of firm climate change governance foundations. Many mainstream scholars consider that low levels of trust and shared objectives often weaken international environmental treaties or are used as an excuse to argue against countries' commitment to ambitious or binding emission targets. As such, on top of its own merits and interests, building

regional dialogue can feed into stronger global commitments. (Chang et al.2021)

5.1 Barriers to effective regional cooperation

In North Africa, where the environmental and socio-economic effects of climate change are already acutely felt, cooperation remains fragile, and no regional climate change partnership encompasses all affected countries. Several barriers impede more effective collaboration. One is the presence of outstanding geopolitical tensions within a semi-institutionalized setting, which leads to mistrust and delays in overcoming acute environmental challenges. Disparate levels of national economic development and varying needs and interests within many of these countries translate into different policy preferences. Technical and financial capacities to implement effective environmental policies and scenarios also show notable differences, particularly with regard to dealing with adaptation and the management of political risks. (Lahn & Shapland, 2022)

There are further significant differences in North African countries' national cultures, perceived identities, and self-perceptions, and these affect national climate change policies as well. Internationally imposed priorities and the local publics' marginal positions within some countries' national politics and societies pose further barriers to regional coordination. These barriers are most severe with regard to approaches towards subsystems in which the human element plays a crucial role; the reduction of pollution in transboundary streams and rivers benefits all riparian states more or less equally. Addressing and overcoming

these barriers is an essential element in fostering future regional cooperation. Deepened interdisciplinary, multi-sector dialogue must aim to foster more extensive, detailed, and practical knowledge. (Marks & Miller, 2022)

I. Methods and Materials:

For the purposes of our paper, regional cooperation encompasses all initiatives aiming at fostering the development and adoption of measures, practices, and policies to moderate the negative effects of climate change and promote sustainable development. These initiatives may have a regional, sub-regional, or international focus. Regional cooperation can take different forms, ranging from conventional governmental collaborations to more inventive public-private partnerships involving actors across various sectors and disciplines. Well-established methods, including a survey and a review of the literature, are used. To be specific, we identified initiatives aimed at building a better understanding of actual and potential impacts of climate change and efforts to promote climate cooperation .

Results of the survey, supported by a theoretical examination of possible reasons why North African hotspot countries are not active in regional cooperation, were analyzed. Regional environmental cooperation is about fostering collaboration among countries sharing a common border through the sharing of information and/or common responses to environmental problems. This study explores whether North African countries have provided a timely response to adequately address negative climate impacts. It assesses the regional

cooperation initiative of only one country, Algeria. Given the absence of any other meaningful climate change cooperation or effort on the part of the Sahel hotspot countries, the authors were unable to evaluate them. (Kyriakopoulos & Sebos, 2023)

Results and discussion :

The North Africa region has common socio-economic, environmental, and security issues. It is among the most affected in the world by the effects of climate change. This fact and the complexity of the impacts of these changes on its countries dictate reinforcing their capacity to confront this issue. Important measures in this context are those achieving economic integration, the transfer of technology and financial resources, and the exchange of experiences and good practices. Although in evolution, intra-regional cooperation remains limited within the region. The growing incidence of the impacts of climate change in the southern shore raises the issue of its incorporation into the objectives of cooperation with a view to attaining a level in line with the needs and geographical dimension of the challenge. The main aim of the work is to analyze whether the main ways used to reduce the effects of economic and social development on climate change and the adaptation to this are significantly different between the countries of the North African region, and those differences have repercussions on its intra-regional cooperation.

The objectives of the work are based on several premises: recent facts make more relevant the importance of the impacts of climate change. The North Africa region does not have to be an isolated entity in the

global economy, since it depends mainly on differentiation and the heterogeneity of the geographic areas with which it is integrated. However, the potential benefits that may be achieved from internal integration are not materializing due to the constraints imposed by the difficult transition from the current period to the competitive period. Since nations respect their sovereignty and Africa is burdened with many smaller states, the path to regional integration, prior to seeking its internal advantages, involves the determination of some prerequisite conditions. The structural problems of underdevelopment and underpopulation of the countries of the southern shore are factors that weaken the economies of scale of regional cooperation in North Africa. The conjunction of these difficulties suggests analyzing if increasing the frequency of cooperation in topics with a regional vocation in the field of climate change could lead to a multiplication of specific benefits, although the overall magnitude does not significantly alter the aggregate peculiarities, regardless of the importance of the challenge.

II. Conclusion:

We began this study by inquiring whether and how Algeria addresses the security aspects of climate change in its domestic and foreign policy. We were able to affirm this, but also to expand the focus of our conclusions. As regards North Africa, well before developing the National Adaptation Program, Algeria was tackling climate change through technical and financial transfers to its destitute neighboring countries. The in-depth analysis of the experience of Algeria and its limitations has shown that the technical component is

essential but needs to be backed by dedicated financial resources. Overall, our deepened reflection shows that we are facing a twofold process of potential collaboration: improved coordination and intentional mutual learning among countries of North Africa. Algeria is making headway in creating resilient systems and encouraging exchange between its citizens, interested in people's strategies, and the concerned ministries.

The situation is possibly different in desert-adjacent countries, where uncontrolled cross-border movements could shake up the entire balance of the southern part of the region. The most important conclusion is of a psychological order. Domestic satisfactions linked to public policies are considered essential. It is equally important to Algeria that the regional strategy be effective but also that it be accompanied by a significant increase in the country's leadership. This leads to an important political diagnosis. Internal confrontation and divergence negatively affect the North African decision-making process at two levels: that of the country's internal relations and of the relations between the different countries in the region. The most important challenge, therefore, is to start by changing these relations. Public policy must remain a basic priority, but in itself, it will fail to put itself into practice without changing the degree of relations between countries. All other challenges are likely to show the same profile of responses.

Recommendations:

This paper has proposed joint arrangements to defend North Africa from the effects of climate change. The suggested arrangements are:

- (1) stabilizing the Maghreb's population
 - (2) constructing an electricity market to cover the Maghreb
 - (3) establishing Maghrebi food security
 - (4) setting up a Maghreb investment fund to finance development projects.
- Implementing these recommendations will also provide a medium through which the Maghreb's leaders can meet, discuss, and reach agreements on how the area should relate to other Mediterranean countries, the Arab world, and continental Africa. The recommendations are aimed at government officials, academics, and experts studying, managing, and guiding the countries' economic policies. A less detailed guide can be prepared for advisors who assist the leaders of the Maghreb's countries. Once completed, the full study that includes details and calculations should be used by the countries' leaders when they decide the best arrangements to put in place in order to defend the area. The aim is to ensure that the arrivals of the next generation will be able to enjoy living and working in the area that their predecessors have inherited.

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