2023 Edition

Rajasthan

Environment

Forest | Widlife | Climate Change



RAS 2023 Edition





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Basic Concepts:

The Environment (Protection) Act, 1986 defines environment as "environment includes water, air and land and the interrelationship which exists among and between air, water and land and human beings, other living creatures, plants, micro-organism and property".

Environment in Constitution of India

Our constitution, originally, did not contain any direct provision regarding the protection of natural environment. However, after the United Nations Conference on Human Environment, held in Stockholm in 1972. Indian constitution was amended to include protection of the environment as a constitutional mandate.

In 1976, the 42nd amendment of Constitution, incorporated protection of wildlife and forests in the Directive Principles. It also included **forests and protection of wild animals** in the Concurrent List – Seventh Schedule (Article 256) of the Constitution.

The chapter on **fundamental duties** of the Indian Constitution clearly imposes duty on every citizen to protect environment. **Article 51-A (g)**, says that "It shall be duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures."

The **Directive principles** under the Indian constitution directed towards ideals of building welfare state. Healthy environment is also one of the elements of welfare state. In particular, **Article 48 - A** of the constitution says that "the state shall endeavor to protect and improve the environment and to safeguard the forests and wild life of the country".

The Constitution of India under part III guarantees **fundamental rights**, Articles 21, 14 and 19 of this part have been used for environmental protection. The right to live in a healthy environment, as part of





Article 21 of the Constitution was first recognized in the case of Rural Litigation and Entitlement Kendra vs. State, AIR 1988 SC 2187 (Popularly known as Dehradun Quarrying Case).

Components of Environment

Environment can be defined as the sum total of living and non-living components, influences and events surrounding an organism. The living components are called the biotic **components** while the non-living are called **abiotic** or physical components.

- Biotic Components: Microbes, Plants, Animals (including human beings)
- Abiotic Components: Light (Energy, Radiation), Atmospheric gases and wind, Temperature and heat flow, Water, Gravity, Topography, Geological Substratum, Soil.

Alternatively, Environment can also be defined as consisting of four fundamental components:

- Lithosphere,
- Hydrosphere,
- Atmosphere,
- Biosphere.

Ecology:

Ecology may be defined as the scientific study of the relationship of living organisms with each other and with their environment.





Levels of Ecological Organizations



There are 6 major levels of organization in ecology. These are:

1. Individual

• Organism is an individual living being that has the ability to act or function independently.

2. Population

• A group of organisms usually of same species, occupying a defined area during a specific time.

3. Community

• Group of organisms consisting of a number of different species that live in an area and interact with each other.

4. Ecosystem

- Communities of organisms and their physical environment, interacting as an ecological unit.
- *Ecotone*: An area that acts as a boundary or a transition between two ecosystems.
- *Niche*: A niche is aunique functional role or place of species in an ecosystem. There are different types of niche like habitat niche (where it leaves), food niche (what it eats), reproductive niche etc.





5. Biomes

- A large community unit, characterized by a major vegetation type and associated fauna, found in a specific climatic region is a biome
- Biomes refer basically to terrestrial areas. The aquatic systems like the seas, rivers etc. are also divided into distinct life zones on basis of salinity.
- No two biomes are alike.

6. Biosphere

- Part of Earth where life exists.
- The relatively thin zone of air, soil and water where life exists is known as **the biosphere**.
- Biosphere is absent at north & south poles, highest mountains & deepest oceans.

Functions of ecosystem

Ecosystems are complex dynamic system. They perform certain functions. These are:-

- (1) Energy flow through food chain
- (2) Nutrient cycling (biogeochemical cycles)
- (3) Ecological succession or ecosystem development
- (4) Homeostasis (or cybernetic) or feedback control mechanisms

Types of Ecosystem:

Ecosystems are classified as follows:

- (1) Natural ecosystems
- (2) Man made ecosystems

Components of ecosystem:

Components of ecosystem are broadly grouped into:-

- Abiotic components
- Biotic components





Ecological Succession

Biotic communities are dynamic in nature and change over a period of time. The process by which communities of plant and animal species in an area are replaced or changed into another over a period of time is known as ecological succession. Both the biotic and abiotic components are involved in this change. There are two types of successions:

Primary Succession:

- Primary succession takes place an over a bare or unoccupied areas such as rocks outcrop, newly formed deltas and sand dunes, emerging volcano islands, lava flows and glacial moraines where no community has existed previously.
- The community that initially inhabits a bare area is called **pioneer community**.
- The community that inhabits the terminal (final) stage of succession forms the **climax community**.
- The entire sequence of communities in a given area, succeeding each other, during the course of succession is termed **sere**.

Secondary succession

• Secondary succession is the development of a community which forms after the existing natural vegetation that constitutes a community is removed, disturbed or destroyed by a natural event like hurricane or forest fire or by human related events like tilling or harvesting land.

Habitat

Habitat is the physical environment in which an organism lives. The features of the habitat can be represented by its structural components namely:

- Space
- Food
- Water
- Cover or shelter





Species:

A species is defined as; "a group of similar populations of organisms whose members are capable of interbreeding, and to produce fertile offspring (children)". Example: all populations of humans living in any part of the world constitute the species Homo sapiens.

Speciation is the process by which new species are formed and **evolution** is the mechanism by which speciation is brought about.

Bio magnification:

Biomagnification refers to the tendency of pollutants to concentrate as they move from one tropic level to the next. Thus there is increase in concentration of pollutants as we move up the food chain.

Types of Biotic Interactions

- Mutualism: Both species benefit
- Commensalism: One species benefits, the other is unaffected
- Competition: Both species are harmed by interaction
- **Predation & Parasitism:** One species benefit, the other is harmed.
- Amensalism: One species in harmed the other is unaffected.

Eutrophication:

Eutrophication is an enrichment of water by nutrient salts (such as nitrates, phosphates) that causes structural changes to the ecosystem such as: increased production of algae and aquatic plants, depletion of fish species and general deterioration of water quality. The growth of green algae on surface of lakes is example of eutrophication.



Environment Impact Assessment

In view of the colossal damage to environment by developmental activities people are now concerned about the environmental impact of developmental projects. Environmental Impact Assessment (EIA) enables the decision makers to analyse the effect of developmental activities on the environment, if any well before the developmental project is implement. The goal of EIA is to ensure environmentally safe and sustainable development.

What is EIA?

EIA is a tool to evaluate environmental impact of proposed developmental projects or programs and through which clearance is accorded after mitigation strategies are included in the plan. It is a study to evaluate and identify the predictable environmental consequences and the best combination of economic and environmental costs and benefits of the proposed project.

On the basis of EIA, an Environmental Management Plan (EMP) is prepared, which is a description of the means by which the environmental consequences as pointed out in the EIA will be mitigated. Together the whole draft is termed as EIA-EMP report.

The important aspects of EIA are:

- Risk assessment,
- Environmental management and
- Post product monitoring.

EIA was introduced in India in 1978, with respect to river valley projects. Later the EIA legislation was enhanced to include other developmental sections.

The Environmental Impact Assessment Notification of 2006

The Environmental Impact Assessment Notification was issued on 14th September 2006 and mandated all developmental projects to abide by the country's environmental laws. In furtherance of this goal, a clear demarcation was made between various categories of project and the authorizing agencies.





Category of Projects:

All projects and activities are broadly categorized in to two categories - Category A and Category B, based on the spatial extent of potential impacts and potential impacts on human health and natural and man made resources.

Category A Projects:

• Mandatorily requires EIA

Category B Projects:

- Category B1, projects (Mandatorily requires EIA).
- Category B2 projects (Do not require EIA).

Appraisal & EIA Clearance of Projects

Environment Impact Assessment Notification of 2006 has decentralized the process of environmental clearance in following manner:

- All projects or activities included as Category 'A' require prior environmental clearance from the Central Government in the MOEFCC on the recommendations of an Expert Appraisal Committee (EAC).
- All projects or activities included as Category 'B' require clearance by State Level Environment Impact Assessment Authority (SEIAA).
- The SEIAA shall base its decision on the recommendations of a State or Union territory level Expert Appraisal Committee (SEAC).
- The EAC and SEAC shall be reconstituted after every three years. However, in absence of a duly constituted SEIAA or SEAC, a Category 'B' project shall be treated as a Category 'A' project;

The Environmental Impact Assessment Notification of 2006 stipulates "A State Level Environment Impact Assessment Authority hereinafter referred to as the **SEIAA** shall be constituted by the Central Government under sub-section (3) of section 3 of the Environment (Protection) Act, 1986 comprising of three Members including a Chairman and a Member – Secretary to be nominated by the State Government or the Union territory Administration concerned."



Hence, the same notification also directed the Central Government to establish State Level Environment Impact Assessment Authority in states for EIA clearance of Category B projects.

Rajasthan State Level Environment Impact Assessment Authority (SEIAA)

- All Category B projects, which include projects with lesser size or capacity and smaller impacts than Category A, came under the purview of the State Level Environment Impact Assessment Authority (SEIAA).
- The SEIAA was further directed to base its decision, recommending or denying the environmental clearance, on the recommendations of a State or Union Territory Level Expert Appraisal Committee (SEAC).

Process of EIA

The process of Environmental Clearance has four stages, namely:

- Screening
- Scoping
- Public Hearing
- Appraisal

Screening:

- This is only for category B projects, as all category A projects are required to undergo EIA process.
- For category B projects, the State or Union Territory Level Expert Appraisal Committee (SEAC) decides if project belongs to category B1 or B2.
- B1 Category project require EIA while B2 category projects are exempted from EIA





Scoping:

- Meant for projects belonging to category A & B1.
- The Central Level Expert Appraisal Committee for category A & State Level Expert Appraisal Committee (SEAC) for category B1 determines comprehensive terms of reference for preparation of EIA report.

Public Hearing:

- It is the process by which the concerns of local affected persons and others who have plausible stake in the environmental impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate.
- A public hearing committee conducts public hearing.
- The committee has district collector as chairman, members including officials of pollution control board, representatives of Taluka, gram sabha.

Appraisal

- Appraisal means the detailed scrutiny by the Expert Appraisal Committee or State Level Expert Appraisal Committee.
- On conclusion of this proceeding, the EAC or SEAC concerned makes categorical recommendations to the regulatory authority concerned either for grant of prior environmental clearance on stipulated terms and conditions, or rejection of the application for prior environmental clearance, together with reasons for the same.

Updates:

In 2020, MoEFCC introduced draft Environment Impact Assessment Notification 2020 which received a lot of flak from civil society, academicians and environmentalists. Consequent to the public outrage, the draft is under scrutiny at present.





Environment Governance

Ministry of Environment, Forest and Climate Change (MoEFCC)

The Ministry of Environment, Forest and Climate Change (MoEFCC) is the nodal agency in the administrative structure of the Central Government for the planning, promotion, co-ordination and overseeing the implementation of India's environmental and forestry policies and programmes.

The primary concerns of the Ministry are implementation of **policies and programmes** relating to conservation of the country's natural resources including its lakes and rivers, its biodiversity, forests and wildlife, ensuring the welfare of animals, and the prevention and abatement of pollution.

The Ministry also serves as the nodal agency in the country for the United Nations Environment Programme (UNEP), South Asia Co-operative Environment Programme (SACEP), International Centre for Integrated Mountain Development (ICIMOD) and for the follow-up of the United Nations Conference on Environment and Development (UNCED). The Ministry is also entrusted with issues relating to multilateral bodies such as the Commission on Sustainable Development (CSD), Global Environment Facility (GEF) and of regional bodies like Economic and Social Council for Asia and Pacific (ESCAP) and South Asian Association for Regional Co-operation (SAARC) on matters pertaining to the environment.

Forest Department, Rajasthan

The Forest Department is responsible for the management of forests and wildlife in the state. The department is organized into different departmental wings like rest protection, forest development, wildlife management, soil and moisture conservation, Eco-tourism, research, training, etc. is given. Users can get details related to forest resource, wildlife, Forest Conservation Act, Right to Information Act (RTI), etc. These wings look after specific activities.







Organisation Structure of Forest Department at Division Level:

- **DFO**: Divisional Forest Officer
- **DCF**: Deputy Conservator of Forests
- ACF: Assistant Conservator of Forests
- **SCA**: Soil Conservation Assistant.

Environment Department, Government of Rajasthan

Environment Department was established in the year 1983 to function as a nodal Department in the matters of Environment and Ecology, to deal with matters related to Rajasthan state Pollution control Board (RsPcB), to solve and control all matters relating to pollution with the help of RsPcB, District Administration and other related departments and organizations.

In 2019, to address the onerous work of Environmental Conservation & Biodiversity conservation, the department of environment has been reconstituted and a distinct **Directorate of Environment and Climate Change (DOECC)** has been established.

The DOECC will have three cells: environment, administrative and IEC.

Compliance of various Acts and Rules:

Environment Department is tasked with ensuring compliance of various Acts and Rules related to Environment through various Departments, Boards and Agencies. Environment Department mainly deals with compliance of the following Acts and Rules:





- Environment Protection Act and Rules
- Water Act and Rules.
- Air Act and Rules.
- Environment impact assessment (EIA) notification, 1986
- Aravali notification, 1992
- Fly Ash Rules
- Wetland Rules 8. Biordiversity Act and Rules.

Communication and Extension (Publicity):

- Environment Department organizes educational and awareness programmes from time to time.
- Information about different activities of the Department, decisions of the State Government, various ongoing schemes, facts related to Environment were disseminated to public from time to time.
- Messages on the occasions of three International Days viz. World Earth Day, World Environment Protection Day and World Ozone Layer Conservation Day were published and communicated through electronic & print media

Rajasthan State Biodiversity Board:

After becoming a party to the Convention on Biological Diversity in 1994, the Government of India has taken many important steps to further strengthen the existing framework. The Biological Diversity Act, 2002 has been enacted which provides a legal mechanism for establishing sovereign rights over biological resources, their conservation, regulation of access and sustainable use of biodiversity and associated knowledge. It is being implemented through Biodiversity management committees (BMCs), State Biodiversity Boards (SBBs) and National Biodiversity Authority (NBA) each with well-defined functions within their respective jurisdiction. Accordingly, it is being operated at National, State and Local level as a three tier system.

Government of Rajasthan notified the Rajasthan Biological Diversity Rules, 2010 under section 63(1) of Biological Diversity Act, 2002 and has established Rajasthan State Biodiversity Board for the purpose of this Act.





Rajasthan State Wetland Authority

On 10th April 2018, <u>Rajasthan Government</u> had issued notification for State Wetland Authority to be setup under the Central Government Wetlands (Conservation & Management) Rules 2019. However, there has been no information on working of the authority.

In November 2019, after the <u>recent deaths of more than 18000 birds in Sambhar Lake</u> in Rajasthan, the notification has been released.

State Wetland Authority

- Chairperson state environment minister.
- Vice-Chairperson Chief Secretary, GoR
- Would comprise chief secretary, additional chief secretary (ACS), urban development and housing (UDH), ACS (revenue) and principal secretary (tourism), principal secretary (local self-government) and senior officials and experts from 12 departments.
- Will also include one expert each in the field of wetland ecology, hydrology, fisheries, landscape planning and socio-economics to be nominated by the state government.

Once functional, the authority will develop a comprehensive list of activities to be regulated and permitted within the notified wetlands and their zone of influence, recommend additional prohibited activities for specific wetlands, define strategies for conservation and wise use of wetlands, and undertake measures for enhancing awareness within stakeholders and local communities on values and functions of wetlands.

Rajasthan State Pollution Control Board

The Rajasthan State Pollution Control Board was constituted under section 4 of the Water (Prevention and Control of Pollution) Act, 1974 on 7th February 1975, with the objectives of prevention, and control of water pollution and maintaining or restoring of wholesomeness of water.

Later, it was also entrusted with the responsibilities of prevention, control and abatement of Air Pollution under the provisions of Air (Prevention and Control of Pollution) Act, 1981.





Water (Prevention and Control of Pollution) Cess Act, 1977 has been enacted to make the State Board financially independent. Under this act the State Board has been given powers to collect Cess on the basis of water consumed by the industries etc.

Enactment of the Environment (Protection) Act, 1986 has further widened the scope of the activities of the Board. This Act being umbrella legislation, different rules for addressing the problems of various sectors have been enacted under this Act. The State Board is engaged in implementation of the rules made under the Environment Protection Act, 1986.

Climate Change

The State Government established a 'Climate Change and CDM Cell' in the State Pollution Control Board to act as a nodal agency to deal with all the issues related with Climate Change in the State. The Cell had been constituted in April 2010 and had been involved in the drafting of the CCA

In 2019, to address the onerous work of Environmental Conservation & Biodiversity conservation, the department of environment has been reconstituted and a distinct **Directorate of Environment and Climate Change (DOECC)** has been established.

The DOECC will have three cells: environment, administrative and IEC.



Important Acts & Rules

The constitutional provisions are backed by a number of legislations – Acts and rules. Important acts include:

The Water (Prevention and Control of Pollution) Act of 1974 and Amendment, 1988

- The main objective of this act is to provide prevention and control of water pollution and maintaining or restoring of wholesomeness and purity of water (in the streams or wells or on land).
- The Act vests regulatory authority in State Pollution Control Boards and empowers these Boards to establish and enforce effluent standards for factories discharging pollutants into water bodies.
- A Central Pollution Control Board performs the same functions for Union Territories and formulates policies and coordinates activities of different State Boards.
- The State Pollution Control Boards control sewage and industrial effluent discharges by approving, rejecting or impose conditions while granting consent to discharge.
- In 1977, the Water Cess Act was passed to generate financial resources to meet expenses of the Central and State Pollution Boards. The Act creates economic incentives for pollution control and requires local authorities and certain designated industries to pay a cess (tax) for water effluent discharge.

The Air (Prevention and Control of Pollution) Act of 1981

- The main objectives of this Act are to improve the quality of air and to prevent, control and abate air pollution in the country.
- Under the Air Act, all industries operating within designated air pollution control areas must obtain a "consent" (permit) from the State Boards.
- The states are required to prescribe emission standards for industry and automobiles after consulting the central board and noting its ambient air quality standards.

The Environment (Protection) Act of 1986:

• In the wake of the Bhopal tragedy, the Government of India enacted the Environment (Protection) Act of 1986.





- In this Act, main emphasis is given to "Environment", defined to include water, air and land and the inter-relationships which exist among water, air and land and human beings and other living creatures, plants, micro-organisms and property
- The Environment (Protection) Act 1986 contains significant innovations for its enforcement, not contained in any other pollution control legislation at the time of the Act's adoption. Section (19) provides that any person, in addition to authorized government officials, may file a complaint with a court alleging an offence under the Act. This "Citizens' Suit" provision requires that the person has to give notice of not less than 60 days of the alleged offence of pollution to the Central Government or the competent authority.
- Under the Act, the Central Government may, by notification in the office Gazette, make rules for the enforcement of the Act.

The Wild Life (Protection) Act of 1972 and Amendment, 1982

- The Wild Life Act provides for state wildlife advisory boards, regulations for hunting wild animals and birds, establishment of sanctuaries and national parks, regulations for trade in wild animals, animal products and trophies, and judicially imposed penalties for violating the Act.
- An amendment to the Act in 1982, introduced a provision permitting the capture and transportation of wild animals for the scientific management of animal population.
- Indian government has also started some conservation projects for individual endangered species like Hungal (1970), Lion (1972), Tiger (1973), Crocodiles (1974), Brown-antlered Deer (1981) and Elephant (1991-92) Ganges Dolphin (1997).

The Forest (Conservation) Act of 1980

- The First Forest Act was enacted in 1927. This is one of the many surviving colonial legislations. It was enacted to consolidate the law related to forest, the transit of forest produce and the duty livable on timber and other forest produce.
- Subsequently, the Forest (Conservation) Act was promulgated in 1980 to make certain reforms over the preceding Act of 1927. The 1927 Act deals with the 4 categories of the forests, namely reserved forests, village forests, protected forests and private forests.
- A state may declare forest-lands or waste lands as reserved forest and may sell the produce from these forests.



• The preservation of protected forests is enforced through rules, licenses and criminal prosecutions. Forest officers and their staff administer the Forest Act.

Biodiversity Act 2002

- The main intent of this legislation is to protect India's rich biodiversity and associated knowledge against their use by foreign individuals and organizations without sharing the benefits arising out of such use, and to check bio-piracy.
- The Act provides for setting up of a National Biodiversity Authority (NBA), State Biodiversity Boards (SBBs) and Biodiversity Management Committees (BMCs) in local bodies.
- NBA and SBB are required to consult BMCs in decisions relating to use of biological resources or related knowledge within their jurisdiction and BMCs are to promote conservation, sustainable use and documentation of biodiversity.
- All foreign nationals or organizations require prior approval of NBA for obtaining biological resources and associated knowledge for any use.
- Indian individuals /entities require approval of NBA for transferring results of research with respect to any biological resources to foreign nationals/organizations.
- Collaborative research projects and exchange of knowledge and resources under these projects are exempted provided they are drawn as per the policy guidelines of the Central Government and have its approval the objectives of conservation, sustainable use and benefit sharing. However, Indian citizens/entities/local people including (vaids and hakims) to have free access to use biological resources within the country for their own use, medicinal as well as Research purposes.

The Commission for Air Quality Management in National Capital Region and Adjoining Areas Act, 2021

The Commission for Air Quality Management in National Capital Region and Adjoining Areas Bill, 2021 was introduced in Lok Sabha on July 30, 2021. The bill was passed by Lok Sabha on 04th August 2021 & by Rajya Sabha on 05th August. The bill received accent of President on 12th August 2021 and was published in gazette of India on 13th August 2021.

The Act provides for the constitution of the **Commission for Air Quality Management in National Capital Region and Adjoining Areas** for better coordination, research, identification and resolution of problems surrounding the air quality index.





Adjoining areas have been defined as areas in Haryana, Punjab, Rajasthan, and Uttar Pradesh, adjoining the National Capital Territory of Delhi and NCR, where any source of pollution may cause adverse impact on air quality in the NCR.

Key features of the Bill include:

- The headquarters of the Commission shall be at Delhi.
- **Composition:** The Commission will consist of: (i) a Chairperson, (ii) an officer of the rank of a Joint Secretary as the member-secretary and Chief Coordinating Officer, (iii) a serving or former Joint Secretary from the central government, (iii) three independent technical members with expertise in air pollution, and (iv) three members from non-government organisations. The Chairperson and members of the Commission will have a tenure of three years or till the age of seventy years, whichever is earlier.
- The Commission will also include ex-officio members: (i) from the central government and concerned state governments, and (ii) technical members from Central Pollution Control Board, Indian Space Research Organisation, and NITI Aayog. It may also appoint representatives of certain ministries.
- Selection of Commission: The central government will constitute a selection committee to recommend appointments of members of the Commission. The Committee will be headed by the Minister of Environment, Forest and Climate Change. Members of the Committee will include the Cabinet Secretary and the Minister of: (i) Commerce and Industry, (ii) Road Transport and Highways, and (iii) Science and Technology.
- Functions of the Commission: Functions of the Commission include: (i) co-ordinating actions by concerned state governments (Delhi, Haryana, Punjab, Rajasthan, and Uttar Pradesh), (ii) planning and executing plans to prevent and control air pollution in NCR, (iii) providing a framework for identifying air pollutants, (iv) conducting research and development through networking with technical institutions, (v) training and creating a special workforce to deal with issues related to air pollution, and (vi) preparing action plans such as increasing plantation and addressing stubble burning.
- **Powers of the Commission:** Powers of the Commission include: (i) restricting activities influencing air quality, (ii) investigating and conducting research related to environmental pollution impacting air quality, (iii) preparing codes and guidelines to prevent and control air





pollution, and (iv) issuing directions on matters including inspections, or regulation which will be binding on the concerned person or authority.

- The Commission will be the sole authority with jurisdiction over matters defined in the Bill (such as air quality management). In case of conflicts, directions of the Commission will prevail over the orders of the respective state governments, the Central Pollution Control Board (CPCB), state PCBs, and state-level statutory bodies.
- **Sub-Committees:** The Commission is required to form sub-committees on: (i) monitoring and identification, (ii) safeguarding and enforcement, and (iii) research and development.
- **Penalties:** Contravention of provisions of the Bill, or orders and directions of the Commission will be punishable with imprisonment of up to five years, or fine of up to one crore rupees, or both. The Bill excludes farmers from the scope of these penalties. However, the Commission may collect an environmental compensation from farmers causing pollution by stubble burning. This compensation will be prescribed by the central government. Appeals against the Commission's orders will lie with the National Green Tribunal.



Rajasthan Environment Policy 2010

Rajasthan Environment Policy 2010 identifies the key environmental challenges and outlines strategies and actions to address them. The document is based on an analysis of the state-specific issues, the natural resource constraints from which these emerge, and their overall implications for the <u>environment</u>.

Above all, it is intended to be a guide to action, and accordingly provides inputs for a <u>State</u> <u>Environment</u> Mission, supported by Task Forces with specific agenda and action plan, and institutional arrangements for implementation of the proposed measures.

Key Environmental Challenges in Rajasthan

Rajasthan faces several environmental challenges that it must address to ensure continued economic growth that is sustainable and equitable. These include:

- Increasing demand for water.
- Mineral reserves in forest areas which the forest policy has restricted from being exploited.
- Abatement of pollution in the face of industrialization and rapid urban growth.
- Population growth and the continual flow of migrants to the cities.
- Strike a balance between the exploitation of forests for products of economic value (such as food, medicines, timber), and conservation efforts which seek to maintain the natural processes that sustain biodiversity.
- Strategy for providing cooking and lighting energy for the rural population.
- Development of the tourism industry also poses a challenge, as it exerts considerable pressure on civic amenities (including water and sanitation and transport), land use, wildlife and forests, and the socio-economic fabric of the State.
- Climate change is of increasing concern not only at the national level but for the State governments as well.
- The nexus between poverty and environment.



• The environment policy must support research and development activities that promote innovation and provide technological alternatives, as well as insights for policy making and regulation.

Objectives of Rajasthan Environment Policy 2010

The objectives and principles of the State Environment Policy are the same as those on which the National Environment Policy, 2006 is founded. Broadly, the SEP aims to:

- 1. **Conserve and Enhance Environmental Resources** by protecting critical ecosystems and natural and man-made heritage, ensuring equitable access to environmental resources for all sections of society, ensuring judicious use of these resources to assure inter-generational equity, and ensuring their efficient use to maximize productivity and minimize environmental degradation.
- 2. Assure Environmental Sustainability of Key Economic Sectors by integrating environmental concerns into policies, plans, programs, and projects for economic and social development, so that these do not erode the very resource base on which they are dependent
- 3. **Improve Environmental Governance and Build Capacity** by assuring transparency, rationality, accountability, time and cost effectiveness, participation, and regulatory independence in the process of environmental management and regulation. The policy should also ensure higher resource flow for environmental conservation and promote beneficial multi stakeholders partnership.

Principles of Rajasthan Environment Policy 2010

The basic principles guiding the strategic interventions of Rajasthan Environment Policy 2010 are the same as those documented in the National Environment Policy, 2006, that is:

- 1. Human beings are at the center of concerns for sustainable development and are entitled to a healthy and productive life in harmony with nature.
- 2. The right to development must be fulfilled with equity for present and future generations across all sections of society.
- 3. Environmental protection is an integral part of the development process and cannot be considered in isolation from it.



- 4. Where there are credible threats to key environmental resources, the 'precautionary approach' shall be followed and lack of full scientific certainty will not be used as a reason for not taking mitigatory action.
- 5. Production and consumption activities will aim for economic efficiency by assigning economic value to the cost of environmental services, ensuring that polluters pay for the cost of pollution, minimizing wasteful use and consumption of natural resources, and minimizing institutional costs and delays in environmental management.
- 6. Entities with 'Incomparable' value (such as unique historical monuments, charismatic species of fauna and flora, unique landscapes) must be preserved at any cost as damage to these cannot be compensated in terms of money or conventional goods and services.
- 7. The environmental policy must be guided by the principles of equity in all its facets, i.e. 'procedural equity' relating to fair rules for allocation of entitlements and obligations, 'end-result equity' relating to fair distribution of outcomes, 'intra-generational equity' within societies, and 'inter-generational' equity relating to justice between generations.
- 8. Civil liability may be used in addition to criminal liability as a deterrent to environmentally harmful actions, and for compensation to the victims of environmental damage.
- 9. The State is the trustee of all natural resources, and must enable their public use while protecting the legitimate interest of a large number of people.
- 10. Decentralization of powers from a Central Authority to State and Local Authorities could empower the public authorities to more effectively address local environmental concerns.
- 11. Environmental concerns must be integrated into sectoral policy making and policy research, and linkages must be strengthened among the various agencies charged with implementation of environmental policies at the central, State, and Local Self-Government levels.
- 12. Environmental standards must reflect the economic and social development situation in which they are to be applied, and must be based on considerations of risk to human health, risks to other environmental entities, technical feasibility, costs of compliance, and other strategic considerations.
- 13. It is preferable (and often cheaper) to prevent environmental damage from occurring, rather than attempting to restore after degradation. (xiv) If endangered species and natural



ecosystems of special importance to sustaining life, providing livelihoods, and general well being are threatened by a developmental activity, environmental offsetting measures must be undertaken to restore as nearly as feasible the lost environmental services to the affected populations.

Strategies and Actions

The set of strategies and actions **to redress** the key environmental problems of the State are covered under three broad areas:

- 1. Conserving and enhancing environmental resources;
- 2. Assuring sustainability of key economic sectors; and
- 3. Improving environmental governance and building capacity.

Water, land, air, forests and biodiversity are key resources that must be conserved and enhanced. At the same time, vulnerability assessment and adaptation measures should be undertaken in the vulnerable sectors to mitigate the impacts of climate change, especially on the poor sections of society.

Policy Review and Implementation

As development imperatives in the State and their environmental implications change, new environmental priorities will emerge over time. Changes in national and global environmental regimes will also affect state level environmental issues. Therefore, the State Environmental Policy needs to be a dynamic document, which is subjected to periodic review and aligned with new knowledge and developments in the forthcoming years.

To assure implementation of this SEP, a State Environment Mission has been constituted, which will be supported by Task Forces with specific agenda and action plan, and institutional arrangements and resources for implementation of the proposed measures. Details with respect to the State Environment Mission are provided in a separate document.





Environment Conservation

The Central & State Government has created various organizations that function to conserve the environment and promote sustainable development. In addition to the wildlife protected area programs, there are various programs/ schemes being implemented by these agencies to conserve environment.

State Symbols

The state government has identified certain state symbols to highlight the importance of these flora & fauna in the state.

State Animal of Rajasthan (Wildlife): Chinkara

• Chinkara was declared as State Animal in 1981

State Animal of Rajasthan (Livestock): Camel

- <u>Camel</u> was declared as State Animal is 19 September, 2014
- With this Rajasthan has two State Animals, <u>Camel</u> was declared as State Animal in Livestock Category.

State Bird of Rajasthan: Godawan

- Godawan is Great Indian Bustard (GIB)
- Godawan was declared as State bird in 1981.

State Flower of Rajasthan: Rohida

- Rohida (Tecomella undulata) is the official state Flower of Rajasthan.
- It was declared as State flower in 1983.
- It is found mainly in Thar Desert, it is also known as Marwar Teak.

State Tree of Rajasthan

- Khejri (Prosopis Cineraria) is the official tree of Rajasthan State.
- Khejri was declared as State tree in 1981.
- It is also known as Kalp tree Shami, Janti (शमी, जांटी) in Rajasthan,





• Its flower is called minjhar (मींझर) and fruit is called Sangiri (सांगरी).

Other State Symbols:

- Ghoomar is the official dance of Rajasthan State.
- In 1948, Basketball was declared as the official Game of Rajasthan State.

National Lake Conservation Plan (NLCP)

Ministry of Environment and Forests has been implementing the National Lake Conservation Plan (NLCP) since 2001 for conservation and management of polluted and degraded lakes in urban and semi-urban areas. The major objectives of NLCP include encouraging and assisting state Governments for sustainable management and conservation of lakes.

National Lake Conservation Plan (NLCP) in Rajasthan

Under the Centrally Sponsored Scheme of National Lake Conservation Programme, five <u>lakes of</u> <u>Rajasthan</u>:

- Fateh Sagar, Udaipur
- Pichhola, Udaipur
- Ana Sagar, Ajmer
- Pushkar, Ajmer
- Nakki, Mount Abu, Sirohi

have been taken up.

Updates:

- Sharing pattern between Central Government and State Government is 60:40 w.e.f. 1st April 2016.
- Implementing agency of this plan is Local Self Government (LSG) Department.

National Plan for Conservation of Aquatic Eco-systems (NPCA)

For conservation of lakes and wetlands, Ministry of Environment and Forests has been implementing two separate Centrally Sponsored Schemes (CSS), namely

• The National Wetlands Conservation Programme (NWCP) and



• The National Lake Conservation Plan (NLCP).

To avoid overlap, promote better synergies and to ensure that conservation/ management works, an integrated scheme NPCA was proposed with the objective of conserving aquatic ecosystems (lakes and wetlands) through implementation of sustainable Conservation Plans, and governed with application of uniform policy and guidelines.

The Cabinet Committee on Economic Affairs (CCEA) in their meeting held on 7th February, 2013, has approved the proposal for merger of National Lake Conservation Plan and National Wetlands Conservation Programme into a new scheme 'National Plan for Conservation of Aquatic Eco-systems' (NPCA). The merged scheme to be operational during XII Plan Period at an estimated cost of Rs.900 crore shall have a funding pattern of 70:30 cost sharing between Central Government and respective State Governments (90:10 for NE States).

The principal objectives of the new scheme is holistic conservation and restoration of lakes and wetlands for achieving desired water quality enhancement besides improvement in biodiversity and ecosystem through an integrated and multidisciplinary approach with a common regulatory framework. The scheme would contribute to reduction of pollution loads and improvement in biodiversity as also the goods and services provided by these water bodies to the stakeholders.

Besides the implementation of comprehensive Management Action Plans, the new scheme on conservation and management of lakes and wetlands in the country shall also cover in its scope, the inventorization and information system on lakes and wetlands, National level directive on criteria for lakes and wetlands, Regulatory Framework (Revisiting the Wetlands Rules, 2010), Capacity building at State Government and local body levels, Evaluation etc.

Rajeev Gandhi Paryavaran Sanrakshan Puraskar:

There is a provision for bestowing Rajeev Gandhi Paryavaran Sanrakshan Puraskars under three categories viz.

- Individual,
- Institution/organization,
- Nagar Palika/Nagar Parishad

for significant contributions in the field of environment.



Scheme for Green Rating for industries

Rajasthan State Pollution Control Board (RSPCB), in collaboration with Confederation of Indian Industries (CII), has launched a system for **Green Rating for the industries** based on their environmental performance which may be evaluated based on their compliance of the prescribed norms and their efforts to perform better than the prescribed standards.

To ensure maximum participation of the industries in the scheme and to provide financial and other benefit to the green rated industries, the State Board has decided to provide the following incentives and recognition to the Green Rated industrial units:

Sr. No	Green Rating Category	Reduction in Consent Fee
1	Certified	-
2	Bronze	5%
3	Silver	10%
4	Gold	25%
5	Platinum	50%

a) Reduction in consent fee will be provided as per the table below:

b) Extension in consent period: Extension in consent period for one year beyond the prescribed period for industries securing rating in Bronze, Silver, Gold and Platinum categories will be provided subject to the condition that no non-compliance is reported within the consented period.

c) Use of Green Rating Logo by the Project Proponent: The Project proponent will be permitted to use Green Rating Logo for promotion of his products/services or any other use. However, the Project Proponent will inform the State Board about the use being made.

d) Exclusive mention of Green Rated Companies on the website of the State Board and CII: State Board and CII will prominently feature all the Green Rated Projects on its website to provide them wide publicity and recognition.





Celebration of Environmentally Important Days

February 2	World Wetlands Day
February 27	International Polar Bear Day
February 28	National Science Day

March 3	World Wildlife Day
March 14	International Day of Action for Rivers
March 20	World Sparrow Day
March 21	World Forestry Day, World Planting Day, World Wood Day
March 22	World Water & Sanitation Day
March 23	World Meteorological Day, World Resources Day

April 7	World Health Day
April 10	World Atmosphere Day
April 18	World Heritage Day
April 22	World Earth Day

May 3	International Energy Day
May 8	World Migratory Bird Day
May 11	National Technology Day
May 14	Endemic Bird Day
May 22	World Biodiversity Day
May 23	World Turtle Day





June 5	World Environment Day
June 8	World Ocean Day
June 9	Coral Triangle Day
June 15	Global Wind Day
June 17	World Day to Combat Desertification and Drought

July 1 – July 7	Van Mahotsav Saptah
July 3	World Seabird Day
July 11	World Population Day
July 26	International Mangrove Day
July 29	International Tiger Day

August 10	World Lion Day
August 12	World Elephant Day
August 22	Honey Bee Day

September 7	International Day of Clean Air for Blue Skies
September 8	World Cleanup Day
September 16	World Ozone Day
September 18	World Water Monitoring Day
September 21	Zero Emissions Day
September 26	World Environmental Health Day





October 1 – Oct 7	Wildlife Week
October 3	World Nature Day, World Habitat Day
October 4	World Animal Day
October 6	World Wildlife Day
October 24	International Day of Climate Action

November 6	International Day for Preventing the Exploitation of the Environment in War and Armed Conflict
November 12	World Birds Day
November 14	World Energy Conservation Day

December 5	World Soil Day
December 11	International Mountain Day
December 14	National Energy Conservation Day



Eco-Tourism in Rajasthan

Rajasthan has established itself as a significant tourist destination on the domestic as well as international tourist map. The state is known for its diversity in terms of natural resources, cultural heritage, historical as well as archaeological wonders and rare wild life. Consequently, there is tremendous potential for eco-tourism in Rajasthan.

What is Eco-Tourism ?

Eco-Tourism has been broadly defined as tourism which is ecologically sustainable. As per international ecotourism society, *Ecotourism is now defined as "responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education"* (TIES, 2015)

Government Support

Rajasthan Government's emphasis has been on community-based ecotourism, encouraging public–private sector participation, and infrastructural development.

The state government has also identified potential Eco-Tourism Sites in Rajasthan including Sunda Mata temple in Jalore district, Bassi in Chittorgarh district, Kumbhalgarh in Rajsamand district, Hamirgarh and Menal, both in Bhilwara district have been developed as per guidelines of eco-tourism.

Eco-Tourism Policy

The Government of Rajasthan notified *Rajasthan's Eco-tourism policy* in 2010 and again in 2021. This policy has been framed with a view to sensitize the public, government departments, NGOs and others about eco-tourism and for laying down the framework for its growth in the State in a sustainable manner.

Covered in detail in next chapter





Eco-Tourism Circuit

In 2018, department of tourism has submitted the proposal to include

- <u>Sariska (Alwar)</u>,
- Kaila Devi wildlife sanctuary (Karauli),
- <u>Kumbhalgarh wildlife sanctuary</u> &
- Todgarh Raoli wildlife sanctuary (Rajsamand),
- Mount Abu wildlife sanctuary (Sirohi) and
- Jhalana Safari Park (Jaipur)

for development under the centre's eco-circuit theme.


Rajasthan Eco-Tourism Policy 2021

As number of tourist arrivals in Rajasthan increases year on year, it exerts increasing pressure on constrained resources. Consequently, <u>eco-tourism in Rajasthan</u> gains importance and it has become necessary to formulate a policy to encourage, guide and regulate in such a manner that it grows in desirable way and benefits the people in general and help achievement of conservation goal.

The State Government first released, Rajasthan Ecotourism policy in 2010 to sensitize the general masses, government departments, NGO's etc about eco-tourism and laying down the framework for its growth in the State in a sustainable manner.

In July 2021, the Rajasthan State Government released the **Rajasthan Eco Tourism Policy 2021** with an aim to generate economic benefits after conserving natural areas and attracting tourism in Rajasthan.

Definition of Eco-Tourism:

Rajasthan Eco Tourism Policy 2021 defines Eco-Tourism as a form of sustainable tourism within a natural or cultural heritage area where community participation, protection and management of natural resources, culture, indigenous knowledge and practices, environmental education and ethics, as well as economic benefits are fostered and pursued for the enrichment of host community and satisfaction of visitors.

Further, The Ministry of Environment, Forest and Climate Change (MoEFCC) describes Ecotourism as 'responsible travel to natural areas that conserves the environment and improves the well-being of local people'.

Characteristics of Eco-Tourism:

The Policy also defines characteristics of Eco-Tourism based on **World Tourism Organisation (UNWTO)** as:

- Tourism where the main motivation of the tourists is the conservation and appreciation of nature as well as the traditional cultures prevailing in natural areas.
- Contains educational and interpretation features.
- Minimises negative impacts upon the natural and sociocultural environment.



• Supports the maintenance of natural areas which are used as ecotourism attractions by generating economic benefits for host communities, providing income opportunities for local communities and increasing awareness towards the conservation of natural and cultural assets.

Salient Features:

- Considers communities as the most vital pillar of ecotourism in the state.
- Identifies that carefully designed ecotourism initiative shall have the potential to contribute both to ecological conservation and local community development.
- The forest department will be the nodal department for implementing the ecotourism policy.
- The Rajasthan Eco Tourism policy 2021 will remain in **operation for a period of 10 years** from the date of notification.

Ecotourism activities to be permitted:

The policy defines, **Eco Tourism activities** as nature-based activities exclusively performed to sensitize people about the beauty, richness and fragility of the state's natural and cultural heritage, and shall not just focus on creating destinations in natural area or using natural environment for outdoor activities.

Ecotourism activities have to be coordinated by a qualified nature and cultural interpreter trained to entertain and educate the visitors.

Permitted activities include:

- Trekking, nature walk, bird and wildlife watching, hiking, flora and fauna observation, photography, etc.
- Boating / River Cruising to view wildlife and experience wilderness.
- Overnight Camping / Star Gazing in designated sites / forts / other monuments.
- Any travel focussed on experiencing Rajasthan's fairs and festivals which promote eco-tourism and sustainability of local traditions.
- Lodging in campsites, eco-lodges, homestays andguesthouses that are located in an area of natural and/ or cultural beauty, and involves local specificities and



• Activities in specified areas of the forests such as jungle safari in vehicles or elephant / camel safari, trekking / nature walk, overnight camping in designated sites, bird watching and study of flora & fauna, etc

As per the policy, all ecotourism activities will be in conformity with the existing environmental laws of the country, including:

- Wildlife (Protection) Act, 1972,
- The FCA 19802, the Environment Protection Act, 1986,
- The Environment (Protection) rules 1986 and rules for Eco sensitive zones,
- NTCA guidelines,
- Rajasthan Tourism Policy 2020,
- Directives of Supreme Court of India and National Green Tribunal.

Policy Implementation:

Rajasthan Ecotourism Policy 2021 shall be implemented by **Rajasthan Forest Development Corporation** and administered by the **Forest Department Government of Rajasthan**.

Marketing: However, for the purposes of branding, promotion, marketing Rajasthan Ecotourism Policy 2021 shall be considered to be a part of Rajasthan Tourism Policy and shall be **promoted by the Rajasthan Tourism Department**, Government of Rajasthan.

The **Rajasthan Ecotourism Development Society (REDS)** registered under the Rajasthan Societies Registration Act 1963 shall be reconstituted and will act as an advisory and oversight body for the Rajasthan Ecotourism Policy.

District Level:

• To implement the policy at the district level, a **district ecotourism committee (DLEC)** will be constituted under the **chairmanship of the district collector** with deputy conservator of forests (territorial) as member secretary.





- It will also have members from other stakeholder departments such as revenue, tourism, tribal development, rural development etc. to promote, manage and regulate ecotourism sites.
- The DLEC will be free to invite opinion from the experts in the field of tourism and hospitality sectors operating in their district.



Forests: Introduction

The forests of Rajasthan cover approximately an area of **32,863 sq km** which is **9.60**% of the total geographical area of the state. The state has teak forests, which is northern most limit of teak zone in India. Apart from meeting the fuel-wood and fodder demand, forest resources of Rajasthan contribute Rs.7160 million to the state domestic product (SDP).

The forests of Rajasthan are spread unequally in Northern, Southern, Eastern and South Eastern parts, and the western region of Rajasthan is devoid of any forest cover. Most of the forests are in hilly regions of Udaipur, Rajasamand, Kota, Baran Sawai Madhopur, Chittorgarh, Sirohi, Bundi, Alwar, Jhalawar and Banswara districts.

However, The extent of **Natural Forests** in Rajasthan is not only one of the lowest in the country but also in terms of productivity of forest, it is the lowest. On the contrary The State is endowed with the largest chunk of wasteland, which is about 20% of the total wastelands of the country.

S.NO	Land Use	Area (in Lakh Hectare)	Percentage
1	Net Sown Area	179.48	52.34
2	Area under Forests	27.72	8.08
3	Non Agricultural Uses	20.10	5.86
4	Permanent Pastures & other grazing land	16.67	4.86
5	Land under Misc. trees & grooves	0.30	0.09
6	Culturable Wasteland	37.27	10.87
7	Fallow Lands (other than current fallow)	20.93	6.10
8	Current Fallows	16.75	4.89
9	Barren & Uncultivable Land	23.67	6.91
	Reporting Area for Land Utilization	342.89	100
	Total Reported area of Rajasthan	342.89	

Land Utilization in Rajasthan

** Based on Rajasthan Economic Review 2022-23 by GOR, published in 2023











Administrative Classification

As per Forest Survey of India, <u>State of Forest report 2021</u>, (ISFR 2021) Rajasthan has recorded forest area of about **32,863 square kms**. This forest area forms **9.60**% of state's geographical area and about **4.23**% of India's forest area.

On Basis of Legal Status:

On the basis of Legal status, the Government has classified this forest area into three types:

- Reserved Forests 12,176 Sq. Kms
- Protected Forests 18,543 Sq. Kms
- Unclassified Forests 2,144 Sq. Kms

Reserved Forest:

- These forests are under the direct supervision of the government.
- No public entry is allowed for collection of timber or grazing of cattle.
- Rajasthan has 12,176 sq kms or 37% of forest as Reserved Forest.

Protected Forest:

- These forests are looked after by the government, but the local people are allowed to collect fuel-wood/timber and graze their cattle without causing serious damage to the forests.
- Rajasthan has 18,543 sq kms or 56.4% of forest area under Protected Forests.

Unclassified Forest:

- The unclassified forests are those in which there is no restriction on the cutting of trees and grazing of cattle.
- Rajasthan has 2144 sq kms or 6.5% of area has Unclassified forests.



ISFR 2021 Rajasthan: Classification based on Canopy Density

According to ISFR 2021, the **Forest Cover** in the State is **16,654.96 square kms**, which is about **4.87%** of State's Geographical Area. In terms of forest canopy density classes, the State has:

Class	Area in Sq Kms	% of Geographical Area
Very Dense Forests (VDF)	78.15	0.02%
Moderately Dense Forests (MDF)	4,368.65	1.28%
Open Forests (OF)	12,208.16	3.57%
Total	16,654.96	4.87%
Scrubs	4,808.51	1.41%



Very Dense Forests (VDF):

- The Lands with forest cover having a canopy density of 70% and more are called Very Dense Forests (VDF).
- In Rajasthan, there are only **78.15** Sq kms of very dense forests.
- Percentage VDF: 0.02% of Geographical Area.





Moderately Dense Forests (MDF):

- The Land with forest cover having a canopy density of 40-70% is called the Moderately Dense Forest (MDF).
- In Rajasthan, there are only **4,368.65** Sq kms of moderately dense forests.
- Percentage MDF: 1.28% of Geographical Area.

Open Forests (OF):

- The Lands with forest cover having canopy density of 10-40% are called Open Forests.
- In Rajasthan, there are only **12,208.16** Sq kms of open forests.
- Percentage OF: 3.57% of Geographical Area.

Scrubs:

- The degraded forest lands which have a Canopy density of less than 10% are called Scrubs.
- In Rajasthan, there are about **4,808.51** Sq kms of scrubs.
- Percentage Scrubs: 1.41% of Geographical Area.

Non-Forest Area:

• Rest of the area, included all other lands except forest area.









ISFR 2021 Rajasthan: Altitude-wise Forest Cover in Rajasthan

The report also identifies, variation of forests with altitude:





Table 13.22.6 Altitude-wise Forest Cover in Rajasthan(in				(in sq km)		
Altitude Zone (m)	Geographical Area	VDF	MDF	OF	Total	Scrub
0-500	3,24,954	27	2,567	9,384	11,978	4,065
500-1000	17,070	51	1,688	2,776	4,515	739
1000-2000	215	0	114	48	162	5
Total	3,42,239	78	4,369	12,208	16,655	4,809

(based on SRTM, Digital Elevation Model, 30 m, 2016)

Important Terms to understand:

Forest Cover:

• Forest Cover All lands which are more than 1 hectare in area and with a Canopy density of more than 10% irrespective of the ownership and legal status is called Forest Cover.

Recorded Forest Area:

• The area recorded as "forests" in the Government records is called Forest Area or Recorded Forest Area.

Canopy and Canopy Density

• The cover of branches and Foliage formed by the crown of trees is called Canopy. The percentage area of land covered by the canopy of trees is called Canopy density.





District-wise Forest Cover of Rajasthan

ISFR 2021 also ranks districts of Rajasthan in terms of their forest cover. Accordingly,

Rajasthan's District with Maximum total forest area:

Ranking	District	Forest Area
1	Udaipur	2753.39
2	Alwar	1195.91
3	Pratapgarh	1033.77
4	Baran	1010.05
5	Chittorgarh	990.05

Rajasthan's District with Maximum Percentage of Forest area:

Ranking	District	Percentage of Area
1	Udaipur	23.49%
2	Pratapgarh	23.24%
3	Sirohi	17.49%
4	Karauli	15.28%
5	Baran	14.45%





Rajasthan's District with least total forest area:

Ranking	District	Forest Area
1	Churu	77.69
2	Hanumangarh	92.97
3	Jodhpur	109.25
4	Ganganagar	115.09
5	Dausa	116.60

Rajasthan's District with Least Percentage of Forest area:

Ranking	District	Forest Area
1	Jodhpur	0.48%
2	Churu	0.56%
3	Jaisalmer	0.84%
4	Bikaner	0.92%
5	Hanumangarh/ Nagaur	0.96%





District	Geo-graphical		2021 Asses	sment		%of	Change	Scrub
	Area (GA)	Very Dense Forest	Mod. Dense Forest	Open Forest	Total	GA	wrt 2019 assess- ment	
Ajmer	8,481	0.00	46.49	285.07	331.56	3.91	26.45	175.72
Alwar	8,380	59.70	334.65	801.56	1,195.91	14.27	-0.75	243.08
Banswara	4,522	0.00	38.52	230.09	268.61	5.94	0.19	60.17
Baran	6,992	0.00	153.66	856.39	1,010.05	14.45	-0.94	98.93
Barmer	28,387	0.00	4.79	284.43	289.22	1.02	-0.57	223.18
Bharatpur	5,066	0.00	26.33	194.73	221.06	4.36	-9.21	77.15
Bhilwara	10,455	0.00	33.31	191.00	224.31	2.15	0.12	189.76
Bikaner	30,239	0.88	28.06	250.77	279.71	0.92	24.10	49.86
Bundi	5,776	1.00	138.98	424.37	564.35	9.77	7.17	172.67
Chittaurgarh	7,822	0.00	222.01	768.04	990.05	12.66	1.25	107.42
Churu	13,835	0.00	2,44	75.25	77.69	0.56	-4.31	27.48
Dausa	3,432	0.00	11.15	105.45	116.60	3.40	-0.40	94.66
Dhaulpur	3,033	0.00	79.75	339.32	419.07	13.82	0.07	76.07
Dungarpur	3,770	0.00	42.53	262.01	304.54	8.08	2.24	83.37
Ganganagar	10,978	0.00	9.87	105.22	115.09	1.05	2.17	15.78
Hanumangarh	9,656	1.01	6.80	85.16	92.97	0.96	3.01	6.71
Jaipur	11,143	12.00	97.20	445.66	554.86	4.98	2.10	272.85
Jaisalmer	38,401	3.56	48.64	270.19	322.39	0.84	-3.38	206.14
Jalor	10,640	0.00	22.67	212.94	235.61	2.21	-32.46	221.89
Jhalawar	6,219	0.00	83.39	353.28	436.67	7.02	1.09	102.57
Jhunjhunun	5,928	0.00	20.79	180.17	200.96	3.39	0.19	179.54
Jodhpur	22,850	0.00	4.26	104.99	109.25	0.48	1.47	163.53
Karauli	5,524	0.00	96.04	747.80	843.84	15.28	-26.16	300.54
Kota	5,217	0.00	153.28	391.55	544.83	10,44	-1.90	135.83
Nagaur	17,718	0.00	14.11	155.65	169.76	0.96	22.72	87.71

District	Geo-graphical	2021 Assessment				%of	Change	Scrub
	Area (GA)	Very Dense Forest	Mod. Dense Forest	Open Forest	Total	GA	wrt 2019 assess- ment	
Pali	12,387	0.00	211.60	489.26	700.86	5.66	26.01	357.60
Pratapgarh	4,449	0.00	562.97	470.80	1,033.77	23.24	-4,14	59.05
Rajsamand	4,655	0.00	129.94	386.93	516.87	11.10	-4.92	126.06
Sawai Madhopur	4,498	0.00	171.30	293.31	464.61	10.33	1.92	138.52
Sikar	7,732	0.00	31.51	170.67	202.18	2.61	9.12	198.68
Sirohi	5,136	0.00	300.96	597.46	898.42	17.49	-13,49	247.50
Tonk	7,194	0.00	27.72	138.18	165.90	2.31	0.84	68.96
Udaipur ¹	11,724	0.00	1,212.93	1,540.46	2,753.39	23.49	-4.15	239.53
Grand Total	3.42.239	78.15	4.368.65	12,208,16	16.654.96	4.87	25.45	4.808.51



Types of Forests

The forests of Rajasthan can be divided into below broad forest types.

- Tropical Thorn Forests,
- Tropical Dry Deciduous Forests,
- Bamboo-Forests
- Central India Sub-tropical hill forests.
- Mixed Miscellaneous Forests

Tropical Thorn Forests of Rajasthan

- Tropical thorn forests are found in arid and semi-arid regions of western Rajasthan, namely Jodhpur, Pali, Jalore, Barmer, Nagaur, Churu, Bikaner etc.
- These extend from western Indo -Park border and gradually merge with the dry deciduous mixed forests of the Aravalli hills and the south-eastern plateau.
- The main species found in this kind of forests are *Acacia nilotica*, *Acacia leucophloea*, *Prosopis cineraria*, *Capparis aphylla*, *Zizyphus spp.*, *Flacourtia spp*. etc.

Tropical Dry Deciduous (Dhol) Forests

- These forests are mostly found in small patches in few parts of the state. the northern and eastern slopes of aravalli ranges, mostly in Alwar, Bharatpur and Dholpur districts, are covered with this type of forests.
- Sporadic growth of certain species of dry deciduous forests is found along the dry river beds of Jalore, Nagaur, Ganaganagar and Bikaner, districts.
- The main species found in this kind of forests are *Babul*

Bamboo Forests

• Bamboo covers about 1.04% of the area occurring mostly in Chittorgarh, Udaipur, Kota & Abu hills.





Central Indian Sub - tropical Hill Forests

- These forests which are most abundant in central India, as in Madhya Pradesh, parts of Gujarat and Maharashtra, are found in Sirohi district of Rajasthan also, mostly on the hills girding Mt. Abu.
- These forests have **semi-evergreen** and some evergreen species of trees.
- The vegetation of Mt. Abu consists of many plants which are similar to the sub tropical region of Himalayas. Around Mt. Abu, they are well represented between 700 to 800 m altitudes.

Mixed Miscellaneous Forests

- These forests are mostly found in south-eastern and eastern part of Rajasthan including Chittorgarh, Kota, Udaipur, Sirohi, Banswara, Dungarpur, Baran and Jhalawar distrists.
- Average rainfall in these forest is more than 60cm and cover approximately 20% of the forest cover.
- These Forests mainly have Anogeissus pendula, Anogeissus latifolia, Terminalia tomentosa, Terminalia arjuna, Terminalia chebula, Albizia lebbeck, Dalbergia paniculata etc. and its associates.

Champion & Seth classification (1968)

The Indian State of Forest Report 2019 classifies forests of India, based on Champion & Seth classification (1968). According to this forests of Rajasthan can be classified into following types:





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SL. No.	Forest Type	Area	% of the total mapped area*
1.	5A/C1a Very dry teak forest	1,052.53	4.92
2.	5A/C1b Dry teak forest	45.03	0.22
3.	5B/C2 Northern dry mixed deciduous forest	8,294.34	38.78
4,	5/DS1 Dry deciduous scrub	2,335.13	10.92
5.	5/DS2 Dry savannah forest	2.87	0.01
6.	5/E1 Anogeissus pendula forest	3,162.27	14.78
7.	5/E1/DS1 Anogeissus pendula scrub	523.55	2.45
8.	5/E2 Boswellia forest	151.04	0.71
9.	5/E5 Butea forest	54.34	0.25
10.	5/E6 Aegle forest	1.69	0.01
11.	5/E8a <i>Phoenix</i> savannah	2.03	0.01
12.	5/1S1 Dry tropical riverain forest	49.86	0.23
13.	5/1S2 Khair-sissu forest	304.35	1.42
14.	6B/C1 Desert thorn forest	813.43	3.80
15.	6B/C2 Ravine thorn forest	329.48	1.54
16,	6B/DS1 Ziziphus scrub	164.31	0.77
17.	6B/DS2 Tropical Euphorbia scrub	2.92	0.01
18.	6/E1 Euphorbia scrub	133.47	0.62
19.	6/E2 Acacia senegal forest	46.44	0.22
20.	6/1S1 Desert dune scrub	969.52	4.53
-	Sub Total	18,438.60	86.20
21.	TOF/Plantation	2,950.95	13.80
	Total (Forest Cover & Scrub)	21,389.55	100.00

*Forest Types have been assigned to the natural forest formations under forest cover and scrub categories shown in forest cover mapping (ISFR, 2019). The total mapped area, therefore, is sum of forest cover and scrub.



Rajasthan Forest Policy 2023

State Forest Policy 2010 envisioned increasing vegetal cover in the State to 20 percent of the geographical area. Forest cover in the State actually increased by around 82 sq km. from 2017 to 2021. There is now a clear need to provide much needed momentum to the efforts being made in this direction.

In the more recent times, a clear obligation has also been felt to integrate the vision of sustainable forest management through elements of ecosystem conservation, ecological security, climate change mitigation and adaptation, promotion of urban forestry and robust convergence with the Sustainable Development Goals.

In June 2023, Rajasthan Forest Policy 2023 has been brought out by the government. The policy aims to increase vegetation cover to 20 percent of the geographical area within next twenty years with special focus on increasing vegetation cover outside forests. The vision and objectives of the State Forest Policy, 2023 shall be achieved on the basis of the principles of protection and consolidation, ecological restoration, and people's participation.

Objectives:

The objectives of Rajasthan Forest Policy 2023 are:

- To protect, conserve, restore and manage existing natural forests, wildlife and bio-diversity to enhance their productive capacity for
- ecological security and flow of ecosystem services as well as to contribute towards economic and social well-being.
- To increase the extent of forest/tree cover in the State by encouraging reforestation, restoration and rehabilitation measures in existing forest areas and by encouraging and expanding vegetal cover in urban and rural areas outside the existing forest areas by promoting protection and afforestation practices on common property resources, agro forestry practices on farm lands and tree planting on available spaces.
- To encourage community participation and improve livelihoods opportunities for people through sustainable use of forest and grassland based resources and ecosystem services.





- To prevent all forms of land degradation including decertification, and improve productivity of land under forests, grasslands and plantations through appropriate management interventions and use of contemporary scientific and technological knowledge.
- To conserve and promote floral and faunal diversity and gene pool reserve especially of the rare and endangered species of flora and fauna through ex-situ, in-situ and circa-situm conservation measures including conservation and management of bio-diversity rich ecosystems like grasslands, wetlands, sacred groves, deserts etc.
- To consolidate climate change mitigation and adaptation measures in forest, wildlife and bio-diversity management and management of vegetal cover in Rajasthan.

Principles of Forest Management

The vision and objectives of the State Forest Policy shall be achieved on the basis of following broad principles:

- **Protection and Consolidation:** Effective protection of forests, wildlife and bio-diversity rich areas enhance and accelerate ecological restoration. Compact and contiguous ecological units have far more beneficial impact than the sum of its parts. Hence, efforts shall be made to increase protection, reduce fragmentation and increase consolidation of ecological units to achieve a synergistic advantage.
- **Ecological Restoration:** Primacy shall be accorded to restoration of constituents of the ecosystem in such a way so as to restore the ecological structure, functions and bio-diversity of the area.
- **Sustainability:** Efforts shall be made to strike an equitable balance between the ecological, economic and social dimension in such a way so as to be able to meet the needs and aspirations of the present generation without compromising the ability of the future generations to be able to meet their own needs and aspirations.
- **Expansion:** It is imperative to spread the efforts and investments also in areas outside the recorded forest area so as to be able to increase the actual forest and vegetal cover.
- **Evidence-based Approach:** Knowledge gained out of research, technological innovation and field experience shall be sourced and put to effective use in all the efforts toward restoration and conservation of forests, wildlife and bio-diversity.
- **Participation:** Participation and productive engagement of stakeholders from all section of the society shall be ensured to achieve long term sustainability.





Sacred Groves in Rajasthan

It is estimated that about 25,000 sacred groves and other sanctified ecosystems, varying in size between 0.1 ha. To 500 ha., are in existence in Rajasthan. Of these, nearly 5,370 sq. kilometers are orans lie in the Thar Desert. Some big 'orans' are Bhadriyaji in Jaisalmer district that covers about 15000 hectares area and Kundla's Oran in Barmer district that covers about 7500 hectares.

Sacred groves are known under various names in Rajasthan as:

- Banis of Mewar,
- Kenkris of Ajmer,
- Orans of Jodhpur, Jaisalmer, Bikaner,
- Shamlat Dehs and Devbanis of Alwar
- Baag in south-eastern Rajasthan regions.

Sacred groves or Orans shade, fuel wood, fodder and even food and livelihood for humans and animals. Local communities control them in a complex management system and they have played an important role in the ecology, politics and history of Rajasthan.

The Orans of the Bishnois in Jodhpur are famous for the protection accorded to the Blackbuck and the Khejri (Indian Mesquite/Prosopis cineraria) tree, which are sacred to the Bishnois.

Delineation of an Oran is conducted during a ceremony called Doodh Jal or Kesar Chaanta, when boundaries of the sacred grove is marked by pouring Ganga water or saffron milk around a specific area within the forest, which is thereafter declared as an Oran or Dev bani (God's forest).

Types of Sacred groves in Rajasthan

Deep N.Pandey and his team in their paper "Sacred Forestry: The Case of Rajasthan, India", have classified the sacred areas into:

- Sacred groves
- Sacred corridors
 - Locally protected riverbanks by villagers in the name of Lord Shiva
- Temple forests





- Temple forests are managed and maintained to serve the temple. This may include economic, ecological, social and religious functions.
- Sacred gardens
 - Baugs or garden planted near settlements for fruit, fodder, fuelwood, medicine, NTFPs and shade.
- Inhabited groves

Protection of Sacred grooves:

In 1730, King of Jodhpur ordered his soldiers to cut the 'Khezri' (Prosospis cineraria) tree in village Khezadali in 1730 AD. The villagers from the Bishnoi community, led by Amrita Devi, had protested the move. Amrita Devi embraced a tree, followed by her three daughters. In all, 363 people were martyred in order to save these trees.

Gujjar community of Rajasthan use to plant 'Neem' (Azadirachta indica) and worship it as Neem-god. A Gujjar settlement normally starts near a water source or along a stream or river. Initially few houses are constructed and neem saplings procured from varying sources are planted in the enclosure around the hut, and worshiped it as the abode of God Deonarayan (Gold and Gujar, 1989)

In another example, according to old inscriptions on copper sheets (tamrapatra), King Vikiramdev came to bathe in Pushkar, Ajmer, in the year 1419 (Vikram Samvat 1476). As his witnesses, the Sun God and Moon God donated the area around the Degrai Mandir (around 38 km, *12 kos*), as oran, estimated to be approximately 60,000 *bigha*. Henceforth, it was declared that no farming, cutting of trees or hunting would be permitted on the land, and it would be left untouched for the animals to graze on.



Wildlife: Introduction

Though a large percentage of the total area of Rajasthan is desert and there is little forest cover, Rajasthan has a rich and variety of animal and plant species. The state has over 2000 plant species, 87 species of mammals, 114 species of fish, over 500 species of birds and about 81 species of reptiles.

Due to vast size and latitudinal variations above the sea level of 1,700m there is a varied vegetation. From semi green forests which are witnessed in the region of Mount Abu to dry grasslands of the desert near Jaisalmer and Jodhpur, from dry deciduous thorn forest of Aravali to wetlands of Bharatpur; the varied topography constructs such different natural habitats for many endangered species and attracts many migratory birds.

The Big Cats of India

Felidae is the biological family of cats and member of this family is called *Felid*. There are five species of big cats found in India. The big cats of India are:

- Asiatic lion
- Bengal tiger
- Snow Leopard (found in Himalayas)
- Clouded Leopard (found in Himalayan foothills, China)
- Indian Leopard

Species Taxonomy

In 1816, Lorenz Oken named Panthera genus with the Felidae family and placed all the spotted cats in this group. The Panthera genus includes:

- <u>Tiger</u> Panthera Tigris
 - There are 6 sub-species of Tiger.
 - Out of them, Bengal Tiger is found in India
- Lion Panther Leo
- Jaguar Panthera Onca
- Leopard Panthera Pardus





• Snow Leopard - Panthera Unca

Other Species:

Cheetah (Acinonyx jubatus) are found only in Africa, and in Iran (only about 50 asiatic Cheetah left in Iran). Asiatic cheetah became extinct in India in the 1950s. Three of the last Asiatic cheetahs recorded from India were shot down in 1947, by Maharaja Ramanuj Pratap Singh Deo of Koriya. Government of India is working towards reintroduction of Cheetah in India.

Leaf Nosed bats

A species of the bats identified as *leaf-nosed bat* (Hipposideros Fulvus), aboriginal to the Thar desert, has been re-sighted by a group of zoological researchers roosting in ancient caves at *Daijar near Jodhpur*. The bat specie has been re-sighted after 37 years, last being not reported since 1979 in the Thar. There are 25 species of bats are reported in Rajasthan, of which 17 are found in the Thar desert.

Mahseer

A double bench of Justice Vinit Mathur and Justice Govind Mathur of the High Court, has issued directions to Rajasthan government to take necessary steps towards conservation of endangered 'Mahaseer' fish in Udaipur Lakes and all other places in Rajasthan.

There was abundance of Mahaseer in reservoirs connected with Chambal and Mahi river system. In southern Rajasthan, waters connected with Bedach river basin had abundance of Mahseer some three-four decades ago, but now, there is little trace of them. Presently, Mahaseer fish is found only in the lake Badi of Udaipur.





Endangered Species

S.NO	Species Name	Districts
1	Tiger	Sawai Madhopur, Alwar
2	Leopard	All Rajasthan
3	Sloth Bear	Sawai Madhopur, Dholpur, Jalore
4	Common Giant Flying Squirrel	Sita Mata WLS, Pratapgarh Fulwari ki Naal WLS, Udaipur
5	Three Striped Palm Squirrel	Fulwari ki Naal WLS, Udaipur
6	Smooth Indian Otter	Ghana (Bharatpur), Chambal River
7	Chousingha or Four Horned Antelope	Kumbhalgarh WLS
8	Mouse Deer	Fulwari ki Naal WLS, Udaipur
9	Gangetic Dolphin	Chambal River
10	Caracal	Sariska NP,Alwar Ranthambore NP, Sawai madhopur
11	Ratel	Sariska NP,Alwar Ranthambore NP, Sawai madhopur Pratapgarh
12	Fishing Cat	Ghana (Bharatpur)
13	Rusty Spotted Cat	Sariska NP, Alwar Sajjangarh WLS, Udaipur
14	Amur Falcon	Mount Abu
15	Brown Cheeked fulvetta	Mount Abu
16	Malabar Whistling Thrush	Mount Abu
17	Indian Yellow Tit	South Rajasthan
18	White Naped Tit	Mid & South Rajasthan
19	Orange Headed Thrush	South Rajasthan





20	Indian Blackbird	South Rajasthan
21	Indian Purple Rumped Sunbird	Udaipur, Banswara
22	Black headed Munia	Ghana(Bharatpur), Udaipur
23	Green Avadavat	Kumbhalgarh, Mount Abu
24	Grey Jungle Fowl	Kumbhalgarh, Todagrah-Raoli, Phulwari & Mount Abu WLS
25	Painted Spurfowl	Vindhyanchal hills & Sariska
26	Aravalli Red Spurfowl	South Rajasthan
27	Siberian Crane	Ghana (Bharatpur)
28	Red Whiskered Bulbul	Mount Abu
29	Great Indian Bustard	National Desert Park, Jaisalmer
30	White Rumped Vulture	All Rajasthan
31	Indian Vulture	South Rajasthan
32	Red-headed Vulture	South-East Rajasthan
33	Slender Racer Snake	Udaipur
34	Dumeril's Black-headed Snake	Khumbhalgarh Udaipur
35	Green Keelback Snake	South Rajasthan
36	Isaballine	South Rajasthan
37	Ghariyal	Chambal River WLS
38	Common Tree Frog	Bansi, Sita Mata WLS Pratapgarh
39	Giant Wood Spider	Sita Mata WLS, Pratapgarh Fulwari ki Naal WLS, Udaipur



Great Indian Bustard

Great Indian Bustard (GIB) is a large bird with a horizontal body and long bare legs, giving it an ostrich like appearance, this bird is among the heaviest of the flying birds. The GIB lost to the peacock in the race to become national bird of India. Now it is on the verge of extinction due to modernization of agriculture practises and rapid infrastructural developments. Rajasthan government in collaboration with the Wildlife Institute of India (WII), is formulating a long-term plan to save its *state bird*, The *Great Indian Bustard (GIB)* from extinction.

GIB Habitat:

• GIB was formerly widespread in India and Pakistan. Presently, 75% of GIB are found in Thar region of Rajasthan, and remaining in Gujarat, Maharashtra, Karnataka and Andhra Pardesh.

Conservation Status:

- GIB is listed in Schedule I of the Indian Wildlife (Protection)Act, 1972.
- GIB is also in the CMS Convention and in Appendix I of CITES.
- GIB has been classified as *Critically Endangered* on the IUCN Red List.
- GIB also forms part of the National Wildlife Action Plan (2002-2016).
- It has also been identified as one of the species for the recovery programme under the Integrated Development of Wildlife Habitats of the Ministry of Environment and Forests, Government of India.

Protected Areas dedicated to conservation of GIB:

- Rajasthan:
 - o Desert National Park, Jaisalmer
- Gujarat
 - o Coastal grasslands of the <u>Abdasa</u> and Mandvi
 - Naliya Sanctuary in Kutch (Only six Great Indian Bustards left)
- Madhya Pradesh
 - Karera Wildlife Sanctuary The species disappeared from Madhya Pardesh in early 90s'.





- Maharashtra
 - Nannaj Grasslands, Solapur

Threats to GIB

- The biggest threat to this species is hunting, which is still prevalent in Pakistan.
- Habitat loss and alteration as a result of widespread agricultural expansion.
- Occasional poaching outside Protected Areas.
- Collisions with high tension electric wires.
- Fast moving vehicles.
- Free-ranging dogs in villages.
- Wind-Mills

Conservation of GIB in Rajasthan

<u>Rajasthan Government</u> initiated "*Project Great Indian Bustard*", on World <u>Environment</u> Day 2013, identifying and fencing off bustard breeding grounds in existing protected areas as well as provide secure breeding enclosures in areas outside protected areas.

Humane Society International (India), Wildlife Institute of India and <u>Rajasthan</u> forest department are conducting a dog population survey on the outskirts of Jaisalmer as controlling the population of stray dogs is critical to the survival of the Great Indian Bustard. The dog census is being carried out in the critical GIB habitat in the Thar region of Rajasthan.

In 2015, Dr. Pramod Patil won green Oscar for efforts in conservation of GIB.

Issues in Conservation:

The *GIB habitat improvement and conservation breeding programme*, to be implemented by the Wildlife Institute of India (WII) in collaboration with the Gujarat, Rajasthan and Maharashtra forest departments, proposes to collect eggs from the wild, transport these to Kutch to build a breeding population and subsequently release captive-bred birds. The Union Government has sanctioned Rs 35 crore for five years under the Compensatory Afforestation Fund Management and Planning Authority (CAMPA) for the project.

Now, <u>Rajasthan Government</u> had decided not to send eggs to Kutch. Instead, the state forest department has been asked to request the Centre for a breeding and research centre for Rajasthan's



state bird near Jaisalmer in the Desert National Park (DNP). Rajasthan considers that conservation efforts in Gujarat are not efficient as it has lost 90% of its population of GIB in last decade, further Rajasthan has the maximum number of GIB's and so breeding center should come in Rajasthan only.

The experts consider that being close to the coast, the site chosen in Mandvi, Kutch, provides the ideal moisture, temperature and vegetation throughout the year to maximise egg laying in GIB. Jaisalmer might not be the optimal location for a breeding centre because it is too dry and hot to ensure productivity.

A similar tussle between Gujarat and Madhya Pradesh appeared to have resolved in April 2013 when the Supreme Court ordered relocation of a few lion prides from the Gir forest to the Kuno wildlife sanctuary to ensure that the endangered species is not confined to a single location. But no action has been taken so far.

Installation of Windmills in Desert National Park

National Green Tribunal (NGT) in September 2016 banned installation of windmills near Desert National Park (DNP) to protect the Great Indian Bustard. NGT had ordered ban on installation of windmills until the notification of the Eco Sensitive Zone (ESZ) around the park was finalized. Hence, NGT had asked the state government to declare 3,162 sq km around DNP as an eco-sensitive zone. However, the ESZ has still not been notified and installation of windmills continue endangered the population of bustard.

What is to be done?

In between all the politics, rights of states, it the GIB that is losing its count everyday. The project requires an agreement between the three states and WII and they need to work together as time is running out for the GIB.



<u>Tigers in Rajasthan</u>

The Bengal Tiger (*Panthera tigris tigris*) is a native tiger species of the Indian subcontinent. Tigers are at the top of the food chain, often referred to as **"umbrella species**" and play a vital role in regulating and perpetuating ecological processes.

Monitoring the status of tigers, along with associated biodiversity of the encompassing ecosystem, is important to assess our success at meeting the commitment of conserving our natural heritage.

Number of Tigers in Rajasthan

As per the <u>Tigers in India 2018 Report</u>, Rajasthan has witnessed an increase of tiger population by 115% in the last 12 years. As per the Report there are at present 69 tigers in the State, compared to 45 in 2014, 36 in 2010 and 32 in the 2006 estimation. Rajasthan stands at 9th position in India, in terms of Tiger Population.

In order to avoid human-wildlife conflict, relocating excess tigers and increasing the carrying capacity of reserves, the Rajasthan forest department is mulling to develop more habitats for big cats. The department is planning to introduce tigers in forest areas, such as Ramgarh Vishdhari, Shergarh, Kumbhalgarh, Rawli Toadgarh, Jhiri in Dholpur, Khetri Bansiyal in Jhunjhunu, Sultanpur in Bundi and Shahbad in Baran.

Tiger Reserves in Rajasthan

Rajasthan has 4 Tiger Reserves under Project Tiger. These are:

- Sariska Tiger Reserve
- Ranthambore Tiger Reserve
- Mukundara Hills Tiger Reserve
- Ramgarh Vishdhari Tiger Reserve (RVTR)

Out of the four, Ranthambore Tiger Reserve has the maximum big cats.

In July 2021, the Union ministry of environment, forest and climate change (MoEFCC) approved the proposal to convert the Ramgarh Vishdhari sanctuary into **Ramgarh Vishdhari Tiger Reserve (RVTR)**.







Ranthambore Tiger Reserve

Ranthambhore was established as the *Sawai Madhopur Game Sanctuary* in 1955 by the Government of India and was declared one of the Project Tiger reserves in 1973. Ranthambhore became a national park on 1 November 1980. In 1984, the adjacent forests were declared the *Sawai Man Singh Sanctuary* and *Kailadevi Wildlife Sanctuary*, and in 1991 the tiger reserve was enlarged to include the Sawai Man Singh and Kailadevi sanctuaries.

- Core Zone or 'Critical Tiger Habitat':
 - o Ranthambore National Park
- Buffer Zone:
 - o Kailadevi Wildlife Sanctuary
 - o Sawai Mansingh Wildlife Sanctuary





During the last few years the tiger population has grown significantly and the management is experiencing the problem of territorial fights among male tiger as main habitat area is not sufficient for growing populations of male tigers. Currently, Ranthambore has the highest population of tigers, among the 4 tiger reserves in Rajasthan.

Mukundhara Hills Tiger Reserve:

After Ranthambhore and Sariska, Mukundara Hills Tiger Reserve is a third big cat habitat in Rajasthan. The Mukundara Hills Tiger Reserve is spread across four districts-Kota, Bundi, Chittorgarh and Jhalawar-covering an area of 759 square kms. It boasts of a core area of 417 square kms and a buffer zone covering 342.82 square kms. The reserve is a combination of three <u>wildlife sanctuaries</u> namely:

- Darrah wildlife sanctuary,
- National Chambal wildlife sanctuary
- Jawahar Sagar wildlife sanctuary.

In 2017, after approvals, the department started reintroduction of Tigers in Mukundhara hills tiger reserve from <u>Ranthambore</u>.

Tiger Corridors in Rajasthan

Tiger corridors have been mandated under section 38V of the Wildlife (Protection) Act, 1972. In such tiger corridors there are no restrictions on people's activities, except illegal mining.

In February 2019, there was news that the straying T-98 tiger of Ranthambhore Tiger Reserve (RTR) in Sawai Madhopur district of Rajasthan has wandered into the Mukundra Hills Tiger Reserve (MHTR) of Kota through the natural tiger corridor existing between the two reserves. After arrival of T-98, now there are 3 Tigers at the MHTR including a tiger named MT-1 and a tigress, MT-2.

There are two tiger corridors between RTR and MHTR, but they do not have legal status as conservation reserves.





- **Corridor 1:** Extends from Lesoda village in Sawai Madhopur to Bagli village in Kota and ends in Gagron region of Jhalawar district along the Kali Sindh river.
- **Corrdidor 2:** Spreads to Lakheri, Ramgarh Vishdhari Sanctuary and Jawahar Sagar Sanctuary in Bundi district, and meets MHTR.



Rajasthan Madhya Pradesh Tiger Corridor

Ranthambhore-Kuno-Madhav tiger corridor has been identified as one of the 32 major tiger corridors in the country by NTCA.

Ramgarh Vishdhari

Rajasthan is poised to get its fourth tiger reserve. In July 2021, the Union ministry of environment, forest and climate change (MoEFCC) approved the proposal to convert the Ramgarh Vishdhari sanctuary into **Ramgarh Vishdhari Tiger Reserve (RVTR)**.

The total area of 1017 sqkm that has been identified as the reserve area comprising two forest blocks of Bhilwara, territorial forest block of Bundi and Indargarh, which falls under buffer zone of Ranthambore Tiger Reserve (RTR). The state government has been advised to send proposal by the National Tiger Conservation Authority (NTCA).





Only in Planning Stage

Kumbhalgarh Tiger Reserve

Rajasthan forest department has initiated the process to upgrade Kumbhalgarh Wildlife Sanctuary in Rajsamand district into another tiger reserve. Tiger Reserve will include Kumbhalgarh Wildlife Sanctuary, Todgarh-Raoli Wildlife Sanctuary and adjoining forest areas. The area of the proposed reserve is 1280.49 square km, out of which 355.25 square km will be the core area and 925 square km as buffer area in phase I.

MOEFCC notifies MHTR Eco-Sensitive Zone

In exercise of the powers conferred by various sections of the Environment (Protection) Act 1986 (29 of 1986) and rule 5 of the Environment (Protection) Rules, 1986, the Central Government has notified an area to an extent varying from 0 (zero) to 1.0 (one) kilometre around the boundary of Mukundara Hills Tiger Reserve, in Kota, Jhalawar, Bundi and Chittorgarh districts in the State of Rajasthan, as the MHTR Eco-sensitive Zone.

- 75 villages will come under the ESZ
- The area of the Eco-Sensitive Zone is 248.70 square kilometres.
- The State Government in consultation with local people prepare a Zonal Master Plan within a period of two years for the purposes of the Eco-sensitive Zone.
- A total of 8 activities including mining will be completely prohibited in ESZ, while 21 regulated and 11 promoted activities will be allowed.



<u>Leopard</u>

The Indian Leopard, locally referred to as Baghera, is the only sub-species of Leopards in Rajasthan. In 2017, Rajasthan became the first state in the country to launch a project to conserve leopards. The leopards of Bera in Rajasthan, have been living in harmony with humans for decades and is often presented as an example story of mutual love and respect between leopards and human beings.

Taxonomy of Leopard

Leopard (*Panthera pardus*) is one of the five extant species in the genus *Panthera*, a member of the Felidae family. Additionally, **Nine** sub-species of the leopard have been recognized, and they are distributed across Africa and Asia. Out of them, <u>Rajasthan</u> has the prominent presence of **The Indian Leopard** (*Panthera pardus fusca*) sub-species.

Sub-Species of Leopards found in India:

- *Snow Leopard -* found in Himalayas
- *Clouded Leopard* found in Himalayan foothills, China.
- Indian Leopard found across Indian sub-continent.

Population of Leopards in Rajasthan

According to 2015 wildlife census, there are 434 leopards in the state. However, according to the wildlife census 2018 (by waterhole method of estimation) conducted by the Forest Department of Rajasthan, the number of leopards in Rajasthan has been estimated at 635 with 420 being residing inside protected areas & 215 being outside protected areas.

Leopard population in Protected Areas:

- Jawai Bandh Conservation Reserve 30
- Kumbhalgarh Wildlife Sanctuary 131
- Mount Abu 48
- Sitamata Wildlife Sanctuary 42



- Todgarh Raoli Wildlife Sanctuary 47
- Panther Conservation Reserve: Sumerpur 30

Decline in Population

As per a <u>NEWS in HT</u>, around 20 leopards have been killed between 2014 and 2016 in accidents or by humans when they strayed into human habitations or agricultural fields. According to the data provided by the Wildlife Protection Society of India (WPSI), 45 leopards died in 2019, nine less than the 2018 figure.

Conservation Efforts for Leopards in Rajasthan

The Indian Leopard is an **endangered animal** under schedule one of the **Wildlife Protection Act, 1972**. It is also listed as **Vulnerable** on the **IUCN Red List** because populations have declined following habitat loss and fragmentation, poaching for the illegal trade of skins and body parts, and persecution due to conflict situations.

Project Leopard in Rajasthan

In 2017, Rajasthan has become the first state in India to launch a project to conserve leopards by improving their prey base, mitigating conflicts with humans and controlling poaching. Initially, the project was planned to implement in 8 wildlife sanctuaries. These were:

- Jaisamand Sanctuary in Udaipur,
- Shergarh Sanctuary in Baran,
- Bassi Sanctuary in Chittorgarh,
- Kumbhalgarh Sanctuary-Raoli Todgarh Sanctuary,
- Mount Abu Sanctuary
- Sundamata Conservation Reserve (Sirohi and Jalore),
- Jhalana Aamagarh Conservation Reserve in Jaipur,
- Jawai Conservation Reserve in Pali and
- Khetri Bansyal Conservation Reserve in Jhunjhunu.





However, later it was decided to implement the Project Leopard on pilot basis on three protected areas only. These are:

- Jaisamand Sanctuary in Udaipur,
- Kumbhalgarh Sanctuary-Raoli Todgarh Sanctuary,
- Jhalana Aamagarh Conservation Reserve in Jaipur,

Eventually, Project Leopard started in 2018 with the inauguration of the 'Leopard Reserve' at Jhalana forest. Now, it is being planned to extend to other protected areas. Proposal of seven more leopard projects in the state including Kumbhalgarh, Jaisamnad, Shergarh, Mount Abu, Khetri, Jawai Baandh Conservation Reserve and Bassi are under consideration.

The project aims to mitigate man-leopard conflict, conserve leopard population by countering the threats the predator's faces and create goodwill between local communities and leopards. Additionally, in conserving leopards, the project will also boost conservation of bears, lesser cats, other smaller mammals and prey species, and support leopard conservation through capacity building, research and monitoring.

Steering Committee on Project Leopard:

The steering committee of Project Leopard will be chaired by forest minister; principal chief conservator of the forest will be the vice-chairman, chief wildlife warden, and member secretary. Directors of eight leopard sanctuaries, chief conservator of forest of those areas and wildlife experts will be members of the committee. This committee will report to the state board of wildlife.

Central conflict management command center

There will also be a central conflict management command center which will work as call center to register, monitor calls and use mobile app to implement rescue missions.




Conservation Issues of Leopards:

- The biggest threats facing the common leopard in India are increasing conflict with humans. Pressure is exerted on protected areas by grazing livestock, extraction of fodder, timber and non-timber forest products and illegal occupation. These lead to human-animal conflict inside forests.
- Leopards also die due to accidents on roads passing through and around protected areas.
- Poaching for illegal trade in body parts and loss of habitat.





<u>Sloth Bear</u>

There are actually *three types* of bear found mostly in India:

- Himalayan Black bear
- Brown Bear
- Sloth Bear

Out of these, Sloth Bear, is a nocturnal (*activity during the night and sleeping during the day*), insectivorous bear species native to the Indian subcontinent. In Gujarati it is called as Reechh & in Hindi as Bhalu. Identified as vulnerable species by IUCN, Sloth bears are the most widespread bear species in India. They like honey too. They are visible on the roads near the forest area at night. They are usually harmless and do not attack those even two metres away, but they can get ferocious if there are young cubs.

The major bear sanctuaries in India for conservation of sloth bears are:

- 1. Daroji bear sanctuary, Karnataka.
- 2. Gudekote bear sanctuary (created recently) in Karnataka.
- 3. Jessore bear sanctuary, Gujarat.

Mount Abu Wildlife Sanctuary:

Mount Abu wildlife sanctuary is located in Aravalli Ranges of Mount Abu. Declared a wildlife sanctuary in 1980, presently it has leopard has apex predator and other animals including sambhar, jungle cat, small Indian civet, wolf, hyaena, jackal, Indian fox, common langur, wild boar, pangolin, common mongoose, Indian hare, porcupine and hedgehog. However, the location is also ideal for sloth bear. *After a census exercise this year, the forest department estimated that there are about 350 sloth bears in Mt Abu. Even though the Jessore Sanctuary is named after the sloth bear, the numbers of these creatures are higher in the Mt Abu area.* (the recent news).





Jessore Widlife Sanctuary

Jessore Sanctuary is situated in the Banaskantha district in Gujarat at the Gujarat-Rajasthan border. The complete area between Mount Abu and Jessore wildlife sanctuary is home to them. Apart from sloth bear, other fauna reported in the sanctuary are leopard, sambar, blue bull, wild boar, porcupine, and a variety of birds.





District Mascots of Rajasthan

To create awareness about animals and birds, each of the 33 districts of Rajasthan has been represented by an **animal mascot**. The forest department published news regarding district mascots of each <u>district</u> <u>of Rajasthan</u> in March 2016: Below is the list:

DISTRICT	Mascot	DISTRICT	Macot
Ajmer	Kharmor bird	Jhalore	Bear
Alwar	Sambar deer	Jhalawar	Gagroni Parrot
Banswara	Bronze winged Jacana	Jhunjhunu	Kala teetar
Baran	Indian Crocodile (Mugger)	Jodhpur	Demoiselle Cranes
Barmer	Fox	Karauli	Ghariyal
Bharatpur	Sarus Crane	Kota	Mongoose
Bikaner	Sandgrouse	Nagaur	Rajhans
Bhilwara	Peacock	Pali	Panther
Bundi	Golden Pheasant	Pratapgarh	Flying Squirrel
Chittorgarh	Gosingha	Rajsamand	Wolf
Churu	Blackbuck	Sawai Madhopur	Tiger
Dausa	Rabbit	Sikar	Shahen
Dholpur	Indian Screamer	Sirohi	Jungli murgi
Dungarpur	जांघिल (Painted Stork)	Sri GangaNagar	Chinkara
Hanumangarh	Little KingFisher	Tonk	Hans
Jaipur	Cheetal deer	Udaipur	kabr Bijju
Jaisalmer	Great Indian Bustard- Godawan		



Wildlife Protected Areas of Rajasthan

Despite being a desert state, Rajasthan has good network of protected areas. Forests of Rajasthan are also very rich in wildlife and contain a varied range of prey and predator animals. Some of the best managed National Parks and Sanctuaries are located in the State. The State has two world heritage wetlands, namely the Keoleodev National Park, Bharatpur and Sambhar lake.

In Desert belt of the State, large number of wildlife is generally sighted outside forest areas also. Rajasthan also has the unique Desert National Park sanctuary.

This rich biodiversity thus attracts large number of tourists to Protected Areas of the State and has become popular tourist destination with large number of historical forts, palaces and religious places with heritage buildings.

Wildlife Protected Areas in Rajasthan

State of Rajasthan has following types of protected area:

- National Parks
- Wildlife Sanctuaries
- Conservation Reserves
- Community Reserves
- Tiger Reserves
- Ramsar Wetlands

Unfortunately, Rajasthan does not have any **Biosphere Reserve** (based on UNESCO's Man and Biosphere Program) and being land-locked does not have any **marine protected area (MPA)**.





Other Protected Areas include:

No Hunting Zones

Under the article 37 of the Wildlife Protection Act, 1972 those areas have been declared 'No Hunting Zones' where the wildlife can be protected and developed. There are 33 hunting prohibited areas in Rajasthan spread across an area of about 26,720 sq. km. These include:

District	No Hunting Zones	Number
Ajmer	Tilora, Sokhalia and Gangwana	3
Alwar	Johadiya and Barrod	2
Barmer	Dhori Manna	1
Bikaner	Mukam, Diyatra, Deshnokh, Jodvir, Bajoo,	5
Bundi	Kanak Sagar	1
Chittorgarh	Menal	1
Churu	Samvatsar Kotsar	1
Jaisalmer	Ramdevra and Ujjala,	2
Jalore	Santhalsagar	1
Jaipur	Santhal and Mahala	2
Jodhpur	Doli, Guda Vishnoi, Jammeshverji, Dechu, Sathin, Lohawat and	7
	FitKhasim	
Kota	Saurson	1
Nagaur	Rotu and Jaroda	2
Pali	Jawai Dam	1
Sawai madhopur	Kanwalji	1
Tonk	Ranipura	1
Udaipur	Baghdara	1





Total

33

Deer Parks in Rajasthan

Deer Forests of Rajasthan are:

1. Amrita Devi Deer Park

Amrita Devi Deer Park has been developed near Khejarli in Jodhpur district.

2. Ashoka Vihar Deer Park-

A tract of 12 hectare in the Ashoka Vihar of Jaipur city has been developed as the Ashoka Vihar deer forest. Close to it another tract of about 7500 sq. m is being developed. There are 24 deer and 8 chinkaras parks.

3. Machiya Safari Park –

It was developed in 1985 near the Kayalana lake of Jodhpur. It covers about 600 hectare area. One can find here many animals as wolf, ape, porcupine, desert cat, nilgai, black deer, chinkara etc. as well as many birds.

4. Chittorgarh Deer Forest –

It was established in 1969 on the southern end of the famous Chittorgarh fort. It has wildlife as Nilgai, Cheetah, chinkara, black deer etc.

5. Pushkar Deer Forest -

This deer forest has been developed in the hilly region close to the ancient, panchkund near the holy pilgrimage, Pushkar. Soon after developing it in 1985 many deer were brought to this forest.

6. Sanjay Park Deer Forest, Shahpura

This park has been developed in about 10 hectare area on the natural highway near Shahpura (District Jaipur). It has been developed as the 'Rural' Awareness centre. It is an habitat for Chinkara, Nilgai, Cheetal etc.

7. Sajjangarh Deer Forest -

Established in 1984, Sajjangarh deer forest extends in the hilly tract of Sajjangarh fort of Udaipur.



National Parks in Rajasthan

Rajasthan is noted for its National Parks and <u>Wildlife Sanctuaries</u>. There are 5 National Parks in Rajasthan, these are:

Summary Sheet:

S.N	Year Est.	National Park (NP)	Main Wildlife	Area (Sq.KM)	Districts
1	1980	Ranthambore NP		282	Sawai Madhopur
2	1981	Keoladeo Ghana NP		28.73	Bharatpur
3	2003	Mukundhara Hills (Darrah) NP		200.54	Kota, Chittorgarh

Ranthambore National Park

Ranthambore National Park is located in Sawai Madhopur, district of Rajasthan. It is situated at the edge of a plateau and is bounded to the north by the **Banas River** and to the south by the **Chambal River**. The park is spread over an area of 392 sq km.

Nearby Places to See:

- Ranthambore Fort
- **Padam Talao:** This is the largest of the many lakes located in the park. A red sandstone Jogi Mahal can be found at the edge of the lake. A gigantic <u>Banyan</u> tree, considered to be India's second largest, is also near the lake.
- Jogi Mahal Forest Rest House
- Rajbagh Talao, Milak Talao
- Kachida Valley & Nal Ghati



Keoladeo Ghana National Park

Keoladeo Ghana National Park is recognised as one of the world's most important breeding and feeding grounds of birds. The area is home to about 353 species of birds. Keoladeo National Park is also known as Bharatpur Bird Sanctuary or Keoladeo Ghana Bird Sanctuary.

Keoladeo Ghana was a royal hunting reserve during the 1850s and was a game reserve for Maharajas and the British. The park was a hunting ground for the maharaja of Bharatpur, who turned his personal hunting domain into a bird sanctuary in 1956. Apart from setting up the sanctuary Maharaja of Bharatpur also built a dam and an artificial lake to store the water from monsoon rains.

The wetlands of Bharatpur were formed when Jat ruler Suraj Mal, who ruled the area between 1726 and 1763, flooded a natural depression by building the *Ajan Bund*. Water was fed into the marshes twice a year from inundations of the <u>Banganga</u> (North) and <u>Gambhir</u> (South) rivers nearby. A well-designed system of canals (*Chiksana & Ghana*), sluices and dykes currently maintains the level of water in different blocks of the park.

Timeline & International Importance:

- 1956 Declared as Reserve Forest under Rajasthan Forest Act, 1953
- 1976- Declared as protected wildlife sanctuary.
- 1982 National Park
- 1981 Ramsar Wetland
- 1985 UNESCO World heritage site
- 1990 Came under Montreux Record.

Mukundhara Hills (Darrah) National Park

Mukundhara Hills (Darrah) National Park is situated between two parallel mountains viz. Mukundra and Gagrola which run across a length of about 80 km (from Murlipura to Rawatbhata). After Ranthambhore and Sariska, Mukundara Hills Tiger Reserve is a third big cat habitat in Rajasthan.

Timeline:

- 1955 Darrah was declared a wildlife sanctuary ((Protected area)
- 2004 Declared as Mukundra Hills National Park





• 2013 - Got approval from NTCA & declared as Tiger Reserve.

Sariska National Park

Sariska is a wildlife refuge that was declared a wildlife sanctuary in 1955. In 1978, it was included in Project Tiger and given the status of a tiger reserve. In 1979 it was upgraded to National Park. Further, 16th-century Kankwadi fort, built by Jai Singh II, is also located near the centre of the park.

Sariska is famous for Bengal Tigers but other species such as such as the Indian leopard, striped hyena, Indian jackal, chital, sambhar, nilgai, chinkara, four-horned antelope, wild boar, hare, hanuman langur can also be found inside the park.

The forest is hilly with two extensive plateaus like topography namely Kankari & Kiraska & a wide valley starting at Baran Tal Gate running south to Thanagazi. At the north-eastern corner, towards alwar lies Silserh Lake.

Nearby Places to See:

- Natural Places to See:
 - o Siliserh Lake
 - Jai Samand Lake
 - Garbhaji Waterfall
- Religious Places to See
 - **Neelkanth Temple:** Built in the 6th century, the temple has a collection of erotic statues, bearing a similarity to Khajuraho.
 - Pandupol Hanuman Temple
 - o Bharti Hari
 - Parashar ji
 - o Jahaz
 - o Tal Vriksha
 - Garthi Mamod
 - o Virat Nagar
 - Tijara Jain Temple
- Historical Places to See:





- **Kankwadi Fort** A 16th-century fort, originally built by Jai Singh II, located near the centre of the park.
- Fateh Jung Gombad
- Bhangarh Town
- Alwar City Palace
- Kesroli Hill Fort
- o Bala Quila
- Neemrana Fort
- o Moosi Maharani ki Chhatri
- o The Palace Museum
- o Thanaghazi
- o Kushalgarh
- o Ajabgarh
- o Tehla
- o Baldevgarh

Desert National Park

Desert National Park displays the best of the Thar desert's ecosystem and its varied wildlife. The Park is formed of undulating sand dunes, jagged rocks, dense salt lake bottoms and inter-medial areas. The highly endangered Great Indian Bustard, one of the world's heaviest flying birds, can also be seen here. In winter, the park hosts an incredible variety of migratory raptors such Himalayan and Eurasian Griffon Vultures, Eastern Imperial Eagle, and the Saker Falcon.

The Desert National Park (DNP) covers an area of 3162 km² of which 1900 km² is in Jaisalmer district and remaining 1262 km² is in Barmer district of Rajasthan State.

The Desert National Park also has a collection of fossils of animals and plants of 180 million years old. Some fossils of <u>dinosaurs</u> of 6 million years old have been found in the area.

Desert National Park (DNP) Timeline:

- 1980 UNESCO World Heritage Site
- 1992 National Park





In 2021, Researchers from the Geological Survey of India and the Indian Institute of Technology, Roorkee have discovered a new extinct species of hybodont shark from the Jaisalmer Basin of Rajasthan. Hybodonts dominated both marine and freshwater environments during the Triassic and early Jurassic periods.

Over 30 teeth specimens collected from the region showed that the species lived about 160 and 168 million years ago. It was named Strophodus jaisalmerensis, and the discovery is significant as this is the first record of Strophodus genus from the Indian subcontinent.

The collected specimens are now housed in the Palaeontology Division of Geological Survey of India, Jaipur.



Wildlife Sanctuaries in Rajasthan

Wildlife Sanctuaries are areas within any reserve forest or the territorial waters, which is of adequate ecological, faunal, floral, geomorphological, natural or zoological significance. The Sanctuary is declared for the purpose of protecting, propagating or developing wildlife or its environment. Rajasthan has 27 wildlife sanctuaries that are abode to its unique & diversified plant & animal life.

Wildlife Sanctuaries in	Rajasthan:	Summary
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S.N	Year Est.	Wildlife Sanctuary (WLS)	Area (Sq.KM)	Districts
1	1985	Band Baretha WLS	193	Bharatpur
2	1988	Bassi WLS	199.50	Chittorgarh
3	1983	Bhensrodgarh WLS	229.14	Chittorgarh
4	-	Darrah WLS	80.75	Kota, Jhalawar
5		Desert National Park Sanctuary	3162	Jaisalmer, Barmer
6	1955	Jaisamand WLS	52	Udaipur
7	1982	Jamwa Ramgarh WLS	300	Jaipur
8	1975	Jawahar Sagar WLS	153.41	Kota, Bundi, Chittorgarh
9	1983	Kailadevi WLS	676.38	Karauli, Sawai Madhopur
10	1955	Kesarbagh WLS	14.76	Dholpur
11	1988	Kumbhalgarh WLS	608.58	Pali, Rajsamand, Udaipur
12	1960	Mount Abu WLS	112	Sirohi





13	1980	Nahargarh WLS	50	Jaipur
14	1979	National Chambal WLS	274.54	Kota, Bundi, Sawai madhopur, Karoli, Dholpur
15	1983	Phulwari ki Nal WLS	692.68	Udaipur, Pali
16	1982	Ramgarh Vishdhari WLS	252.79	Bundi
17	1955	Ramsagar WLS	34.40	Dholpur
18	1987	Sajjangarh WLS	5.19	Udaipur
19	1955	Sariska WLS	491.99	Alwar
20	2012	Sariska –'A' WLS	3.01	Alwar
21	-	Sawai Madhopur WLS	131.3	Sawai Madhopur
22	1984	Sawai Mansingh WLS	103.30	Sawai Madhopur
23	1983	Shergarh WLS	98.71	Baran
24	1979	Sitamata WLS	422.94	Pratapgarh
25	1971	Tal Chappar WLS	17.19	Churu
26	1983	Todgarh Raoli WLS	495.27	Ajmer, Rajsamand, Pali
27	1955	Van Vihar WLS	25.6	Dholpur
		Total	9015.79	Excluding overlaps with National Parks & among Sanctuaries



Conservation Reserves in Rajasthan

Conservation Reserves can be declared by the State Governments in any area owned by the Government, particularly the areas adjacent to National Parks and Sanctuaries and those areas which link one Protected Area with another. Such declarations are made after having consultations with the local communities.

Conservation Reserves in Rajasthan

S.N	Year	Conservation Reserve (CR)	Area (Sq.KM)	Districts
1	2008	Bisalpur CR	48.31	Tonk
2	2008	Jodbeed Gadhwala Bikaner CR	56.4	Bikaner
3	2008	Sundhamata CR	117.4	Jalore, Sirohi
4	2011	Gudha Vishnoiyan CR	2.31	Jodhpur
5	2012	Shakambari CR	131	Sikar, Jhunjhunu
6	2012	Gogelav CR	3.58	Nagaur
7	2012	Rotu CR	0.72	Nagaur
8	2012	Ummed Ganj CR	2.78	Kota
9	2013	Jawai Bandh CR	19.78	Pali
10	2013	Beer Jhunjhunu CR	10.4	Jhunjhunu
11	2019	Khetri Bansyal CR	70.18	Jhunjhunu
12		Bansial Khetri Bagore CR	39.66	Jhunjhunu
13		Jawai Bandh Leopard CR-II	61.98	Pali





14	Mansa Mata CR	Mata CR 102.31	
15	Rankhar Conservation Reserve	72.88	Jalore
16	Shahbad Conservation Reserve	189.39	Baran
17	Shahabad Talahatee Conservation Reserve	178.84	Baran
18	Beed Ghaas Phuliakhurd Conservation Reserve	0.8579	Bhilwara
19	Baghdarrah Crocodile Conservation Reserve	3.6871	Udaipur
20	Wadakheda Conservation Reserve		Sirohi
21	Jhalana-amagarh		Jaipur
22	Ramgarh kunji sunwaans		Baran
23	akhar gaanv		Ajmer
24	Sorsen		Baran
25	hamirgarh		Bhilwara
26	Kheenchan gaanv		Jodhpur
27	Baanjh aamli		Baran
	Total	667.01	



Wetlands in Rajasthan

Ramsar Wetlands are wetlands deemed to be of "international importance" under the Ramsar Convention.

What is RAMSAR Convention?

The Convention on Wetlands, called the Ramsar Convention, is the intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources. The Convention was adopted in the Iranian city of Ramsar in 1971 and came into force in 1975.

The convention entered into force in India on 1 February 1982. India currently has 27 sites designated as Wetlands of International Importance (Ramsar Sites), with a surface area of 1,056,871 hectares.

Ramsar Wetlands in Rajasthan

The State of Rajasthan has two wetlands that come under the Ramsar Convention, namely:

- Keoladeo Ghana, Bharatpur
- Sambhar Lake,

Keoladeo Ghana Wetland, Bharatpur, Rajasthan

Keoladeo Ghana wetland is a complex of ten artificial, seasonal lagoons, varying in size, situated in a densely populated region. The area was earlier declared as a <u>Wildlife Sanctuary</u> and later upgraded as a <u>National Park</u>. The wetland was also placed on the <u>Montreux Record</u> in 1990 due to "water shortage and an unbalanced grazing regime".

Sambhar Lake Wetland, Jaipur, Rajasthan

Sambhar Lake Wetland is a shallow wetland, the depth of which ranges between 0.5 and 2.0 metres. Four main streams feed the lake from a drainage area of about 2,688 sq. metres. The vegetation present





in the catchment area is mostly xerophytic type. Sambhar Salt Lake is India's largest inland salt lake. It is famous for harbouring flamingos in large numbers, next only to Rann of Kutch in the country.





Climate Change in Rajasthan

Climate change is the greatest global challenge, which through a multitude of impacts poses a risk to our ecology, economy and society. Studies show that climate change in Rajasthan is over and above the natural climate variability prevailing in the region. Experts say that Rajasthan falls in areas of greatest climate sensitivity, maximum vulnerability and lowest adaptive capacity. According to State Action Plan on Climate Change (SAPCC), it was found that <u>Rajasthan</u> has been identified as one of the four most vulnerable states in India.

What is Climate Change?

The Earth's climate is not static. Over the billions of years of earth's existence, it has changed many times in response to natural causes like sun spot, ice age glaciations, etc.

"Climate change" means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods (100 years).

Climate Change in Rajasthan

Being the largest state, Rajasthan has unique vulnerabilities in terms of exposure to climatic extremes and varying capabilities for responding to the likely risks. Rajasthan has only about 1% of the country's water resources, and the average rainfall in the state is 574 mm as compared to the all-india average of 1,100mm.

Impact of Climate Change in Rajasthan

- Severe and frequent spells of **famines & droughts**.
- According to a study recently undertaken by the state pollution control board, the state is likely to suffer from further increased **water shortage** due to overall reduction in rainfall and increased evapo-transpiration due to global warming.
- **Rise in surface temperature** (especially in desert districts), resulting in excessive loss of water and migration of people, livestock and desertification of the cropped land.



• Increase in unpredictability of weather and rainfall.

Measures to mitigate Climate Change

Rajasthan Government Action Plan on Climate Change (RAPCC)

To deal with the climate change related issues and find out the right strategy India had released a National Action Plan on Climate Change in 2008. In 2010, Rajasthan released <u>Rajasthan Environment</u> <u>Policy</u> (SEP) and formulated a Climate Change Agenda for Rajasthan (CCAR). Later, the **Rajasthan Environment Mission** was constituted to bring into focus the high priority issues emerging from the SEP and CCAR.

Under the Rajasthan Environment Mission, the CCAR listed a set of state priorities for adaptation and mitigation policy and action during the time period 2010-2014. State-specific missions for Rajasthan were developed highlighting research gaps and needs along with relevant policy measures, in light of the state's vulnerabilities and capacities. Thus 7 key areas were identified & task forces were constituted on:

- 1. Water Resources
- 2. Agriculture and Animal Husbandry
- 3. Forestry and Biodiversity
- 4. Human Health
- 5. Enhanced Energy Efficiency and Solar Energy
- 6. Urban Governance and Sustainable Habitats
- 7. Strategic Knowledge for Climate Change

In 2012, the state government drafted the Rajasthan Action Plan on Climate Change (RAPCC 2010-2014) in concurrence with the guiding principles of the Rajasthan Environment Policy 2010, Rajasthan Environment Mission 2010 and the Climate Change Agenda for Rajasthan (2010-2014).

RAPCC Guiding Principles

• National priorities as identified in NAPCCC





- State- specific risks, impacts and opportunities under changing climate,
- Stakeholder consultation.

Institutional Structure for Implementation

- Climate Change & Clean Development Mechanism (CDM) Cell
 - Rajasthan State Government established a Climate Change and Clean Development Mechanism (CDM) Cell' in the Rajasthan State Pollution Control Board (RSPCB) to act as a nodal agency for coordinating issues related to climate change in the State.
 - The Cell was constituted in April 2010 and was involved in the drafting of the CCAR.
- Environment Mission
 - To be headed by CM and Ministers Ministers of various various key departments departments as members members.
- Steering Committee
 - To be headed by Chief Secretary and Principal Secretaries of various key departments as members.
- Task Forces
 - In key thrust areas to be constituted under the concerned Principal Secretary/Secretary

However, RAPCC remained a draft – never circulated and never came into effect.

Recent Initiatives

The state government is renewing its focus on climate change and has announced to restructure the directorate and make a new action plan. In budget speech 2019-20, Chief minister Ashok Gehlot announced restructuring of the DOE as **Directorate of Environment and Climate Change (DOECC)**. He also announced drafting a new state action plan for climate change with Central government funding.





Climate Change mitigation as part of Sustainable Development

On the lines of central Government, Rajasthan has also undertaken significant initiatives towards achieving the target of Sustainable Development Goals (SDGs). Two of SDG's deal exclusively with climate change and its impacts, these are:

- **Goal 13:** Take urgent action to combat climate change and its impacts
- **Goal 15:** Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss





Desertification & Land Degradation

Rajasthan is the state with highest area under desertification (land degradation) with respect to country's total geographical area (TGA). The state has 62.90% of the TGA under desertification/land degradation for the period of 2011-13. The desertification/land degradation area in <u>Rajasthan</u> has decreased about 0.29% since 2003-05.

Definitions & Differences:

Soil Degradation

- Soil degradation is the decline in soil quality caused by its improper use, usually for agricultural, pastoral, industrial or urban purposes.
- Soil degradation is a serious global environmental problem and may be exacerbated by climate change. It encompasses physical (soil erosion), chemical (salinity and alkalinity, pollution) and biological deterioration (pollution and deterioration of vegetal cover).

Soil Erosion

- Soil erosion is the removal of top soil by agents like wind and water.
- Top soil has most of the nutrients necessary for a plant's growth. With depth, the fertility of the soil decreases. Thus, erosion results in reduction of fertility of the soil by washing away the fertile top layer.

Desertification

- UNCCD defines desertification as 'land-degradation in arid, semi-arid and sub-humid areas resulting from various factors including climatic variations and human activities'.
- Loss of soil cover, mainly due to rainfall and surface runoff, is one of the biggest reasons for desertification.





Problems of Soils in Rajasthan

The degree of degradation and its severity are influenced by special variability and its niche with the surrounding. The terrain factors like slope, aspect, topographic position are found to be dominant factor while intensity and distribution of rainfall are climatic factors, determining the extent and severity of degradation.

Wind Erosion & Shifting Sand Dunes:

- Wind Erosion is the **most significant cause** of land degradation/desertification in Rajasthan.
- The wind erosion is playing a prominent role, in the western flank of the state and is found active with full force in the core of desert, causing sand blasting, sand drifting, which results active dunes and interduneal plains.

Water Erosion

- Severity of water erosion is found at the peak in central highland, including Aravalli landscape and Bundelkhand upland.
- This causes loss of top soils through sheet and rill erosion.
- It also causes terrain deformation through gully and ravine land. Example: Ravine Lands along the <u>Chambal River & its tributaries</u>.

Water Logging:

- With the introduction of canal irrigation system water table of the area is rising at an average rate of about 0.8 m per year.
- As a result of this large area has become water-logged and this area is increasing every year, it is a serious problem particularly in deep black soils.

Sodicity of Soil:





• Sodality of the soil and high residual sodium carbonate content of irrigation water are the main problems.

Salinity & Alkalinity:

- The Salinity & Alkalinity is found maximum in the Aravalli and Bundelkhand alluvial plains where the quality of ground water and poor management practices about the secondary salinization.
- Salinity is due to high permanent water table.

Steps for Soil Conservation in Rajasthan

Adequate Drainage:

• The solution for **salinity & Alkalinity** of soil is to provide of soil is to provide adequate drainage.

Use of Gypsum:

• Use of gypsum which is abundantly and cheaply available in Rajasthan, is economical and long term solution to the problem of **Alkalinity**.

Afforestation:

• Large scale planting of saplings which act as wind breaks & also prevents soil erosion through water.

Shelter Belts:

• In dry regions rows of trees are planted to check wind movement to protect soil cover.

Contour Barriers:

• Stone, gross, soils are used to build barrier along contours. Trenches are made in front of the boomers to collect water.





Grass Development:

• Plantation of trees & grasses on marginal and sub marginal land.

Wind strip cropping:

• Grass and crop strip at right angle to wind direction.

Stubble Mulching:

• Crop stubbles are left in the field and next crop planted with minimum tillage.

Contour Bonding:

- Ravine land can be made cultivable by leveling followed by contour bonding
- The medium and deep gullies can also be converted into productive wood lands.

Proper Drainage System in canal Project Area:

• The problem of water logging can be checked and overcome by introducing proper drainage system in the canal project area.

Dry Farming:

• Dry Farming is a method of conserving soil moisture preventing soil erosion.

RockDam:

• Rock Dam is built to slow down its flow of water.

Mulching:

• A layer of organic matter is made on soil. It helps to retain soil moisture.





Intercropping:

• Different crops are grown in alternative rows to protect the soil form rain wash

Terrace Farming:

- Broad flat steps or terraces are made on the steep slopes so that flat surfaces are available to grow crops.
- They reduce surface run off & soil erosion.

Contour Plugging:

• Plugging parallel to the contours of a hill slope to form a natural barrier for water to flow down the slope





Air-Pollution in Rajasthan

In 2018, a state-wise report released by Indian Council of Medical Research highlighted that the average life expectancy in Rajasthan would have been 2.5 years higher, if the air pollution levels were less than the minimal level. Kota along with <u>Jaipur</u>, Alwar and Jodhpur comes in the top 100 polluted cities in the country.

What is Air Pollution?

When air is contaminated by unwanted substances which have a harmful effect on both the living and the non-living, it is referred to as air pollution.

Air pollution occurs when harmful or excessive quantities of substances including gases (such as carbon dioxide, carbon monoxide, sulfur dioxide, nitrous oxides, methane and chlorofluorocarbons) , particulates (both organic and inorganic), and biological molecules are introduced into Earth's atmosphere.

Major Air Pollutants & Their Sources

The substances which contaminate the air are called air pollutants. Pollutants can be added to atmosphere both by natural processes (volcanic eruptions, sand storms, forest fires etc) and man-made processes like (factories, power plants, automobile exhausts). Few major air-pollutants are:

- Carbon Monoxide (CO)
 - Vehicle exhaust & burning of fossil fuels.
- Carbon Di-oxide (CO2)
 - Principal greenhouse gas
 - Burning of fossil fuels.
- Sulphur Oxides
 - Petroleum refineries, thermal power plants





- Nitrogen Oxides
 - Vehicle exhausts, thermal power plants
- Chloroflorocarbons (CFC)
 - Air-conditioning & refrigeration
- Ozone
 - Occurs naturally in upper layers of atmosphere. Shields from harmful UV rays.
 - However, vehicle exhaust & industries release Ozone near ground. Pollutant with high toxic effects.
- Suspended Particulate Matter (SPM)
 - Consists of solids in air in form of smoke, dust & vapour.
 - Particulate matter 2.5 (PM_{2.5}): tiny particles or droplets in the air that are 2.5 micrometers or smaller in width.
 - Particulate matter 10 (PM₁₀): Inhalable particles, with diameters that are generally 10 micrometers and smaller.'
- Volatile organic compounds (VOC)
 - VOCs are categorized as either methane (CH₄) or non-methane (NMVOCs).

Indoor Air Pollution in Rajasthan

Indoor air-pollution refers to physical, chemical and biological characteristics of air in indoor environment within a home, institution or commercial space.

- Rural Areas
 - More indoor pollution as people reply on traditional fuels such as firewood, charcoal, cowdung for cooking & heating.
- Urban Areas
 - Sources of indoor air-pollution in urban areas include lack of ventilation, construction activity etc.





Impact of Air Pollution in Rajasthan

Deaths linked to Air Pollution

- As per a <u>TOI report</u>, over 90 thousand deaths in 2017 in Rajasthan were linked to air pollution.
- The highest death rate in India due to pollution was in Rajasthan.
- As many as 112.5 per lakh population died due to pollution in Rajasthan, while in Kerala, it was 79 per lakh. It is because Rajasthan has both indoor and outdoor pollution.

Control Measures Air Pollution in Rajasthan

Rajasthan State Pollution Control Board (RSPCB)

RSPCB is the nodal agency for controlling pollution in the state of Rajasthan. It is responsible for implementation of:

- Air (Prevention & Control of Pollution) Act, 1981.
- Rajasthan Air (Prevention & Control of Pollution) Rules, 1983.
- Fly Ash Act, 1999.
- Ozone Depleting Substances (Regulation) Rules, 2000.

RajVayu

• In June 2016, Rajasthan Government had launched mobile application *RajVayu* for sharing information about air quality index of Jaipur, Udaipur and Jodhpur.

National Air Quality Index (NAQI)

- On April 6, 2015, India had launched its first ever National Air Quality Index (NAQI).
- NAQI classifies pollution levels into 6 categories—good, satisfactory, moderate, poor, very poor and severe—and denotes a color code on the basis of how harmful the pollution in a specific area is.





- Pollutions measured include—PM2.5, PM10, NO2, NH3, SO2, CO and Ozone.
- In Rajasthan, NAQI is measured for <u>Alwar</u>, Ajmer, Jaipur, Jodhpur, Kota, Pali, Udaipur.

AQI	Remark	Color Code	Possible Health Impacts
0-50	Good		Minimal impact
51-100	Satisfactory		Minor breathing discomfort to sensitive people
101-200	Moderate		Breathing discomfort to the people with lungs, asthma and heart diseases
201-300	Poor		Breathing discomfort to most people on prolonged exposure
301-400	Very Poor		Respiratory illness on prolonged exposure
401-500	Severe		Affects healthy people and seriously impacts those with existing diseases



Uranium Contamination in Ground Water

A recent news article published in *the Hindu & Times of India*, highlights a a study conducted by researchers at the *Duke University in North Carolina*, *United States*, *and the Central Groundwater Board of India*. The report raises concerns over presence of high uranium levels in their groundwater of <u>State of Rajasthan</u> along with 16 other north-western states including Punjab, Haryana etc.

The Problem:

Uranium levels in 75 out of 226 wells in Rajasthan and five out of 98 wells tested in Gujarat exceeded the WHO provisional health guidelines. According to WHO the safe drinking water standards are 30 micrograms of uranium per litre. As mentioned in the study India extracts more than a third of world wide groundwater resources and more than 90% of this is being used for irrigation. Long term exposure to uranium in drinking water can cause **kidney deceases**.

Causes of Uranium Contamination:

The main source of uranium contamination was "natural," but human factors such as declining ground water table and rising nitrate pollution contributes significantly to the rise in contamination.

It is demonstrated in the paper that the combination of different factors, like aquifer rocks containing uranium (granitic rocks or sediments derived from weathering of granitic rocks), oxidizing conditions that leach out uranium from the rocks and make it soluble, and the groundwater chemistry with high bicarbonate in which uranium is attached and thus become mobile, all contribute to the high uranium in groundwater in India.

Possible solution to Uranium Contamination:

- The first step towards solution could be first monitoring, than avoiding (using other water source) or treatment (RO desalination).
- Including uranium in the list of contaminants monitored under the Bureau of Indian Standards' Drinking Water Specifications.





What is State Government doing ?

Principal secretary of PHED Rajasthan said that no such contamination has been found as of yet in the drinking water of the state but they are keeping an eye on the issue and samples have been sent to their lab in Hyderabad and if something comes up they will take action.



Famines and droughts

The state of Rajasthan is prone to famine and droughts, particularly the western-most districts consisting of Thar desert which often experience successive years of scarcity and droughts.

Types of droughts:

Put simply, a drought is a failure of rain, leading to moisture stress, that in turn leads to agricultural losses and other forms of social and economic hardship. There are many definitions and classifications of drought, including that of the National Commission on Agriculture (quoted in Bokil 2000) which has defined three types of drought:

• Agricultural drought:

- o When crops are affected due to moisture stress and lack of rainfall.
- Meteorological drought:
 - o When there is more than 25 per cent decrease (from normal) in rainfall in any area.
- Hydrological drought:
 - o When recurring meteorological droughts result in decrease in surface water and groundwater levels.

Under this classification. if drought occurs in 20 % of the years in any area, it is classified as *drought prone area* and if the drought occurs in more than 40 % of the years. it is classified as *chronically drought prone area*.

Causes of droughts in Rajasthan:

Droughts in the Indian sub continent are mainly due to failure of rainfall from southwest monsoon. The root cause for failure of monsoon rainfall is cued to the widespread, persistent atmospheric subsidence, which results from the general circulation of the atmosphere. Recent studies on interactions between global circulations and drought showed that the EI Nino phase of the Southern Oscillations (EN SO) has the largest impact on India though drought.





Declaration of drought in Rajasthan:

The Scarcity Manual (formerly known as the Famine Code) for Rajasthan lays out the rules and procedures to be followed in declaring a drought.

While the Scarcity Manual includes many criteria, in practice, the State government has come to rely almost exclusively on the *girdawari report* and the losses in sowing and production reported therein. The *girdawari report* is a land-use report and is prepared by the patwari (land records official) of each panchayat. To calculate the losses, the current year's figures are compared with area sown and production in "normal" years (defined as the average production for the past few years). On the basis of this, calculations of affected population are made. The other criteria in the Scarcity Manual include distress migrations, increase in thefts, news of starvation deaths, etc.

Difference between droughts and famine

While, droughts and famine may seem referring to same thing. However, in actuality there is a huge difference. **Famine** is a widespread scarcity of food, caused by several factors including war, inflation, crop failure, population imbalance, or government policies. This phenomenon is usually accompanied or followed by regional malnutrition, starvation, epidemic, and increased mortality.

Frequency of Droughts in Rajasthan

Low rainfall coupled with erratic behavior of the monsoon in the state make Rajasthan the most vulnerable to drought. Based on historical data the frequency of occurrence of droughts in the state is given in following table.





S. No.	Recurrence Period (Year)	Districts	
1.	Once in 3 years	Barmer, Jaisalmer, Jalore, Jodhpur and Sirohi	
2.	Once in 4 years	Ajmer, Bikaner, Bundi, Dungarpur, Sriganganagar, Nagaur, Hanumangarh and Churu	
3.	Once in 5 years	Alwar, Banswara, Bhilwara, Jaipur Jhunjhunu, Pali, Sawai Madhopur, Sikar, Dausa and Karauli	
4.	Once in 6 years	Chittorgarh, Jhalawar, Kota, Udaipur, Tonk, Rajsamand and Baran	
5.	Once in 8 years	Bharatpur and Dholpur	

Number of districts affected by damage caused by famine/scarcity in Rajasthan

Agricultural year	No. of districts affected	No. of villages affected	Affected population (in lakhs)
2021-22	10	6122	74.28
2022-23	1	92	2.36




Floods in Rajasthan

Popularly known as the desert state of India, Rajasthan is largely water deficit yet there are incidents of flood and there are flood prone areas in the state. In last 30 years, there have been multiple instances of floods in Rajasthan.

Flood Prone Areas of Rajasthan



The flood prone areas in Rajasthan include <u>Ajmer</u>, Barmer, Jodhpur, Pali, Jalore, Sirohi, <u>Udaipur</u>, Chittorgarh, Bundi, Kota, Jaipur, Jhalawar, Baran, Bharatpur, Alwar, Sri Ganganganagar districts. These regions spread across the Basins and Sub-Basins of the rivers Banas, Banganga, Chambal, Ghaggar, Luni, Mahi, Sabi, Shekhawati, Sukli and West Banas.





Categories of Floods

The categorization of floods is done on the basis of the average annual rainfall received at that centre as compared to the average rainfall of the observed 30 years. Accordingly, floods are classified as:

- Moderate Floods: If the excess of rainfall is 25 to 50 percent above the average rainfall of a specific region.
- **Severe Floods:** When the rainfall is more than 50 percent in a region.

Types of Floods in Rajasthan

Flooding of river and its catchment under the influence of excessive rainfall depending on the topography of the regions through which the rivers flows. The floods in rivers mostly occur either due to very heavy rainfall for a few days concentrated in a specific catchment or due to the obstructions that are caused either because of human interference by bridges or embankments that restrict the flow of the river or natural choking of river bed.

In Urban areas, flooding occurs usually because lack of proper planning, choking of damage systems and unplanned growth of the settlements during monsoons.

In rare cases, flooding can also be result of cloudburst that might happen in a specific area.

Impact of Floods in Rajasthan:

- Floods deplete all the sources of clean or drinkable water in the area.
- Floods leads to submergence of crops and hence, destroys agricultural produce.
- A huge of livestock perishes because of floods.
- The biggest threat after flood is curbing the spread of diseases like Diarrhea, Dysentery, Malaria, skin infections, Jaundice, Typhoid and Cholera.
- Infrastructure like roads, electricity distribution and communication network are also damaged during floods.





Flood Management in Rajasthan

The Disaster Management and Relief Department of Government of Rajasthan handle all the disasters in the state. The department has published a Flood Manual that gives a complete description of the flood response system of the state. Among other things, it streamlines department wise responsibilities of each department in case of floods.





Forest Fires in Rajasthan

Forest is one of the most important renewable natural resources and plays a significant role in the human life and environment. India reported 345,989 forest fires from November 2020 to June 2021, according to the State of Forests Report, 2021 (SoFR, 2021). maximum number of forest fires were reported in Odisha (51,968) followed by Madhya Pradesh (47,795) and Chhattisgarh (38,106). In the same year, there were 3,402 recorded incidents of forest fires in Rajasthan. The fire season in the state is from January to June. Peak fire season in the month of May.

Types of Forest Fires:

Forest fires can be sub grouped into four types depending upon their nature and size:

- Surface Fires:
 - Surface fire is the most common forest fires that burn undergrowth and dead material along the floor of the forest.
- Underground Fire
 - Fires of low intensity, consuming the organic matter beneath and the surface litter of forest floors
- Ground Fires
 - Fires in the sub surface organic fuels and organic soils of swamps or bogs.
- Crown Fires:
 - Crown fire is the most unpredictable fires that burn the top of trees and spread rapidly by wind.

Causes of Forest Fires in Rajasthan

More than 90% forest fires are caused either by negligence or unknowingly by the human being. The rest of the fires are caused by natural reasons i. e. lightning, extreme rise in the temperature etc.

Climate Change





Studies suggest that climate change influences forest fire frequency and intensity which results in forests becoming increasingly inflammable. The increasing duration of forest fire season, numbers of large fires, frequency of severe fire years may be related to climate change.

Traditional Customs

As per tradition, local tribals go on a forest-burning spree after the Holi festival. Example, tribal customs like 'Magra Snan' i.e offering fire to please 'Magra Bavji' or the Hill God upon accomplishment of any wish.

Human negligence

Unwanted forest fires may also occur due to human negligence, for example, from casually discarded cigarettes or from poor control of burning on adjacent croplands.

Weather

Fire intensity and behavior are intricately linked to weather and climate. For most of India, forest fires peak during the dry months of March or April before the arrival of the monsoon (FSI 2012).

Impact of Forest Fires

Some forest fires are beneficial, but not all. Occasional fires can also keep down fuel loads, check invasive weeds, and eliminate pathogens. However, majorly forest fires have a devastating or degrading effects. Few of these are:

- Loss of natural vegetation and reduction of forest cover.
- Loss of wildlife habitat and depletion of wildlife.
- Repeated fires in short succession reduce species richness and hamper natural regeneration ability.
- Monetary damages in terms of loss of timber resources.
- Forest fire also adversely affects livelihood resources, especially for tribals, who habitat within or near the forest.





- Loss of environmental services.
- Fires alter the physical, chemical, and biological properties of forest soils. Higher-intensity fires can severely deplete soils and strip them of organic matter and nutrients. Fires increase water repellency of forest soils, reducing infiltration and increasing erosion.
- Forest fire release multiple gases back to atmosphere in a matter of hours. The burning of forest also destroys an important sink for atmospheric carbon dioxide and aggravate global warming
- The smoke from forest fires cause air pollution and rise in the temperature which leads to adverse impact on Health system.
- Forest fire that spreads outside the forest can consume buildings or infrastructure and cause threat to Life and Property
- Forest Fires pose a risk to policy goals for enhancing India's forest carbon sinks.

Forest fire prone area in Rajasthan

As per ISFR 2021-Rajasthan, geographical area under different classes of fire proneness in Rajasthan is:







S. No.	Forest Fire Prone Classes	Geographical Area (in sq. kms)	% of Total Forest Cover
1	Extremely fire prone	0.00	0.00
2	Very highly fire prone	197.33	1.18
3	Highly fire prone	366.57	2.20
4	Moderately fire prone	705.56	4.24
5	Less fire prone	15.385.54	92.38
	Total	16.655.00	100.00

Source: ISFR 2021 - Rajasthan

Measures to Control Forest Fires:

A joint study report of MoEF&CC and World Bank titled "<u>Strengthening Forest Fire Management in</u> <u>India</u>" was released in June 2018. It synthesized information from various studies, analyzed the forest fire situation in the country and suggested measures to improve them.

National Action Plan on Forest Fires, 2018

- Initiative of the Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India.
- Main objective is to reduce the incidences of fires by informing, enabling and empowering forest fringe communities and incentivizing them to work in tandem with the State Forest Departments (SFDs).
- Also aims to reduce the vulnerability of forests against fire hazards across the diverse forest ecosystems in the country, enhancing the capabilities of institutions in fighting fires, and accelerating the recovery after a fire incidence.





• The plan proposes nine strategies to address the issue, including establishment of a "Centre of Excellence on Forest Fire Management" at FSI.

Forest Fire alert system of FSI

- Started in year 2004
- Upgraded version of the Forest Fire Alert System version 3.0 (FAST 3.0) released in 2019.

Fire Watchers:

• Rajasthan Forest department appoints fire watchers during the summer.

Fire Prevention Practises:

• In National Parks and Wild Life Sanctuaries various silvicultural practices i.e. clearance of fire line, burning of litter, back fire are adopted to prevent fire.



Human Wildlife Conflict in Rajasthan

The intensity and frequency of human-wildlife conflicts has escalated in recent decades due to the exponential increase in the human population over the past century and the subsequent encroachment of human activities on wilderness areas. In <u>Rajasthan</u>, the <u>leopard</u> is the most common carnivore involved in conflicts with humans.

Human Wildlife Conflict

In simple terms, Human-Wildlife Conflict is any interaction between wildlife and humans which causes harm, whether it is to the human, the wild animal, or property. (Property includes buildings, equipment, livestock and pets, crops fields or fences.)

Human - Wildlife Conflict (HWC) is defined as 'interaction between humans and wildlife where negative consequences, whether perceived or real, exists for one or both the parties when action of one has an adverse effect on the other party'. *Conover*, 2001; *Decker et al.*, 2002

It has been in existence for as long as wild animals and humans have co-existed and shared the same resources. Historical records from Nile Delta revealed that hippopotamuses raided crops while crocodiles attacked livestock in Egypt while elephants had been raiding crops all across Africa and other parts of world (Barnes, 1996).

Some examples of human-wildlife Conflict:

- Predation on livestock or domestic animals by wildlife like leopards.
- Damage of crops & fences
- Birds nesting in undesirable residential locations
- Wild animals being killed in road, train accidents.

Reasons for rising Human-Wildlife Conflict in Rajasthan

• Development of roads, railway tracks within forest areas and accidents caused by speeding vehicles.





- Grazing of livestock in forest areas.
- Pressure is exerted on protected areas by extraction of fodder, timber and non-timber forest products and illegal occupation.
- Increasing human population and ever expanding human settlements.
- Shrinking natural habitats for wild animals as more and more land is diverted towards human requirements.
- Damage to crops and livestock by wild animals.
- Sometimes, natural factors like droughts, bush fires, climatic changes also contribute to human-animal conflicts.

Ways to Mitigate Human Wildlife Conflict

- **Physical Barriers:** Barriers whether natural (rivers, mountains) or man-made (wire fencing, walls) that separate adjacent wildlife & human settlements.
- **Increasing Awareness:** Engaging with affected communities and foster awareness about conflict mitigation techniques, wild animal's social behaviour and ecological importance, and government policies and legal frameworks that protect the species.
- **Tans-location**: Translocation of human communities or problem animal.
- **Compensation Policy** for damage caused by wild animals to agricultural crop and property, killing of livestock and human beings.

Recent Initiatives

In July 2016, Wildlife Trust of India initiated Project Pardus Conservation, a Rapid Action Project (RAP) conducted in partnership with Hope & Beyond and supported by the David Shepherd Wildlife Foundation, to address issues of conflict and the attendant fall in leopard numbers in the Nahargarh and Jhalana regions of Jaipur.

In 2021, to help human-tiger conflicts, Ramgarh Vishdhari Tiger Reserve has been approved. The new tiger reserve will link Ranthambore Tiger Reserve in the Northeast & Mukundra





Hills Tiger Reserve on the southern side and provide an opportunity to tigers to reclaim their lost habitat.

According to a 2018 tiger census, there are 102 tigers in three reserves -- Ranthambore Tiger Reserve in Sawai Madhopur, Sariska Tiger Reserve in Alwar, and Mukundra Hills Tiger Reserve in Kota — in the state. According to experts, there is overcrowding at the Ranthambore reserve, which houses 77 tigers.

The rising number of tiger-human conflict in and around Ranthambore is also attributed to contracting spaces for tigers. Often, young or weak tigers leave Ranthambore and attack human beings and cattle in a bid to reclaim their lost habitat, which the NTCA and state government have now tried to facilitate by creating the RVTR.

Human-Wildlife Interactions: Something to learn from Rajasthan

- The unique co-existence of leopards and humans in Bera Village where man-animal conflict is largely absent.
- Love & protection extended by Bishnoi villages to blackbucks and chinkaras.



Current Affairs related to Environment

33 new air quality monitoring stations in the state

On the occasion of World Environment Day-2023, Rajasthan Forest and Environment Minister Mr. Hemaram Chowdhary inaugurated 33 new air quality monitoring stations in the state through video conferencing and laid the foundation stone of Integrated Resource Recovery Park at Tholai in Jamvaramgarh.

Work done for environmental protection in Rajasthan:

- Single use plastic has been banned to control pollution.
- Plantation has been promoted in the new Forest Policy 2023 released in the state. Programs like Trees Outside Forests in Rajasthan (TOFR) are being conducted in Rajasthan.
- Rs 40 crore has been allocated for wet land and grass land development and Rs 10 crore for the development of world famous Sambhar lake.
- To promote eco-tourism in the state, the work of 2-2 Luv Kush Vatika is in progress in each district.
- The 'Hack the Waste Hackathon' was launched by the State Pollution Control Board to encourage youth to solve real-world waste-related challenges at the grassroots level with technical skills and rewarded the winners.

2 Luv- Kush Vatika in every district

On 20 May 2023, Rajasthan Chief Minister Ashok Gehlot approved Rs 66 crore for developing two Luv-Kush Vatikas in all the districts of the state. This will give a boost to Eco-Tourism in the state.

Key Points:

- In these Vatika's recreation activities, walking tracks, water bodies, bird watching facilities, Signage's for awareness, benches etc. facilities will be available for visitors.
- These gardens aim to educate and educate the common people about environmental protection.
- In the budget of the year 2023-24, the Chief Minister had announced to develop an additional garden in each district.



Trees Outside Forest in Rajasthan (TOFR) scheme

The State of India's Forest Report 2021 shows that India's growing stock has increased along with an increase in forest and tree cover by 2,261 sq km. Much of this increase is due to an increase in the area under 'trees outside the forests' (TOF).

TOF is one of the important renewable resources that contribute to climate change mitigation, as every area of forest around the world absorbs carbon. The "Trees Outside the Forest in India" (TOFI) scheme has been launched by the Government of India on September 9, 2022, to increase the forest cover in India.

On the same lines, The Government of Rajasthan announced the "Trees Outside Forest in Rajasthan" (TOFR) scheme in the budget 2023-24. Under the scheme, 5 crore saplings will be planted in the year 2023-24 with the cooperation of various departments, institutions and citizens to increase greenery outside the forest areas. Out of this, 1 crore saplings will be made available for pastures, orchards and pastures, 1 crore saplings in various urban areas and 3 crore saplings for common people to plant in their homes, fields etc.

Amagarh Leopard Reserve

On May 22, 2022, which is International Biodiversity Day, Chief Minister Shri Ashok Gehlot inaugurated the 'Amagarh Leopard Reserve', Rajasthan's third Leopard Reserve. The Amagarh Leopard Safari is expected to generate employment opportunities for the local population and contribute to the state's tourism sector.

Status of Amagarh Leopard Reserve

Amagarh, a reserved forest block situated in the Aravalli mountain ranges, covers a forest area spanning 1524 hectares. It is situated east of Jaipur city and holds significant importance in terms of wildlife conservation and corridor development. This is due to the presence of the state's first leopard reserve, which lies between Jhalana and Nahargarh sanctuary. Adjacent to the Amagarh forest block is the Lalberi reserved forest block, spanning an area of 112 hectares. The combined area of both forest blocks is 1636 hectares, with a perimeter of approximately 28.6 kilometers.





Rajasthan's First Panther Rescue Center

Rajasthan's first Panther Rescue Center will be established in the Sajjangarh Wildlife Sanctuary of Udaipur's Forest Department. A budget of 4.72 crore rupees has been approved for this purpose. This rescue center will be built on approximately 3 hectares of land near the Biological Park. The center will feature state-of-the-art facilities, including eighteen large open enclosures and night centers, specifically designed for panthers.

Rajasthan's first bird park in Udaipur

On May 12, 2022, Chief Minister Shri Ashok Gehlot inaugurated the state's first bird park at Gulab Bagh in Udaipur. Here the Bird Park has been jointly constructed by the Tourism Department, Forest Department, Municipal Corporation and UIT at a cost of Rs 11.50 crore. Spread over an area of about 3.85 hectares, the construction work of the park has been done by RSRDC Limited.

50 aviaries will be constructed in the state of Rajasthan, following the model of the Gulab Bagh Bird Sanctuary in Udaipur. An additional budget provision of 43.50 crore rupees has been approved for the construction of these aviaries. These birdhouses will be built in 33 Lav Kush gardens and 17 other locations.

Rajasthan Forest and Biodiversity Development Project

The Rajasthan Forest and Biodiversity Development Project will be implemented in collaboration with the funding agency AFD (Agence Française de Développement) from France, under the supervision of the Forest Department in the state of Rajasthan. This project aims to undertake important work for environmental conservation, forestry, and wildlife protection in 13 districts of eastern Rajasthan.

Under this project, afforestation will be carried out in an area of 32,000 hectares in these districts. Additionally, 23,000 hectares of forest area will be further enriched. The project also includes the restoration of forests, the development of plant micro-reserves, and the development of wildlife areas. Furthermore, the establishment of a biological park and the development of eco-tourism sites will also take place in Bharatpur.

The main objective of this project is to mitigate climate change through community empowerment and ensure the sustainable conservation of forests and biodiversity.





Ramgarh Wildlife Sanctuary Declared as Rajasthan's Fourth Tiger Reserve

The state government has issued a notification declaring Ramgarh Wildlife Sanctuary as a Tiger Reserve. With the efforts of the state government and the Forest Department, Ramgarh Wildlife Sanctuary has been declared as the fourth new Tiger Reserve in the state.

Using the powers of Section 38 F of the Wildlife Protection Act, 1972 (Central Act No. 53), and after recommendations from the National Tiger Conservation Authority and consultations with the respective Gram Sabha and expert committee, the state government declared Ramgarh Wildlife Sanctuary as a Tiger Reserve.

The core and buffer area of Ramgarh Tiger Reserve cover approximately 150 square kilometers. It includes 225 square kilometers of Ramgarh Sanctuary, 256 square kilometers of Chambal Ghariyal Sanctuary, and a buffer area of 1,019 square kilometers.

Ramgarh Wildlife Sanctuary (Bundi) has been declared as Rajasthan's fourth Tiger Reserve by the Ministry of Environment, Forest and Climate Change. Prior to this, Ranthambore, Sariska, and Mukundra Hills were Tiger Reserves in Rajasthan.

With the declaration of Ramgarh Wildlife Sanctuary as a Tiger Reserve, there will be uninterrupted connectivity for tigers from Ranthambore to Mukundra, ensuring their conservation.

Neelkanth Biodiversity Forest and Khan Bankari Eco Park, Dausa

To promote tourism development, the state government is giving impetus to eco-tourism. In view of the tourism potential in Dausa district, decisions have been made for the development of natural sites. Chief Minister Shri Ashok Gehlot has approved a financial allocation of 3 crore rupees (1.50-150 crore) for the development of the Neelkanth Biodiversity Forest and Khan Bankari Eco Park in the district.

Neelkanth Biodiversity Forest

The Neelkanth Biodiversity Forest will focus on wildlife conservation, tourist facilities, and environmental awareness. The tourist facilities will include walking trails, eco huts, water facilities, watchtowers, entry gates, signage, and various activities related to wildlife conservation, such as the development of wetlands, anurans, and afforestation.

The forest boasts a rich biodiversity of flora and fauna. The vegetation includes Sal, Khair, Gular, Bilpatra, Gundi, Siras, Palas, Dhonk, and many other trees. The herbal plants include Vajradanti,





Satavar, Arni, Thor, Harsingar, and Morpankhi, among others. The wildlife includes Sloth Bear, Woodpecker, Leopard, Blue Bull, Wild Boar, Peafowl, Civet, Mor, and other species.

Khan Bankari Eco Park

Khan Bankari Eco Park is located just 300 meters away from the Dausa Collectorate. It will feature walking trails, garden work, fencing, walls, and an office building for various activities. A small pond is already present, and boating may be introduced in the future. Proposed walking trails of about 4-5 kilometers will surround the hills. Plantation of various species such as Neem, Shisham, Peepal, Karanj, Amla, Ashok, Morchadi, Gular, and Bilpatra will be carried out on both sides. The construction of rainwater harvesting structures and the beautification of wetlands through excavation work are also planned.





Unsustainable Mining in Rajasthan

Rajasthan is one of the richest states in terms of availability and variety of minerals in the country. The state has deposits of 81 different types of major and minor minerals. Out of these, 57 minerals are being currently mined.

Rajasthan is the **sole producer** of:

- Lead & Zinc ores,
- Selenite
- Wollastonite

Rajasthan is **leading producer** of:

- Silver
- Calcite
- Gypsum
- Ball Clay
- Feldspar
- Silver
- Rock Phospate
- Steatite
- Red Ochre
- Steel & Cement grade limestone

It also has prominent position in the country in the production of dimensional and decorative stones, such as marble, sandstone, granite etc. and about 70% of Boone-China tableware is produced in Rajasthan.





Environmental Effects of Unsustainable Mining:

The undesirable effects of mining can be termed as mining pollution. Mining pollution can be defined as an undesirable change in the physical or biological characteristics of the air, water or land that can harmfully affect health, survival or activities of human or other living things. Few adverse impacts on environment by mining include:

- Land degradation,
- Degradation of forest
- Loss of biodiversity,
- Soil contamination,
- Air pollution,
- Surface and ground water pollution,
- Noise and vibrations,
- Deterioration of natural drainage system

Marble slurry imposes serious threats to the ecosystem in the state. When dumped on land, it adversely affects productivity due to decreased porosity, water absorption and water percolation.

Major issues of Mining in Rajasthan

The state government has failed to regulate **illegal mining in forest areas**. Udaipur, the most forested district of Rajasthan is also the most mined. The government has issued leases for hundreds of mines in Sariska National Park. Despite repeated Supreme Court orders to close them down, mining continues unabated in Sariska and Jamwa Ramgarh sanctuary.

In 2018, Comptroller and Auditor General (CAG) report tabled in Vidhan Sabha highlighted that 98.87 lakh metric tonnes of minerals were illegally excavated in a period of five years in five Rajasthan districts.

In Rajasthan, extensive mining of sandstone, marble and other minerals has converted the Aravallis into a rocky wasteland. Soil erosion is rampant, natural recharging of groundwater has been affected, and riverbeds have been flooded with coarse sand. This is despite they being notified as an ecologically sensitive area (ESA) more than a decade ago in 1992. Mining in the catchments has also played its part





in threatening the region's water bodies. The limestone mines of Chittor have breached the region's water table.

Mining without a licence, mining outside lease area, raising of minerals without paying royalty are illegal mining activities which not only put immense pressure on environment as they do not comply with any regulations or environmental conditions but they also have serious consequences on natural resources like forests, rivers, flora and fauna and public health.

