

*Development and Environmental Protection in the Saharan Atlas: An Environmental and Legal Study of the Status of the Aissa Mountain National Park in Southwestern Algeria*

التنمية وحماية البيئة في الأطلس الصحراوي: دراسة بيئية وقانونية لوضعية الحظيرة

الوطنية لجبل عيسى بالجنوب الغربي الجزائري

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**Abstract (English):**

Saharan Atlas constitutes a vital component of Algeria's ecological diversity. It faces significant challenges in reconciling the demands of economic and social development with the urgent need to safeguard its fragile environment. Within this critical zone lies the Aissa Mountain National Park, a prominent example of these challenges. Situated in the southwest, specifically in the Ain Sefra region of Naama Province, the park forms part of the Ksour Mountains, which represent the western extension of the Saharan Atlas.

The park's unique geographical location at the Saharan-Mediterranean border bestows upon it exceptional ecological characteristics. These include rich biodiversity and interconnected habitats within a limited area. The park encompasses a distinctive natural, cultural, and historical heritage, harbouring rare and endangered plant and animal species. Its location also renders it susceptible to a range of environmental challenges, such as desertification, water scarcity, and biodiversity loss, in addition to the escalating impacts of climate change.

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This study examines the current legal framework governing the Aïssa Mountain National Park while analysing the effectiveness of implemented environmental policies in addressing pressing issues. It further sheds light on the importance of environmental legislation and the roles of governmental institutions and civil society organizations in bolstering environmental protection and achieving balanced development that preserves the environment and meets the needs of local communities. The focus is on the interplay between economic, social, and environmental factors to ensure a sustainable future for the Aïssa Mountain National Park and its inhabitants.

**Keywords:** The Saharan Atlas, the Aïssa Mountain National Park, environmental protection, sustainable development

#### ملخص باللغة العربية :

يعد الأطلس الصحراوي جزءًا حيويًا من التنوع الإيكولوجي الجزائري، حيث يواجه تحديات كبيرة لتحقيق التوازن بين متطلبات التنمية الاقتصادية والاجتماعية وضرورة حماية بيئته الهشة. وضمن هذا المجال الحيوي تقع الحظيرة الوطنية لجبل عيسى، التي تمثل نموذجًا بارزًا لهذه التحديات، في الجنوب الغربي وتحديدًا بمنطقة العين الصفراء بولاية النعامة، وهي جزء من جبال القصور التي تشكل الامتداد الغربي للأطلس الصحراوي. تتميز الحظيرة بموقعها الجغرافي الفريد عند الحدود الصحراوية-المتوسطية، مما يمنحها خصائص بيئية استثنائية تشمل تنوعًا بيولوجيًا غنيًا ومواطن بيئية متداخلة ضمن نطاق محدود. تحتوي الحظيرة على تراث طبيعي وثقافي وتاريخي مميز، حيث تضم أنواعًا نباتية وحيوانية نادرة، بعضها مهدد بالانقراض. كما أن موقعها الجغرافي يجعلها عرضة لتحديات بيئية متعددة، مثل التصحر، ندرة المياه، وفقدان التنوع البيولوجي، إلى جانب التأثيرات المتزايدة لتغير المناخ.

تناول هذه الدراسة الإطار القانوني الحالي الذي يحكم الحظيرة الوطنية لجبل عيسى، مع تحليل فعالية السياسات البيئية المطبقة في مواجهة القضايا الملحة. كما تسلط الضوء على أهمية التشريعات البيئية ودور المؤسسات الحكومية ومنظمات المجتمع المدني في تعزيز الحماية البيئية وتحقيق تنمية متوازنة تحافظ على البيئة وتلبي احتياجات السكان المحليين. من خلال التركيز على الترابط بين العوامل الاقتصادية والاجتماعية والبيئية لضمان مستقبل مستدام للحظيرة الوطنية لجبل عيسى وسكانها.

كلمات مفتاحية: الأطلس الصحراوي، الحظيرة الوطنية لجبل عيسى، حماية البيئة، التنمية المستدامة

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## 1- Introduction

National parks are one of the most important types of protected areas in Algeria. They are natural regions of high environmental value. National parks are characterized by their biological diversity and richness in natural resources. These parks aim to protect ecosystems and preserve animal and plant species, in addition to promoting eco-tourism and scientific research (Benchouala, A., Bekdouch, F., & SI BACHIR, A. (2023).

The Algerian legislator has given significant attention to national parks by enacting numerous laws and regulations that govern their establishment, management, and protection. Among the most important of these laws are Law No. 03-83 concerning environmental protection and Law No. 02-11 concerning protected areas (Betrouni, M. (2024)).

Law No. 02-11 defines a national park as "a natural area of national importance established for the complete protection of an ecosystem or several ecosystems, aiming to ensure the

preservation and protection of unique natural areas due to their biological diversity, which has made them open to the public for education and recreation." National parks in Algeria are classified into three categories, which are:

- National parks in coastal areas, such as El Kala National Park, Gouraya National Park, and Taza National Park.
- National parks in mountainous areas, such as the Djurdjura National Park, the Belezma National Park, the Chrea National Park, the Thénia El-Had National Park, and the Tlemcen National Park.
- National parks in desert areas, such as Tassili n'Ajjer National Park and Hoggar National Park (Fenni, M. (2009).

National parks in Algeria face many challenges, including pollution, overgrazing, urban expansion, and a lack of financial and human resources. To ensure the protection of these parks and maintain their sustainability, the efforts of all concerned parties, including the government and civil society, must be combined to provide the necessary resources for their management and protection, and to raise environmental awareness among citizens about the importance of these areas.

## **2- Study area**

### **2.1- Technical card about the Aissa Mountain National Park**

The Aissa Mountain National Park is considered a region of significant geological and ecological importance, as it represents an important part of the Saharan Atlas Mountain range. It is characterized by its unique biodiversity and natural richness, making it a focal point for researchers and environmental enthusiasts.

The Aissa Mountain is located in the heart of the Saharan Atlas region and is considered the western boundary of the Kasbah Mountains range. Its strategic location distinguishes the Aissa Mountain to the south of the Ouarsenis Highlands, bordered to the north by the Chott Chergui, which is considered a vast salt flat. This location makes it part of a transitional area between the coastal plains and the rugged terrain of the Saharan Atlas.

Mount Issa is administratively under the municipalities of Twit and Ain Sefra, which are part of the Naama province. The Naama province is considered a border area with many other Algerian provinces, such as Tlemcen and Sidi Bel Abbes. This geographical and administrative location makes the Aissa Mountain a region of strategic importance, as it represents a connecting point between various areas and regions (Sekkoum, S., & Maachou, H. M, 2018).

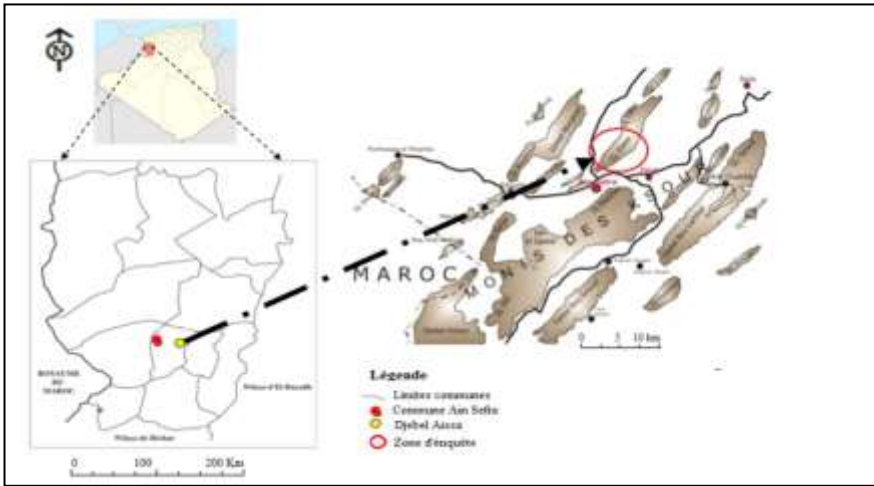


Fig.1. The site of The Aissa Mountain National Park

## 2.2- Natural characteristics

The "Ksarous Sandstone" is considered the most important geological component of Mountain Aïssa, and it is a sandstone with a yellow or light brown colour. This stone formed in the Jurassic period, about 150 million years ago. In addition, there are other geological formations in The Aïssa Mountain, such as clay and limestone rocks, which date back to different geological eras (Kouider, Hadjadj, Mohammed, B., Mohammed, M., Abdelkader, O., & Abdelkarim, R. A. H. M. O. U. N. E, 2019).

The height of the highest peak in Mount Aïssa reaches 2,236 meters, making it the highest peak in the Kasour Mountain range. This height makes the Aïssa Mountain rank fourth among the highest peaks in Algeria.

The terrain of the Aïssa Mountain is characterized by ruggedness and diversity, with deep valleys and vast plains interspersed throughout, creating stunning natural landscapes. These valleys were formed as a result of the impact of erosion factors, such as water and wind, on the rocks over thousands of years. As for the plains, they are relatively flat areas formed as a result of the accumulation of sediments carried by water (Mohammed, B., & El Haitoum Ahmed, H. K. (2018).



Fig.2. An image of the peaks of the Aissa Mountain National Park.

### 2.3- Plant diversity Plant diversity

The Aissa Mountain is not just a unique geological formation, but it is also home to a vibrant ecological diversity that deserves study and contemplation. The Aissa Mountain hosts a variety of plants, some of which date back to very ancient times, such as the Tiliacine plants that date back to the early Quaternary period. These plants represent a living testament to the region's history and its evolution over time.

In addition, there are endemic plant species in the Aissa Mountain that are not found anywhere else in the world, and they are threatened with extinction. These species include unique herbs and shrubs and require special attention for their protection and preservation.

The plant diversity in Mount Issa is not limited to ancient and endemic species; it also includes a wide range of other plants, such as herbs, white wormwood, esparto, as well as date palms, pistachios, Phoenician juniper, green oak, cedar, and Aleppo pine. These plants play an important role in the mountain's ecosystem and contribute to the balance and beauty of nature (Sekkoum, S., & Maachou, H. M. (2018).



Fig.3. The plant diversity in the Aissa Mountain National Park

### 2.4- Animal diversity

The animal diversity in the Aissa Mountain is no less important than the plant diversity, as the mountain is home to a variety of animals, such as wild rabbits, wild boars, jackals, and foxes. These animals represent an important part of the wildlife in the region and play a role in maintaining the balance of the food chain. Additionally, there are rare animal species in the Aissa Mountain that were

once abundant, such as the badger, the ibex, the sheep and the Dorcas gazelle. These animals are endangered and require special efforts to protect them and provide suitable conditions for their survival.

The Aissa Mountain is home to approximately 25 species of birds, all of which are protected by law. These birds include various species, such as the golden eagle, the peregrine falcon, the lanner falcon, and the ostrich, and they are considered an important part of the region's biodiversity. In addition to the unique natural features and environmental diversity that Mountain Aissa boasts, it holds significant importance on both environmental and tourism levels, necessitating a more detailed spotlight on these aspects (Hadjadj, K., Guerine, L., & Derdour, A. (2021).



**Fig.4. The animal diversity in the Aissa Mountain National Park**

### **3- The multidimensional importance of the region**

#### **3.1- Environmental Importance**

The Aissa Mountain National Park is considered an important natural refuge, serving as a safety valve that protects the region from increasing environmental threats. Environmental importance: The Aissa Mountain National Park is considered an important natural refuge, serving as a safety valve that protects the region from increasing environmental threats. These threats include desertification that is encroaching on vast areas, overgrazing that leads to the deterioration of vegetation cover, and pollution that affects the quality of air, water, and soil. The sanctuary plays a pivotal role in maintaining ecological balance and protecting endangered plant and animal species. It can be considered an open natural laboratory for scientists and researchers, offering the opportunity to study unique ecosystems and rich biodiversity, these studies provide valuable information that helps in better understanding environmental changes and how to address them.

#### **3.2- The tourist and cultural significance**

The Aissa Mountain National Park has become an attractive destination for tourists and nature lovers, where they can enjoy the stunning landscapes and unique biodiversity. Touristic and cultural

significance: The Aissa Mountain National Park has become an attractive destination for tourists and nature lovers, where they can enjoy the stunning landscapes and unique biodiversity. Tourists can engage in various activities, such as hiking, camping, and mountain climbing, which contribute to stimulating the local economy. The Kasr Mountains, especially the Tiyut Mountains, contain around 50 sites of cave carvings, making them an important archaeological site that bears witness to the region's history and culture. These sites attract tourists interested in history and archaeology, providing them with the opportunity to learn about the ancient civilisations that once inhabited the area.

#### **4- Environmental and Human Challenges in The Aissa Mountain: A Comprehensive Overview**

The Aissa Mountain, a prominent natural landmark in Algeria, faces a range of environmental challenges that threaten its sustainability and unique biodiversity. One of the most prominent challenges is desertification, which leads to the degradation of vegetation cover and a decline in soil fertility, threatening the survival of many plant and animal species. This problem is exacerbated by overgrazing, with the number of sheep in the Naama province estimated at around 1.6 million heads, which far exceeds the carrying capacity of the pastures. Consequently, this contributes to the destruction of vegetation and soil degradation, threatening biodiversity and worsening the desertification problem. Studies indicate that approximately 80% of the area of Naama province is threatened by desertification (Khelif, K. (2022).

Additionally, the Aissa Mountain suffers from a pollution problem, which affects the quality of air, water, and soil, threatening the health of humans, animals, and plants. The sources of pollution in the area include agricultural and industrial activities, in addition to household waste. The region also suffers from the deterioration of water resources, with the flow rate of water in some springs in the Aissa Mountain decreasing by up to 66% due to drought and water misuse, threatening water security and affecting biodiversity.

Moreover, it doesn't stop there; climate changes also affect the Aissa Mountain through rising temperatures, with an increase in the average temperature in the region estimated at 0.5 degrees Celsius over the past two decades and fluctuations in precipitation, which threaten biodiversity and exacerbate the problem of desertification.

The challenges facing the Aissa Mountain are not limited to environmental factors; they extend to include the increasing population pressure, where the population of Naama Province has exceeded 313,445 people, and this number is expected to double by 2050, leading to increased demand for natural resources, which contributes to environmental degradation and exacerbates the

problem of desertification. Unsustainable agricultural activities, such as farming on marginal lands and the use of pesticides, also contribute to soil degradation and water pollution. Reports indicate that only about 25% of the reclaimed agricultural lands under the land distribution project are being utilised.

Some industrial activities lead to air, water, and soil pollution, threatening human health and the environment. Poor urban planning also leads to haphazard urban expansion, threatening agricultural lands and biodiversity.

Finally, the lack of environmental awareness is considered one of the most important challenges facing the Aissa Mountain, as it contributes to the exacerbation of environmental problems, such as pollution and waste disposal (Gordo, B., & Hadjadj-Aoul, S, 2019).

## **5- Environmental legislation and its role in protecting the Aissa Mountain**

In embodiment of Algeria's efforts to preserve the environment and its biodiversity, Executive Decree No. 03-148 was issued on the 26th of Muharram 1424 AH, corresponding to March 29, 2003 AD, which stipulated the classification of part of the Aissa Mountain in Naama Province as a national park, with a total area of 24,400 hectares, distributed over the municipalities of Ain Safra and Tiout.

The Aissa Mountain National Park is defined by clear boundaries, starting from the south, where it extends along the area at an altitude of 1200 meters above sea level, beginning from Ain Bou Dena, passing through Ain El Beida, and reaching Tiloula and Hassi Messaoud. As for the north, the park follows the area that is 1400 meters above sea level, starting from Ain Bou Dma, passing through the northern part of Hassi Bou Ghlaba, and reaching the northern part of Gour El Amara. In the west, the railroad linking Ain Sefra and Naama defines the park's boundaries, while National Road No. 47 forms its eastern limit.

This step aims to protect the area and preserve its unique natural resources by defining a precise geographical scope that prevents any ambiguity regarding the classified area.

### **5.1- Evaluation of Executive Decree No. 03-148 in light of the Sustainable Development Goals**

Evaluation of Executive Decree No. 03-148 in Light of Sustainable Development Goals Despite the importance of Executive Decree No. 03-148 in designating part of the Aissa Mountain as a national park, it suffers from some shortcomings that may affect its effectiveness in protecting the environment and biodiversity in the region.

- A. The absence of accompanying maps with the decree:** The lack of detailed maps showing the boundaries of the national park is one of the most notable shortcomings of this decree. The absence of maps attached to the decree: The lack of detailed maps showing the boundaries of the national park is one of the most notable shortcomings of

this decree. The presence of accurate maps contributes to precisely defining the classified area on the ground and facilitates the monitoring of human activities within it. The absence of maps also makes it challenging to implement the decree on the ground, and it can lead to violations by some entities, which threatens the ecosystem within the park.

- B. Failure to establish a buffer zone:** Establishing a buffer zone around the national park is considered a necessary measure to mitigate the impact of human activities on the ecosystem within it. Failure to designate a buffer zone: Designating a buffer zone around the national park is considered one of the necessary measures to reduce the impact of human activities on the ecosystem within it. The buffer zone represents a barrier that separates intensive human activities from the protected area, contributing to the protection of biodiversity within the park. The decree has neglected to designate a buffer zone, exposing the park to numerous threats such as pollution, overgrazing, and urban expansion (Kerbiche, F. (2023).
- C. The absence of precise monitoring and evaluation mechanisms is a significant issue,** as the presence of precise mechanisms is one of the essential elements to ensure the effectiveness of any environmental project. These mechanisms contribute to monitoring human activities within the national park and assessing their impact on the environment, enabling necessary actions to protect biodiversity. The decree has overlooked the establishment of precise monitoring and evaluation mechanisms, which threatens its effectiveness in achieving its objectives.
- D. The absence of clear sustainable development plans:** Achieving sustainable development is considered one of the most important goals of environmental protection, as it ensures a balance between environmental protection and achieving economic and social development. The decree has overlooked the establishment of clear plans for sustainable development of the area, which could lead to conflicts of interest among various parties and threaten the sustainability of the national park.

## 6- Conclusion

In conclusion, the Aissa Mountain National Park serves as a vital model for the challenges facing protected areas in Algeria, especially in light of the delicate balance between economic and social development and environmental preservation. Its unique geographical location, rich biological diversity, and cultural and historical heritage make it an area of national and regional importance. However, the reserve faces many challenges, ranging from environmental threats, such as desertification and the degradation of water resources, to human pressures, such as overgrazing and unregulated urban expansion. These challenges are compounded by some deficiencies in the legal

framework governing the park, which may affect its effectiveness in achieving its goals of protection and sustainable development.

Therefore, ensuring the sustainability of the Aissa Mountain National Park requires the concerted efforts of all concerned parties, including the government, civil society, and researchers, to develop comprehensive and effective plans that address these challenges and contribute to achieving sustainable development for the region. It includes strengthening the legal framework, developing monitoring and evaluation mechanisms, activating the role of sustainable eco-tourism, and raising environmental awareness among the local community.

Protecting the Aissa Mountain National Park is not just a national duty, but a responsibility toward future generations, to ensure the continuity of this unique ecosystem and preserve its natural and cultural wealth.

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## The bibliography

1. Benchouala, A., Bekdouch, F., & SI BACHIR, A. (2023). The update and ecological status of the flora of the Belezma National Park, Algeria. <https://doi.org/10.13057/biodiv/d241135>
2. Betrouni, M. (2024). From national park to cultural park an Algerian experience. *Journal of Geography and Cartography*. <https://doi.org/10.24294/jgc.v7i2.6358>
3. Fenni, M. (2009). climatic changes and natural resources management in algeria.
4. Sekkoum, S., & Maachou, H. M. (2018). Le parc national de Tlemcen (Algérie). *Études caribéennes*, (39/40), 406-427.
5. Kouider, H. A. D. J. A. D. J., Mohammed, B., Mohammed, M., Abdelkader, O., & Abdelkarim, R. A. H. M. O. U. N. E. (2019). Importance des plantes médicinales pour la population rurale du parc national de Djebel Aissa (Sud ouest algérien). *Lejeunia, Revue de Botanique*
6. Kouider, H. A. D. J. A. D. J., Mohammed, B., Mohammed, M., Abdelkader, O., & Abdelkarim, R. A. H. M. O. U. N. E. (2019). Importance des plantes médicinales pour la population rurale du parc national de Djebel Aissa (Sud ouest algérien). *Lejeunia, Revue de Botanique*.
7. Sekkoum, S., & Maachou, H. M. (2018). Le parc national de Tlemcen (Algérie): un potentiel touristique sous-exploité. *Études caribéennes*, (39-40).
8. Hadjadj, K., Guerine, L., & Derdour, A. (2021). Flore des populations de frêne dimorphe (*Fraxinus dimorpha* Coss. & Durieu) dans l'Atlas saharien (Monts des Ksour, Algérie Occidentale). *Lejeunia, Revue de Botanique*
9. Khelif, K. (2022). Les Monts des Ksour d'Ain Sefra: De l'Art Rocheux aux ksour. *المجلة المغربية للدراسات التاريخية والاجتماعية*, 14(2), 593-609
10. Gordo, B., & Hadjadj-Aoul, S. (2019). L'endémisme floristique algéro-marocain dans les monts des Ksour (Naâma, Algérie). *Flora Mediterranea*, 29, 129-142.
11. Kerbiche, F. (2023). *La politique publique de gestion des parcs nationaux, un outil* de préservation du patrimoine naturel et de développement des territoires: cas du *djurdjura (PND)* (Doctoral dissertation, UNIVERSITE DE MOULOUDE MAMMERI DE TIZI-OUZOU).