II-Chapter 02: Environmental legislation applied to variable ecological units:

1. Definitions:

1. 1. Environmental legislation:

Environmental legislation is the set of laws, regulations, decrees, standards, and legal principles adopted by national, regional, or international authorities to regulate human interaction with the natural environment and ensure its protection, conservation, restoration, and sustainable use. It establishes a structured legal framework aimed at preventing and controlling pollution of air, water, and soil, protecting biodiversity, ecosystems, natural habitats, regulating the management of waste and hazardous substances, and ensuring the rational exploitation of natural resources.

Environmental legislation defines the rights and obligations of individuals, enterprises, and public authorities, sets quality standards and permissible limits for environmental emissions and discharges, requires environmental impact assessments for projects likely to affect the environment, and creates monitoring, enforcement. It also integrates international environmental agreements into domestic law and promotes a balance between economic development and environmental protection to safeguard human health, ecological balance, and the interests of present and future generations.

1.2. Ecological units:

Ecological units or natural divisions are land or water areas and ecosystems that are delineated based on similarities in their biological, physical, and ecological characteristics, including climate, geology, landform, soils, hydrology, and potential natural vegetation. They represent natural spaces with relatively uniform ecological potentials and limitations, reflecting similar ecosystem structure, function, processes, and responses to disturbance and management activities. Ecological units are organized within a hierarchical framework at different spatial scales and are used to identify and classify a map landscape in order to support ecological assessment and resource management.

2. Position of environmental legislation among variable ecological units:

2.1. National parks:

2.1.1. Concept of a protected area:

According to the IUCN (International union for conservation of nature), a protected area is “a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature together with associated ecosystem services and cultural values.”

2.1.2. Concept of a National Park:

A national park is classified as a Category II protected area **(Table 01).** According to the International Union for Conservation of Nature, national parks are defined as: ″Large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic

of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities."

Table 01. Classification of protected areas (UICN)

Category	Description
Ia	Strict Nature Reserve: Protected area managed mainly for science.
Ib	Wilderness Area: Protected area managed mainly for wilderness protection
II	National Park: Protected area managed mainly for ecosystem protection and recreation
III	Natural Monument: Protected area managed mainly for conservation of specific natural features
IV	Habitat /Species Management Area: Protected area managed mainly for conservation through management intervention
V	Protected Landscape/Seascape: Protected area managed mainly for landscape/seascape conservation and recreation
VI	Managed Resource Protected Area: Protected area managed mainly for the sustainable use of natural ecosystems

2.1.3. Characteristics of national parks:

Synthesizing the IUCN criteria, national parks must satisfy several fundamental requirements:

- **Size:**

National parks must be relatively extensive areas, sufficiently large to contain complete ecosystems and in order to maintain viable populations of species and functioning ecological systems.

- **Ecosystem integrity:**

The area must contain one or more ecosystems that have not been materially altered by human exploitation and permanent occupation (Minimal anthropogenic modification).

- **Legal protection:**

National parks must be established by the highest competent authority of the country, typically through national legislation rather than administrative decree alone.

- **Resource use restrictions:**

Economic exploitation activities are strictly prohibited within national parks. This includes the use of forest products, mining and mineral extraction, settlement, hunting, grazing, and other commercial products.

- **Public access:**

Visitors are permitted under special conditions for inspirational, educational, cultural and recreational purposes.

- **Management authority:**

National parks require professional, centralized administration by a dedicated park service or comparable competent authority, operating according to approved management plans.

Figure 01. Global distribution of national parks

2.1.4. The Main national parks in Algeria:

Algeria **(Table 02)** has several national parks **(Figure 02)** that play an essential role in protecting biodiversity, preserving ecosystems, and enhancing natural and cultural heritage. Here are the main national parks of the country:

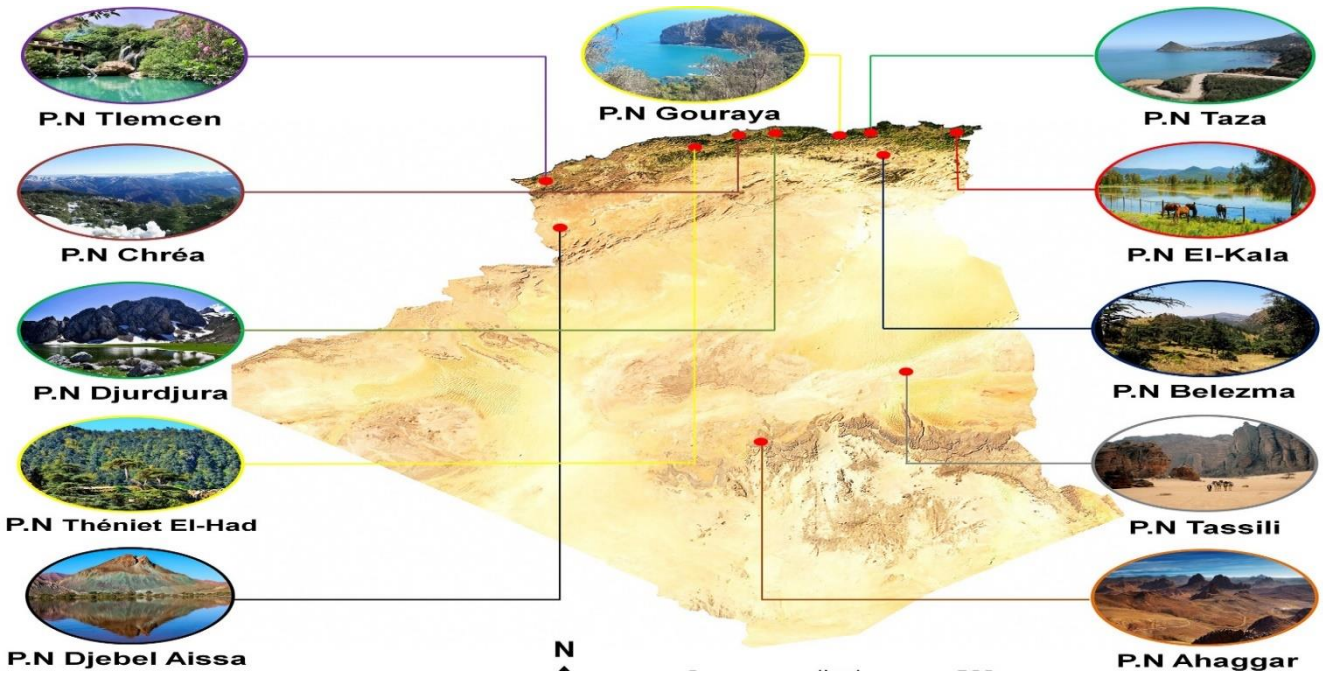

Figure 02. Principal national parks in Algeria

Table 02. Main characteristics of Algerian national parks.

NATIONAL PARKS	AREA	DATE OF CREATION	PARTICULARITIES
Coastal Parks			
El Kala National Park (El-Taref)	80,000 ha	Decree No. 83-462 of 23.07.1983	-Encompasses a unique wetland area, and classified as a biosphere reserve in 1990 by M.A.B.
Gouraya National Park (Bejaia)	2,080 ha	Decree No. 84-327 of 03.11.1984	-Unique stand of *Euphorbia dendroides.*
Taza National Park (Jijel)	3,807 ha	Decree No. 84-328 of 03.11.1984	-Presence of the rare Kabyle nuthatch. -Cave formations and cliffs.
Mountain Parks			
Theniet El Had National Park (Tissemsilt)	3,425 ha	Decree No. 83-459 of 23.07.1983	-Beautiful cedar forests. -Summit of Kef Siga (1,714 m).
Djurdjura National Park (Bouira-Tizi Ouzou)	18,850 ha	Decree No. 83-460 of 23.07.1983	-Faunal and floral richness; beautiful cedar forests. -Makabé Cave and Léopard Cave.
Chrea National Park (Blida-Medea-Aïn Defla)	26,600 ha	Decree No. 83-461 of 23.07.1983	-Botanical biodiversity (*Berberis vulgaris*). -Ruisseau des Singes (Monkeys' Stream).
Belezma National Park (Batna)	26,250 ha	Decree No. 84-326 of 03.11.1984	-Magnificent cedar stands. -Presence of *Lonicera etrusca* and the very rare *Epipactis helleborine.*
Tlemcen National Park	8,225 ha	Decree No. 93-117 of 12.05.1993	-Archaeological and speleological riches (mosques and caves).
Saharan Parks			
Tassili National Park (Illizi)	80,000 km²	Decree No. 72-168 of 27.07.1972	-Rich and diverse cultural heritage (archaeological) -UNESCO World Heritage Site in 1982. -Man and Biosphere Reserve (1986).
Ahaggar National Park (Tamanrasset)	450,000 km²	Decree No. 87-231 of 03.11.1987	-Archaeological sites dating back 1 million years. -Highest massif in Algeria (Mount Tahat: 2,918 m). -Unique and very dense natural heritage (geology, flora, fauna and landscapes).

In addition to these main national parks, other type II protected areas, such as "Djebel Aïssa" National Park (Naâma) (24,400 ha) and "Babor or Tababort" National Park (Sétif, Béjaïa and Jijel) (23,656 ha), have been recently created in Algeria (2003-2019).

2.1.5 Legislation and regulation of national parks in Algeria:

2.1.5.1. Algerian national parks and international conventions:

The establishment of national parks in Algeria has been strengthened by the emergence of the concept of sustainable development and by the country's ratification of several international conventions and protocols relating to cultural and natural heritage. The ordinance 73-38, allowing the creation of UNESCO (United nations educational, scientific and cultural organization). World Heritage sites and biosphere reserves in 1972. Several conventions were ratified from 1982 onward:

- The international Convention on Wetlands (December 1982), known as the Ramsar Convention.
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora in 1982.
- The African Convention on the Conservation of Nature and Natural Resources (known as the Algiers Convention), ratified in 1982.

Algeria has adopted several other conventions related to the protection of natural heritage, such as:

- The Paris Convention concerning the protection of historical and natural sites and monuments.
- The Earth Summit (1992), which defined the principles aimed at reconciling the three pillars of sustainable development (environmental protection, economic efficiency, and social equity).

2.1.5.2. Algerian national parks and juridic context:

Our country has strengthened the existing legislative framework through the promulgation of several laws aimed at ensuring the protection and sustainable management of our natural heritage:

- Law No. 83-03 of 5 February 1983, which is the foundational Algerian legislation for environmental and natural areas protection, aiming to establish a national policy for preserving natural resources, controlling pollution, and improving quality of life.
- Law No. 03-10 of 19 July 2003, relating to fundamental rules for environmental protection, promoting sustainable development, and managing natural resources (air, water, soil, flora, fauna).
- Law No. 11-02 of 17 February 2011, which provides the legal framework for creating, managing, and protecting natural sites to conserve biodiversity while promoting sustainable development. It defines types of protected areas, including national parks and nature reserves.
- Decree No. 83-458 enacted on July 23, 1983, established the standard statute for national parks, defining their missions to include the conservation of natural environments against artificial intervention and degradation.

- Decree No. 87-143 of 16 June 1987. An Algerian regulation establishing the rules and procedures for the classification of national parks and nature reserves**.** It stems from Law No. 83-03 of 5 February 1983.

Each national park is placed under different supervisory authorities. National parks in northern Algeria fall under the Directorate General of Forests (DGF), which is attached to the Ministry of Agriculture and Rural Development (MADR). In contrast, those in southern Algeria are under the supervision of the Ministry of Culture.

2.2. Forests:

2.2.1. Concept of natural forest:

A forest is a terrestrial ecosystem characterized by a dense cover of trees and vegetation, hosting a great diversity of fauna and flora. It plays an essential role in climate regulation, oxygen production, carbon storage, and biodiversity conservation.

According to the FAO (Food and Agriculture Organization of the United Nations)**,** the word "forest" is defined as the "Land with tree crown cover (or equivalent stocking level) of more than 10 percent and area of more than 0.5 hectares (ha). The trees should be able to reach a minimum height of 5 meters (m) at maturity in situ." Forests cover about 30% of the Earth's total land area, harboring most of the world's terrestrial biodiversity and containing almost as much carbon as the atmosphere. They have many functions, providing livelihoods for more than a billion people, and are of high relevance for biodiversity conservation, soil and water protection, supply of wood for energy, construction and other applications, as well as other bio-based resources and materials such as food and feed.

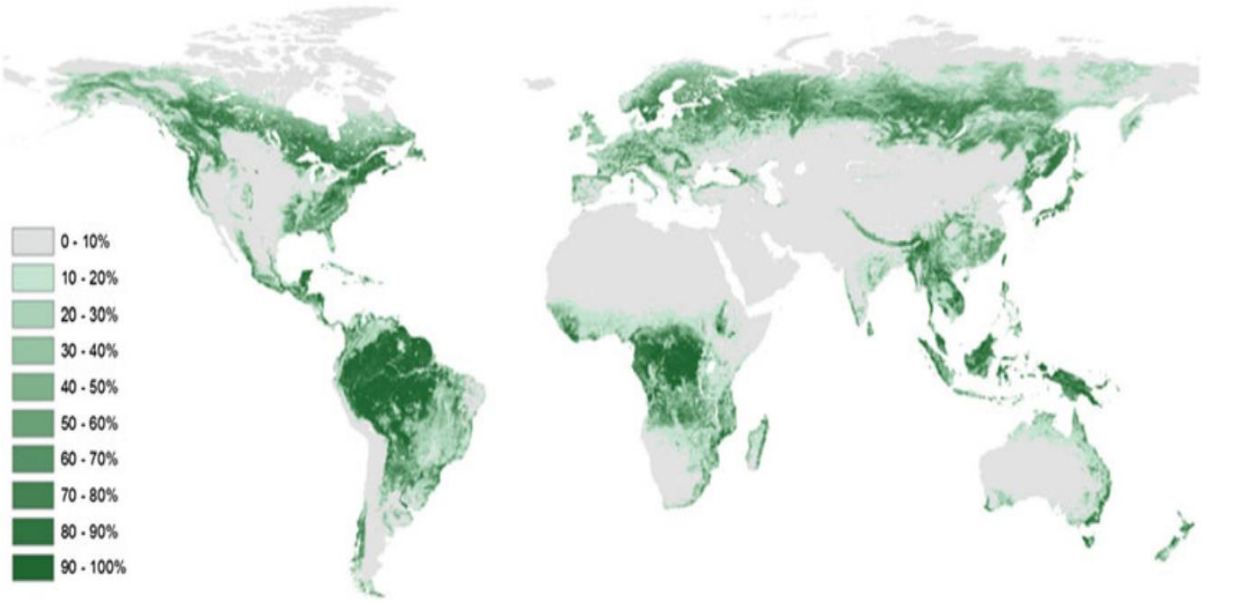

Figure 03. Global extent of forest areas (FAO 2010)

2.2.2. Principal characteristic of forests:

Forests are one of the most important terrestrial ecosystems on Earth with numerous characteristics:

- **Structure and Composition:** Forests are defined by a high density of trees, which form distinct layers: the canopy (top layer/roof), understory (middle), and forest floor (moss/ferns).
- **Biodiversity and Habitat:** Forests house over 80% of the world's terrestrial biodiversity, providing habitats for a vast array of species.
- **Climate Regulation and Carbon Storage:** Acting as "lungs" of the Earth, forests absorb large amounts of carbon dioxide (CO2), and release oxygen (02). They also influence local temperature and increase humidity
- **Water Management:** Forests act as giant filters, controlling water runoff, reducing erosion, and maintaining soil quality.
- **Ecological and Economic Roles:** Forests provide essential resources, including wood, fuel, and medicinal plants, while supporting the livelihoods of many communities.
- **Nutrient-Rich Soil:** The forest floor is generally rich in nutrients due to decomposing organic matter.

Table 03. Types, position and characteristic of Forests around the world

Forest Type	Global Share	Geographic Position	Climate	Main Characteristics
Tropical Forests	45%	Near the Equator (Amazon Basin, Central Africa, Southeast Asia)	Warm temperatures, all year, heavy rainfall	• Very high biodiversity, dense canopy, evergreen trees, rapid nutrient cycling, • major carbon storage
Boreal Forests (Taiga)	27%	High northern latitudes (Canada, Russia, Scandinavia)	Long cold winters, short cool summers	• Dominated by coniferous trees, • low biodiversity, • slow decomposition, large carbon
Temperate Forests	16%	Mid-latitudes (Europe, North America, East Asia)	Moderate climate, four seasons	• Mix of deciduous and evergreen trees, • moderate biodiversity, fertile soils
Subtropical Forests	11%	Between tropical and temperate zones (Southern China, Southern USA, parts of South America)	Warm, humid climate, seasonal rainfall	• Mixed vegetation, moderate to high biodiversity, adapted to seasonal variation

2.2.3. Forests in Algeria:

Algerian forests, concentrated in the north, cover approximately 4.2 million hectares (16.5 % of the northern region and 2% of the entire land). The total forest cover was estimated at about 1.9 million hectares in 2020. The ecosystems include oak forests, pine forests, and Mediterranean maquis. The main areas are the Akfadou Forest (Béjaïa/Tizi-Ouzou) and Djebel Ouahch (Constantine). The country faces deforestation and wildfires, losing nearly 230,000 hectares of tree cover between 2001 and 2024.

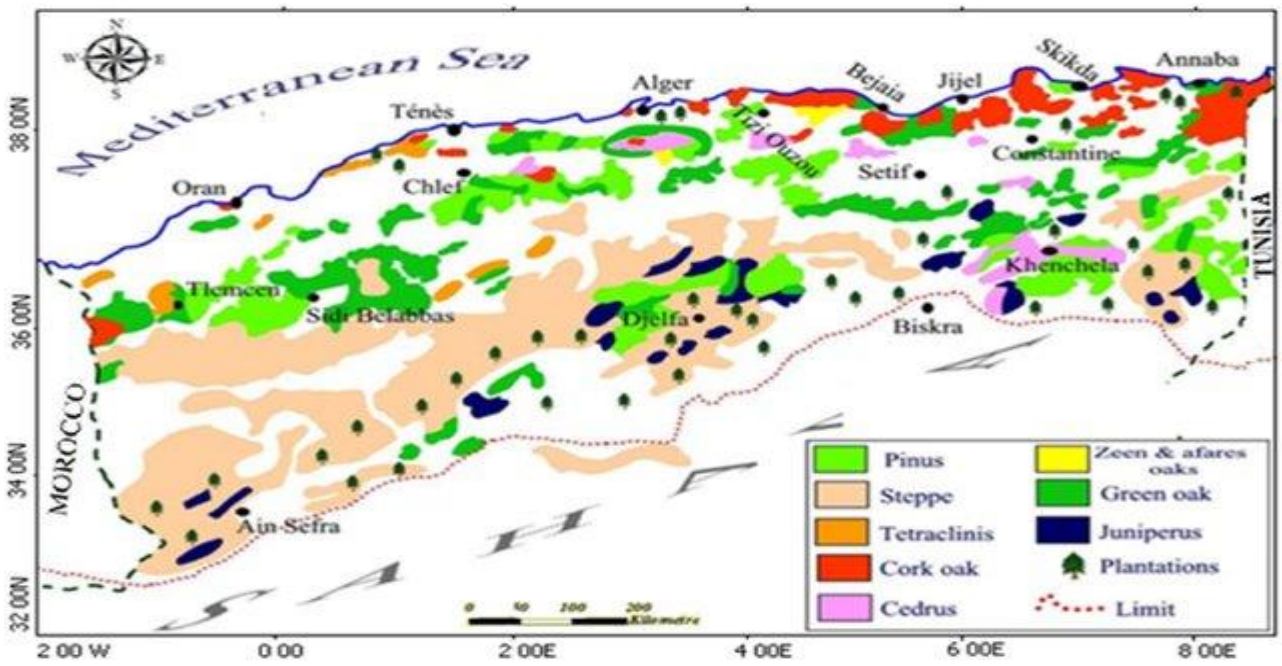

Figure 04. Main forest species in Algeria

2.2.4. Legislation and regulation of Forests in Algeria:

2.2.4.1. Algerian forests and international conventions:

Algeria actively participates in several international and regional agreements aimed at protecting forests, biodiversity, and combating desertification and climate change:

- The international Convention on Biological Diversity (June,1992, Rio de Janeiro), with the objectives of forest biodiversity conservation and the Sustainable management of forest ecosystems.
- The United Nations Framework Convention on Climate Change (April,1993, ONU, New York), treating important subjects as carbon sequestration and climate regulation and tracing Reforestation and afforestation programs.
- United Nations Convention (1996), to Combat Desertification and the risk of desertification.
- African Convention known as the Algiers Convention (September 1968, Algiers), It obligates member states to take conservation measures relating to their natural resources, including protection of vegetation cover, forests, and soil.
- Revised African Convention (July, 2003, Mozambique), including forest governance and sustainable development principles.

2.2.4.2. Algerian forests and juridic context:

Algerian law, has given significant attention to forests, enacting legal provisions to establish frameworks for legal protection at the national level.

- Law No. 84-12 of 1984 which established the initial framework for the forest patrimony, defining forest lands and basic protection rules, but it became outdated in the face of new ecological and climatic challenges.
- Law No. 03-10 of 19 July 2003 named as Framework Law on Environmental Protection, which Established sustainable development principles and environmental impact assessment, including forest ecosystems.
- Law No. 23-21 of December 23, 2023**.** This is the new fundamental law relating to forests and forest resources. It abrogates the 1984 text and modernizes the entire legal framework with the principal goals of:

    1. Sustainable Management**,** to establish sustainable forest management as a fundamental priority of national economic and social policy, integrated into regional planning schemes.
    2. Reinforced Protection of the national forest patrimony as a "national wealth and good of the national community," making it the duty of every citizen to protect it.
    3. Dissuasive Penalties as criminal sanctions, including life imprisonment with hard labor for voluntarily setting fires to state forests with malicious intent.
    4. Planning and Inventory to mandate a national inventory of forest resources every ten years to inform development plans and guide the national forest strategy.

2.2.4.3. Algerian forestry institutions:

The forestry sector in Algeria is structured around a central administration, decentralized local services, and specialized technical and research institutions. Here are the main institutions:

- Ministry of Agriculture, Rural Development and Fisheries (MADRP).
- General Directorate of Forests (DGF).
- Wilaya Forest Conservation Units.
- National Institute of Forest Research (INRF).
- National Agency for Nature Conservation (ANN).

2.2.4.4. Algerian national activities applied for Forests protection:

Algeria has implemented a range of national measures and programs aimed at protecting and sustainably managing its forest ecosystems. Among these activities:

- ❖ The national inventory, which began in 1984, and be followed by an update in 2008, both conducted under the supervision of the National Institute of Forest Research (INRF) to enable the quantification of forest timber volumes, as well as the monitoring of changes in forest cover and the health status of forest species and ecosystems.

- The National Reforestation Plan (NRP)**,** Launched in 2000, and aimed to reforest 1,245,900 hectares over a period of 20 years, with the objective of increasing the national forest cover rate from 11% to 13% by 2020.
- The Green Dam Project**,** initiated in 1970, and aimed to create a forest barrier to slow down desert expansion. Relaunched in 2019, it programmed the planting of 43 million trees equivalent to one tree per inhabitant in order to strengthen and extend this green barrier.

2.3. Steppe rangelands :

2.3.1. Concept of Steppe Rangeland:

A steppe zone is a region characterized by a semi-arid climate with low rainfall (generally between 250 and 500 mm per year), often extreme temperatures, and vegetation dominated by short grasses, shrubs, and drought-adapted plants. Steppes are mainly found in Eurasia (such as the Mongolian or Russian steppe), North America (the Great Plains), and parts of Africa and Australia. They are often used for extensive livestock grazing and cereal farming when conditions allow. These rangelands are steppe regions subjected to ecological pressures such as overgrazing, desertification, and climate change, which highlights the importance of their protection and sustainable management.

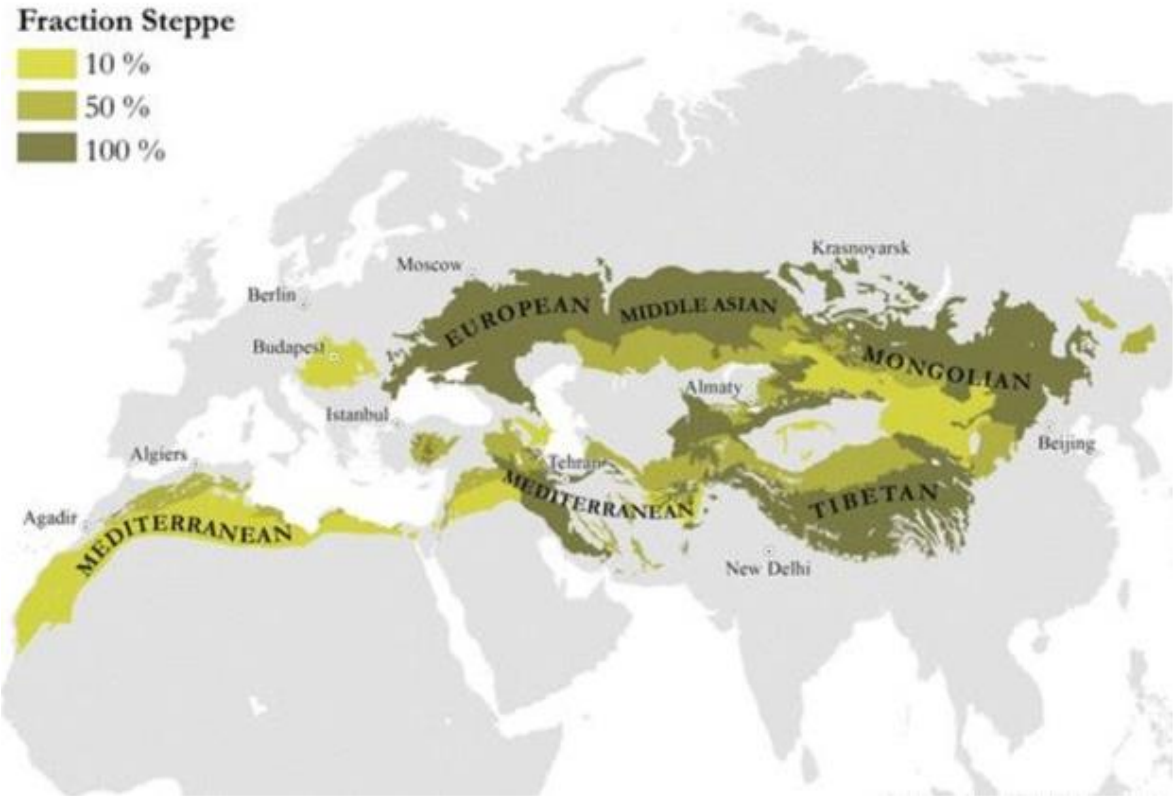

Figure 05. Extent of Steppe Rangelands arears in the world

2.3.2. Principal activities in steppe Rangelands:

Steppe rangelands are vast semi-arid grasslands that support both human livelihoods and biodiversity. Their natural resources have shaped the economic activities in these regions for centuries:

- ✓ Livestock grazing**,** due to sparse vegetation and low rainfall, grazing is mostly extensive rather than intensive. Commonly raised animals include sheep, goats, and cattle, which provide meat, milk, wool, and hides.
- ✓ Cereal farming is practiced where rainfall or irrigation permits. Crops such as wheat, barley, and millet are cultivated, often in rotation with grazing lands to maintain soil fertility and provide fodder for
- ✓ Hay and forage production is another important activity, allowing communities to store feed for dry seasons or harsh winters when natural pasture is insufficient.
- ✓ Hunting and wildlife management, both as a traditional practice and as part of conservation efforts.
- ✓ Ecotourism and recreational activities are growing in importance in steppe rangelands, offering opportunities for wildlife observation, cultural experiences with pastoral communities.

2.3.3. Steppe Rangelands in Algeria:

The steppe rangelands in Algeria are semi-arid grasslands which cover roughly 20 million hectares (About 8 % of Algeria's total land area). Most of this area lies in the High Plateaus and the southern steppe zones, forming a vast semi-arid belt between the Tell Atlas in the north and the northern Sahara. characterized by sparse trees, shrubs, and herbaceous vegetation. They are primarily used for livestock grazing, supporting traditional pastoral systems. These rangelands play a vital ecological role in soil protection, carbon storage, and biodiversity preservation, while also providing a source of livelihood for rural communities.

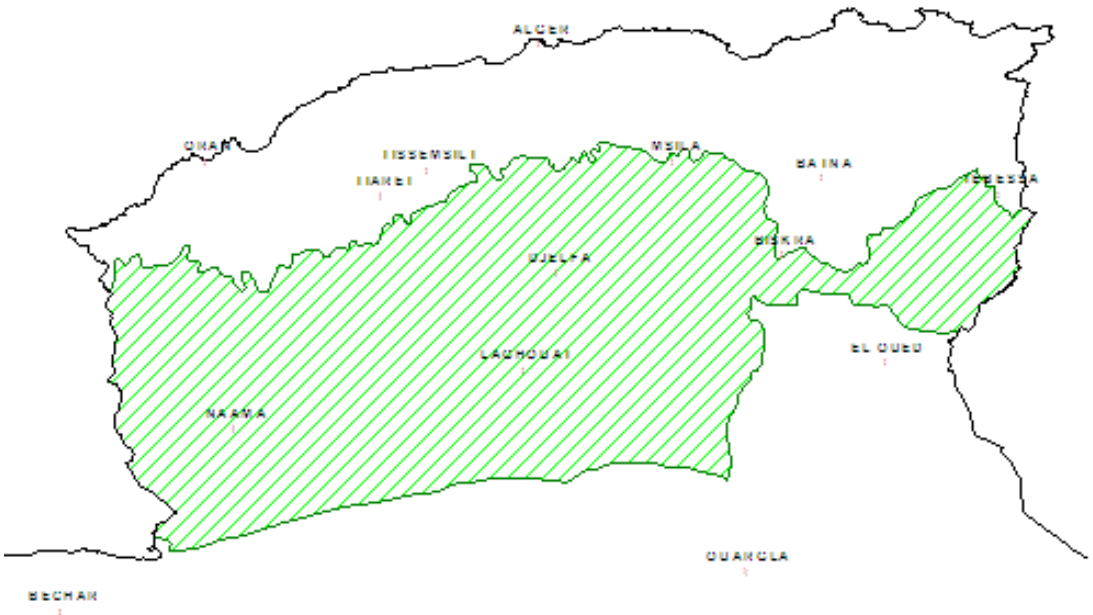

Figure 06. Geographic position of steppes in Algeria

2.3.4. Characteristics of Algerian steppes:

The Algerian steppes represent a unique ecological and geographical zone characterized by:

- **Geographical Distribution**

In Algeria, steppe rangelands are mainly found in the High Plateaus, situated between the Tell Atlas and the Saharan Atlas, including regions such as Djelfa, Laghouat, Biskra, Tiaret, and Sétif. These areas lie at altitudes ranging from 800 to 1200 meters. They also extend into the southern steppe zones, which form a transitional area between the High Plateaus and the northern Sahara.

- **Climate**

The steppe rangelands of Algeria experience a semi-arid climate, with annual precipitation ranging between 150- and 400-mm. Summers are hot, and winters are cold, reflecting a continental climate pattern. The soils in these areas are typically calcareous, shallow, and prone to erosion, which can limit agricultural use and make the land sensitive to overgrazing and degradation.

- **Vegetation**

Vegetation in Algerian steppe rangelands is dominated by drought-resistant grasses and shrubs. Common species include *Stipa tenacissima* (Esparto grass), *Artemisia herba-alba* (white wormwood), and *Lygeum spartum*. This vegetation is adapted to harsh climatic conditions and provides essential forage for grazing livestock.

- **Economic Importance**

Steppe rangelands are economically significant as they provide grazing areas for sheep, goats, and camels, which are central to the livelihoods of local communities. Traditional pastoralism remains the primary activity, while Esparto grass is harvested for handicrafts and the paper industry.

2.3.5. Legislation and regulation for steppe rangelands in Algeria:

2.2.5.1. Algerian steppe rangelands in juridic context:

Algeria has implemented several legal frameworks to protect steppe ecosystems while regulating their use:

- Law No. 83-18 of August 13, 1983, which facilitated access to private ownership of state-owned agricultural land through land development and reclamation, particularly in Saharan and steppe regions.
- Law n° 04-20 of 2004 which reinforced state ownership of rangelands, focusing on sustainable management to prevent degradation in pastoral areas, combat desertification, and protect ecosystems.
- Law No. 03-10 of July 19, 2003: Concerning environmental protection within the framework of sustainable development. Several chapters of this law aimed to protect steppe rangelands, specifically within the framework of:

1. The preservation of fragile ecosystems such as steppe rangelands, which are vulnerable to desertification and overexploitation of resources.
2. The implementation of protective measures to limit soil degradation, which directly concerns steppe management.
3. The need to combat desertification and soil erosion affecting the Algerian steppes.
4. The development of pastoral areas and the regulation of grazing to prevent overexploitation.

- Decree No. 81-337 (1981) established the High commission for the development of the steppe (HCDS).
- Decree No. 06-90 (2006): Establishes the legal framework for rangeland management, including sustainable grazing practices and anti-desertification measures.

2.3.5.2. Algerian steppe rangelands Institution:

The high commission for the development of the steppe (HCDS) is the principal public institution responsible for the sustainable management and development of Algeria's steppe regions. As the leading authority overseeing these vast semi-arid territories, the HCDS plays a central role in coordinating integrated development strategies that aim to balance environmental conservation with socio-economic progress. Its mandate includes land-use planning, regulation of pastoral activities, and the rehabilitation of degraded rangelands. The institution designs and implements programs focused on combating desertification, restoring vegetation cover, improving water resource management, and enhancing forage production.