NIDM

Rajasthan

*National Disaster Risk Reduction Portal*
1. STATE PROFILE

1.1 General

Rajasthan, the largest state of India is located in the north-western part of the subcontinent. It is bound in the north and north-east by the states of Punjab and Haryana, to the east and south-east by the states of Uttar Pradesh and Madhya Pradesh, to the south-west by the state of Gujarat, and to the west and north-west by Pakistan. The southern part of the state is about 225 km from the Gulf of Kutch and about 400 km from the Arabian Sea. Jaipur is the capital city and lies in the east-central part of the state. The Tropic of Cancer passes through its southern tip in the Banswara district. The state has an area of 132,140 square miles (342,239 square kilometres). The present state of Rajasthan was formed in 1956.
The Aravalli Range forms a line across the state running roughly from Guru Peak (1,722 meters), near the town of Abu (Mount Abu) in the south-west, to the town of Khetri in the northeast. About three-fifths of the state lies northwest of this line, leaving two-fifths in the southeast. These are the two natural divisions of Rajasthan. The north-western tract is generally arid and unproductive, although its character shifts gradually from desert in the far west and north-west to comparatively fertile and habitable land toward the east. The area includes the Thar (The Great Indian) Desert. The name Thar is derived from t’hul, the general term for the region’s sand ridges.

The huge portion of the state of Rajasthan is desiccated and houses the biggest Indian desert- the Thar Desert known as the 'Maru-kantar’. The oldest chain of fold mountains- the Aravali Range splits the state into two geographical zones- desert at one side and forest belt on the other. Only 9.56% of the total geographical region lies under forest vegetation. Mount Abu is the only hill station of the state and houses the Guru Shikhar Peak that is the highest peak of the Aravali range with an elevation of 1,722 m.

National parks and wild life sanctuaries: The diverse landscape of the state houses a number of well-known wild life sanctuaries and national parks. It is home to some of the most majestic beasts that the whole world is struggling to save. Here one can have a rendezvous with a variety of animals which include the world-famous Indian tigers, chinkara, black buck, the greatly threatened caracal and the great Indian bustard. Exotic birds like the common crane, ducks, coots, pelicans and the rare Siberian cranes, imperial sand grouse, falcons, buzzards flock to the state to escape the bitter cold in their homeland. Rajasthan has two national parks, over a dozen sanctuaries and two closed areas. Most of these are open for tourists around the year except for the monsoon months. Ranthambhore National Park and Sariska Wildlife Sanctuary are both known worldwide for their tiger population and considered by both wilderness lovers and photographers as the best places in India to spot tigers. Prominent among the wildlife sanctuaries are Mount Abu Sanctuary, Bhensrod Garh Sanctuary, Darrah Sanctuary, Jaisamand Sanctuary, Kumbhalgarh Wildlife Sanctuary, Jawahar Sagar sanctuary and Sita Mata Wildlife Sanctuary.

### Interesting facts about the Thar Desert

- It is the world's 18th largest subtropical desert.
- The Thar Desert is the most densely populated desert in the world, with a population density of 83 people per square km.
- India exploded its first nuclear bomb in the Thar Desert on May, 1974.
- It is the biggest wool-producing area in India.
- There are ten times more animals per person in Rajasthan than the national average.

#### 1.2 Geography

In the west, Rajasthan is relatively dry and infertile; this area includes some of the Thar Desert, also known as the Great Indian Desert. In the southwestern part of the state, the land is wetter, hilly, and more fertile. The climate varies throughout Rajasthan. Winter temperatures range from 8° to 28° C (46° to 82° F) and summer temperatures range from 25° to 46° C (77° to 115° F).
Average rainfall also varies; the western deserts accumulate about 100 mm (about 4 in) annually, while the southeastern part of the state receives 650 mm (26 in) annually, most of which falls from July through September during the monsoon season. Rajasthan has a single-chamber legislative assembly with 200 seats. The state sends 35 members to the Indian parliament: 10 to the RajyaSabha (Upper House) and 25 to the LokSabha (Lower House). Local government is based on 33 administrative districts.

1.3 Area
The north-western state of Rajasthan is the largest Indian state with an area of 3, 42,239 sq.km comprising of the 10.41% of the total geographical area of the country. This state has a type of rhomboid shape and stretches lengthwise 869 km. from west to east and 826 km. from north to south.

1.4 Topography
Rajasthan has varying topographic features though a major part of the state is dominated by parched and dry region. The extensive topography includes rocky terrain, rolling sand dunes, wetlands, barren tracts of land filled with thorny scrubs, river-drained plains, plateaus, ravines and wooded regions. In a more broad way the topography of Rajasthan can be divided in the following regions- the Aravalli or the Hilly regions, the Thar and the other arid regions, the Plateaus including Vindhya and the Malwa, the Fertile plains including the Mewar, the Forest Regions and the Water bodies including Rivers and Salt Lakes.

1.5 Soil & Vegetation
The soil and vegetation of Rajasthan alters with its wide-ranging topography of the state and the availability of water. The varied kind of soils available in Rajasthan are mostly sandy, saline, alkaline and chalky (calcareous). Clay, loamy, black lava soil and nitrogenous soils are also found.
Owing to the limited rainfall seasonal vegetation such as a few grass species, shrubs and dwarf trees can be found. However food crops are grown in the plains that are drained by the rivers and streamlets owing to the alluvial and clay soil deposits. The hilly tracts of the Aravali are characterized by the black, lava soils that sustain the growth of cotton and sugarcane.

1.6 Rajasthan Desert
The Thar Desert or the Great Indian Desert encompasses about 61% of total landmass of Rajasthan and hence it is identified as the "Desert State of India". The Rajasthan desert which forms a major portion of the Thar Desert is the biggest desert in India and encompasses the districts of Jaisalmer, Barmer, Bikaner and Jodhpur. In fact the Rajasthan Desert comprises the desert triangle of three cities - Jaisalmer, Bikaner and Jodhpur. The desert becomes very hot during the summer and it experiences extreme climate with an average annual rainfall less than 25 cm. Days are hot and the nights are cold. Vegetation consists of thorny bushes, shrubs and xerophilious grass. Various species of lizards and snakes are found here.
1.7 Agriculture

Despite all the appearances to the contrary, the soil of Rajasthan does support a substantial agricultural population (almost eighty percent) who harvest protein-rich crops like jowar and bajra. As a matter of fact, the agricultural sector accounts for almost 22.5 percent of the state are GDP. The state is the second largest producer of oilseeds (17.71 percent), and spices like coriander, cumin and fenugreek (10.89%). It is also the largest producer of rapeseed and mustard and accounts for 44.61 percent of the total national produce.

It accounts for close to 70% of the country’s production of guar. About 9.18 percent of country’s soyabean is produced by Rajasthan, which makes it the third largest producer of the crop. The state tops in the production of bajra (31.28%). It is also a major producer of food grains, gram, groundnut and pulses.

With the arrival of high-input extensive agriculture, people have been able to make considerable profits by turning to the production of cash crops such as sugar cane and cotton. As a result, this sector has boosted the economy of Rajasthan to a great extent. Wheat, corn and millets are the three most important crops of the region, along with pulses. The water from Indira Gandhi canal has proved to be a boon for the semi-arid regions, which are now being used to cultivate citrus fruits, including tangerines, oranges and lemons.

Though there are vast tracts of the desert in western Rajasthan, the ecological environment is semi-arid; in eastern Rajasthan, where rivers and a lush green cover are present, there is a more rain, and the seasonal crops, fruit and vegetables are plentiful. The farms are mainly irrigated with the help of tanks and wells.

1.8 Temperature

There are distinct temperature range variations both diurnal and seasonal throughout the state, revealing the most typical phenomenon of the warm-dry continental climate. The summer begins in the month of March while the temperature keeps rising progressively through April, May and June. West of Rajasthan and the eastern side of Aravalli Range, in the region of Bikaner, Phalodi, Jaisalmer and Barmer, the maximum daily temperature hovers around 40°C to 45°C. Sometimes, it even reaches as high a 49°C during the summer months. Nights of summers see a considerable temperature fall with a minimum daily temperature around 20°C to 29°C. However, Udaipur and Mount Abu, have a pleasanter climate in summers with a relatively lower daily maximum temperature that reaches 38°C and 31.5°C, respectively. The daily minimum temperature at nights for these two stations hovers around 25°C and 22°C, respectively. The major portion of the state consists of the arid west and the semi-arid mid-west has an average maximum of 45°C in June.

January is the coldest month in the state of Rajasthan. The minimum temperature sometimes falls to -2°C in the night at places like Sikar, Churu, Pilani and Bikaner. The sandy land gets even colder with occasional secondary Western winds that cross the western, northern and eastern Rajasthan during winter months, and even cause light rainfall and chilly winds can be experienced during this period. Most of the Rajasthan, except the southeast Rajasthan comprising of Kota, Bundi and Baran and western Barmer have an average temperature of more than 10°C.
Due to the cold western winds, the whole of Rajasthan sometimes come under the spell of the cold wave for 2 to 5 days during winters.

1.9 Rainfall
Rajasthan being the desert area, its climate varies mostly from arid to sub-humid. To the west of the Aravallis, the climate is marked by low rainfall, extreme diurnal and annual temperature, low humidity and high velocity winds. In the east of the Aravallis, the climate is semi-arid to sub-humid marked by lower wind velocity and higher humidity and better rainfall. The annual rainfall in the state differs significantly. The average annual rainfall ranges from less than 10 cm in north-west part of Jaisalmer region (lowest in the state), to 20 to 30 cm in the regions of Ganganagar, Bikaner and Barmer, 30 to 40 cm in the regions of Nagaur, Jodhpur, Churu and Jalor and more than 40 cm in the regions of Sikar, Jhunjhunu, Pali and the western fringes of the Aravalli range. The more fortunate eastern side of the Aravallis see 55 cm rainfall in Ajmer to 102 cm rainfall in Jhalawar. Mount Abu in the Sirohi district in the southwest region receives the highest rainfall in the state (163.8 cm).

The southwest monsoon begins in the last week of June in the eastern parts and may last till mid-September. There are occasionally pre-monsoon showers in mid-June while post-monsoon rains may occur in October. Winters may also receive a little rainfall with the passing of western distribution over the region. However, Rajasthan receives most of its monthly rainfall during July and August.

1.10 Socio-Economic Profile

Demography and administration:
Rajasthan has a population of 68,621,012 as per the 2011 census. The population growth over the last ten years has been around 21.44%. The sex ratio of Rajasthan is 926 per 1000 males. The largest cities of Rajasthan are Jaipur, Jodhpur and Kota. The state of Rajasthan has 33 districts and 25 Parliamentary constituencies. Rajasthan has a single-chamber legislative assembly with 200 seats. The state sends 35 members to the Indian national parliament: 10 to the Rajya Sabha (Upper House) and 25 to the Lok Sabha (Lower House). Local government is based on 30 administrative districts.

Education: The literacy rate in Rajasthan has increased significantly in the recent year. From an average of 38.55 % (54.99% male and 20.44% female) in 1991, the state’s literacy rate has increased to 67.06% (80.51% male and 52.66% female) in 2011. Rajasthan has a number of well known universities and more than 250 colleges. It has more than 50,000 primary and 7,000 secondary schools. There are many engineering colleges with an annual enrolment of approximately 11,500 students. The state has more than 20 polytechnics and more than 100 Industrial Training Institute (ITIs) which impart vocational training.

Economy:
The economy of the state is primarily agricultural and pastoral. Wheat, barley, pulses, sugarcane and oilseeds are the main food crops, while cotton and tobacco are the state’s cash crops. A major portion of edible oils is produced by Rajasthan, which is also the second largest producer of oils seeds. Rajasthan is the biggest producer of wool and opium in the country. The crops are
irrigated using water from wells and tanks. The north-western region of the state receives ample water from the Indira Gandhi Canal.

**Industries:**
Mineral-based, agriculture-based and textile industries dominate the scenario in the state. Rajasthan is the second largest producer of polyester fibre and cement in India. Several prominent chemical and engineering companies are located in the city of Kota, in southern Rajasthan. The state is also known for its marble quarries, copper, zinc mines and salt deposits in Sambhar Lake.

**State at a glance**

<table>
<thead>
<tr>
<th>1. Date of formation:</th>
<th>November 1, 1956</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Size:</td>
<td>342,239 sq km</td>
</tr>
<tr>
<td>4. Capital:</td>
<td>Jaipur</td>
</tr>
<tr>
<td>5. Legislature:</td>
<td>Unicameral</td>
</tr>
<tr>
<td>6. Population density:</td>
<td>165/sq km</td>
</tr>
<tr>
<td>7. No. of districts:</td>
<td>25</td>
</tr>
<tr>
<td>8. Lok Sabha seats:</td>
<td>33</td>
</tr>
<tr>
<td>9. Judicature:</td>
<td>Jodhpur High Court</td>
</tr>
<tr>
<td>10. Languages:</td>
<td>Hindi and Rajasthani</td>
</tr>
<tr>
<td>11. Rivers:</td>
<td>Beas, Chambal, Banas, Luni</td>
</tr>
<tr>
<td>12. Minerals:</td>
<td>Zinc, mica, copper, gypsum, silver, magnesite, petroleum</td>
</tr>
<tr>
<td>13. Industries:</td>
<td>Textiles, woollen, sugar, cement, glass, zinc smelters</td>
</tr>
<tr>
<td>14. Airports:</td>
<td>Jaipur, Jodhpur, Udaipur</td>
</tr>
<tr>
<td>15. Forests and national parks:</td>
<td>Sariska Tiger Reserve, Keoladeo Ghana NP, Ranthambore NP, Dhawa WS</td>
</tr>
<tr>
<td>17. State animal:</td>
<td>Chinkara</td>
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<tr>
<td>18. Main crops:</td>
<td>Mustard, jowar, bajra, maize, gram, wheat, cotton, millet</td>
</tr>
</tbody>
</table>
2. DISASTER RISK PROFILE

2.1 Earthquake
Rajasthan state lies in earthquake zones II, III and IV. Some area of Jalore, Sirohi, Barmer and Alwar districts fall in zone IV where as many parts of Bikaner, Jaisalmer, Barmer, Jodhpur, Pali, Sirohi, Dungarpur, Alwar, Banswara, fall in zone III.

Recent Earthquakes in the Area
09 April 2009. A moderate earthquake (M5.0-5.9 termed as moderate) struck the Thar Desert near Jaisalmer on 9 April 2009. It had a magnitude of Mb=5.1 and was felt in a large part of the region along the India-Pakistan border. The earthquake was centred 2 kms N of Mokal (27 kms NW of Jaisalmer) 166 kms NNW of Barmer.
26 Jan 2001. Bhuj quake of Kutch in 2001 was felt in many parts of Rajasthan as well. Its effect was felt more severely in Jalore, Barmer and Jaisalmer. Many buildings in these districts like schools, rest houses and privately owned buildings had developed huge cracks and had been rendered unsafe. Many other buildings developed cracks making them unsafe for further use without proper retrofitting. Many of the public buildings mainly schools are still lying in dilapidated conditions.
8 November 1991. A 5.4 magnitude earthquake near Jaisalmer caused some damage in the village of Konoi and was felt as far as New Delhi.
The area where Mangala processing terminal and the well pads are located lie in a MODERATE seismic zone (Zone III) and there are no incidents of severe seismic activities till date as per the records available with the local district authorities. However all its facilities are built to withstand earth quakes of the expected intensity in Zone III category.

2.2 Drought
The major natural hazard in the region is drought brought about due to the hot arid climate and very dry sandy soils. Moderate to severe drought occurs every year. In 2009 alone, 269 villages in the Barmer Taluk were affected by drought.

2.3 Sandstorm
Barmer region where the Cairn facilities are located are prone to frequent sandstorms which disrupt the normal functioning and operations.

2.4 Epidemics
Biological hazards facing Barmer comprise high temperatures (heat stroke), fires (burns), accidents and diseases. In terms of epidemics, Barmer has faced mainly small scale epidemics of swine flu, malaria and chikungunya. The main reason behind the limited spread of disease in this region is the sparse population. Thus the impact scale of the epidemics is small, generally covering not more than 50 people. The single largest epidemic in recent years was the swine flu epidemic where 35 were infected of which 9 died. The other major disease is malaria which is endemic to the region due to the large-scale usage of open water storage tanks.

2.5 Floods
Floods are rare due to poor rainfall in the region but unusually high quantum of rain can result in flash floods as seen in Kawas region of Barmer district in 2006. In August 2006, the usually drought prone Barmer district was hit by flash floods. As of August 27, 2006, 103 deaths were reported in Rajasthan due to floods. The village of Kawas was the most affected and located close to Mangala Processing Terminal. The water level as on March 6, 2007 was about 3 feet to 10 feet above ground in Kawas. People had to live in make shift camps for several months. The loss included the death of 75,194 cattle and damage to Kharif crop was worth Rs.1300 crore. In Barmer Tehsil, Aati and Undkha villages alone nearly 600 people were affected by 2006 floods. In August 2006, unprecedented floods hit the region and destroyed many buildings and infrastructure elements. It was for the first time in recorded history of 200 years that such severe flooding had taken place in this desert, normally known for its perennial droughts. Many school buildings in rural Barmer were destroyed or severely damaged, rendering them unusable and unsafe for occupation. Even after the rain stopped, the water did not drain out, because of an impermeable layer of subsurface gypsum. A layer of gypsum below the sandy surface prevented flood waters from seeping into the ground in the region, slowing down relief efforts. Gypsum is a mineral used in the building industry. Bodies of thousands of cattle were floating in the flood waters, causing a foul smell in some areas and raising concern about the spread of disease in Barmer.
2.6 Fires
The high incidence of fires is due partly to the high temperatures during summer and partly to the presence of large numbers of kutcha (thatched) houses in the villages. The percentage of temporary housing made from dried thatch is 57.8% thereby exposing a large percentage of the population to fire-related hazards. There is also a lack of proper fire safety awareness among the community members. Annually there are at least 10 – 15 villages badly affected by fire accidents in every taluk of Barmer District.

2.7 Other Hazards
Hazards and risks can potentially emanate from riots, civil strife, pilferage and sabotage and may be taken into consideration for disaster preparedness and management. The project area is about 100 -150 km away from the Indo–Pak border and hence the chances of collateral damage during a war are high. The proximity of the border also increases the probability of terrorist attacks.

3. INSTITUTIONAL SETUP

3.1 Disaster Management & Relief Department
Relief Department came into existence vide state ordinance dated 24.10.1951 to establish the office of the Relief Commissioner. Before this the relief work was carried out by a branch under the Revenue Department. Famine code pertaining to the relief work was prepared on 30.04.1962 and accordingly the work started. Food and Relief Department was jointly working till 1964 and in the end of year 1964 both the department were separated and Relief Department came into existence separately. In the year 1963-64 and 1964-65 the state faced severe drought which resulted enlarged establishment of the department. Keeping in view the damages affected by the cyclone in the past few years in Gujarat the Ministry of Home Affairs; Government of India has issued the directions to all the states to rename the Relief Department as Disaster Management and Relief Department. On receipting the directions by the State Government the name of Relief Department was changed to DM & Relief Department w.e.f. 30.10.2003.

Relief department is a permanent department of the state administration which is functioning under the Commissioner and Secretary, Relief Department. Head office of the department is of state level and has no subordinate offices or branch. Relief work and activities are being carried out by different departments / organizations like P.W.D., forest department, soil conservation department, PHED, Panchayati Raj Department, Revenue Department, local bodies etc. District collectors and district level officers of other organization act as administrative, technical controlling and coordinating officers in their districts and the expenditure occurred in executing the process is born by this department.
### 3.2 Rajasthan State Disaster Management Authority

| 1. | Chief Minister, Rajasthan | Chairman |
| 2. | Minister In charge, Finance Department, Govt. of Rajasthan | Member |
| 3. | Minister In charge, Home Department, Govt. of Rajasthan | Member |
| 4. | Minister In charge, Disaster Management & Relief Department, Govt. of Rajasthan | Member |
| 5. | Minister In charge, Water Resources Department, Govt. of Rajasthan | Member |
| 6. | Minister In charge, Rural Development & Panchayati Raj Department, Govt. of Rajasthan | Member |
| 7. | Minister In charge, Agriculture & Animal Husbandry Department, Govt. of Rajasthan | Member |
| 8. | Minister In charge, Medical & Health Department, Govt. of Rajasthan | Member |
| 9. | Minister In charge, Local Self Govt. and Urban Development Department, Govt. of Rajasthan | Member |
3.3 District Disaster Management Authority

| 1. | Collector and District Magistrate | Chairperson |
| 2. | Pramukh Zila Parishad | Co-Chairperson |
| 3. | Chief Executive Officer, Zila Parishad | Member |
| 4. | District Superintendent of Police | Member |
| 5. | Senior Most officer of the Public Works Department in the district | Member |
| 6. | Senior Most officer of the Water Resource Department in the district | Member |
| 7. | Additional Collector and District Magistrate (officer incharge of relief section) | Ex-Officio |

The following shall be permanent invitees to the Authority :-

- Member of Parliament (Lok Sabha) elected from the district
- Member of Legislative Assembly representing the area of the district
- Senior most officers of the Public Health Engineering Department, Medical Department and Animal Husbandry Department posted in the district.
- The Chairperson of DDMA, under special circumstances, if he feels necessary, may invite any person a special invitee.

4. INITIATIVES

Draft State Disaster Management Plan has prepared and in process of approval from SEC and SDMA.

4.1 District Disaster Management Plan

To view the District Disaster Management plan use following link. [http://www.rajrelief.nic.in/ddmplan/ddmp.htm](http://www.rajrelief.nic.in/ddmplan/ddmp.htm)

4.2 Disaster Management Policy

To view the Disaster Management Policy use following link. [http://www.rajrelief.nic.in/](http://www.rajrelief.nic.in/)

4.3 Publications

- Drought Management Manual
- Earthquake Manual
- Flood Manual
• Apda Prabhadhan Evam Sahayata Nirdeshika

REFERENCES

2. http://www.rajasthan.gov.in
5. http://www.rajrelief.nic.in/