



ECOLOGICAL STUDY OF NEEM KA THANA RANGE, SIKAR(RAJASTHAN)

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Abstract: - The variety of life on Earth, or its biological diversity, is commonly referred to as biodiversity. The number of species of plants, animals, and microorganisms, the enormous diversity of genes in these species, the different ecosystems on the planet, such as deserts, rainforests and coral reefs are all part of a biologically diverse Earth. Appropriate conservation and sustainable development strategies attempt to recognize this as being integral to any approach. Almost all cultures have in some way or other form recognized the importance that nature, and its biological diversity has had upon them and the need to maintain it. Yet, power, greed and politics have affected the precarious balance. Biodiversity is the vast array of all the species of plants, animals, insects, and the microorganism inhabiting the earth either in the aquatic or the terrestrial habitats. The human civilization depends directly or indirectly upon this biodiversity for their very basic needs of survival viz. food, fodder, fuel, fibre, fertilizer, timber, liquor, rubber, leather, medicines, and several other raw materials. This diversity is indispensable for the condition for the long-term sustainability of the environment, continuity of the life on earth and the maintenance of its integrity. It is highly “generic” containing vast range of underlying dormant seeds which blooms into colourful ranges of herbs and grasses with the very first shower.

Keywords: - Biodiversity, Ecology. Reserve, Leopard, Neem Ka Thana Range.

Introduction

As many as 500 million myriads of species of plants, animals, and micro-organisms inhabited this earth since life began over 3.5 billion years ago. A many of them disappeared from the face of the earth in the normal evolutionary process, some of them have left their descendants and surviving remnants. The “Garden Lizard” and the “crocodile” are the surviving remnants of the giant reptiles, the dinosaurs of the Mesozoic age. Though we know of about 1.5 million species today, recent discoveries of astonishing insect diversity in rain forests have forced scientists to revise their estimates. There may be anything between 5 to 50 million species of plants and animals. On average, 2,500 new species of both plants and fungi are identified every year, always with the hope that they will provide “new sources of food, medicine, and nature-based solutions to the biggest challenges

of our times". There are 400,000 named plant species at present, and RGB Kew scientists estimate up to 100,000 more are still to be discovered. In particular we do not know how much variability exists among soil micro-organism. Whatever species we see today are not there by any chance, but are the products of long evolutionary process managing to survive through ecological adaptations in the ever-changing environment conditions over time and space.

Wild life Diversity in the Neem Ka Thana Range

The Neem Ka Thana Range is fairly rich in wildlife diversity. While work on invertebrates is still in progress, intensive studies have been carried out on the vertebrates, which show predominant affinities and are found on a variety of desert habitats, but a few exhibits habitat specificity. The earlier flocks of sand grouse were of the order of 3000 to 4000 birds. Now, they fly in few hundred only. Their population in Neem Ka Thana range and nearby districts has been adversely affected due to prolonged droughts which drastically reduced the availability of seeds for them. the major reason of depletion in their number is the paucity of grazing lands in the neem ka thana range.

Study Area

Neem ka thana, itself as the district's headquarter and also administrative headquarter, it is located 73 km from Sikar City in the Dhundhar region in the Rajasthan state of India. Sikar, Khandela, Sri Madhopur, Kotputli, Khetri, and Narnaul are some major cities and towns near Neem Ka Thana. It is located at a distance of 120, kilometres from Jaipur and 240 kilometres from Delhi. Neem ka thana is well connected with others cities with roads and Indian Railways.

Topography: -

For the purposes of this report, the geographical coordinates of Neem ka Thana are 27.740° latitude, 75.787° longitude, and 1,503 ft elevation. The topography within 2 miles of Neem ka Thana contains only modest variations in elevation, with a maximum elevation change of 141 feet and an average elevation above sea level of 1,482 feet. Within 10 miles contains only modest variations in elevation (1,522 feet). Within 50 miles contains very significant variations in elevation (2,592 feet). The area within 2 miles of Neem ka Thana is covered by cropland (93%), within 10 miles by cropland (89%), and within 50 miles by cropland (91%).

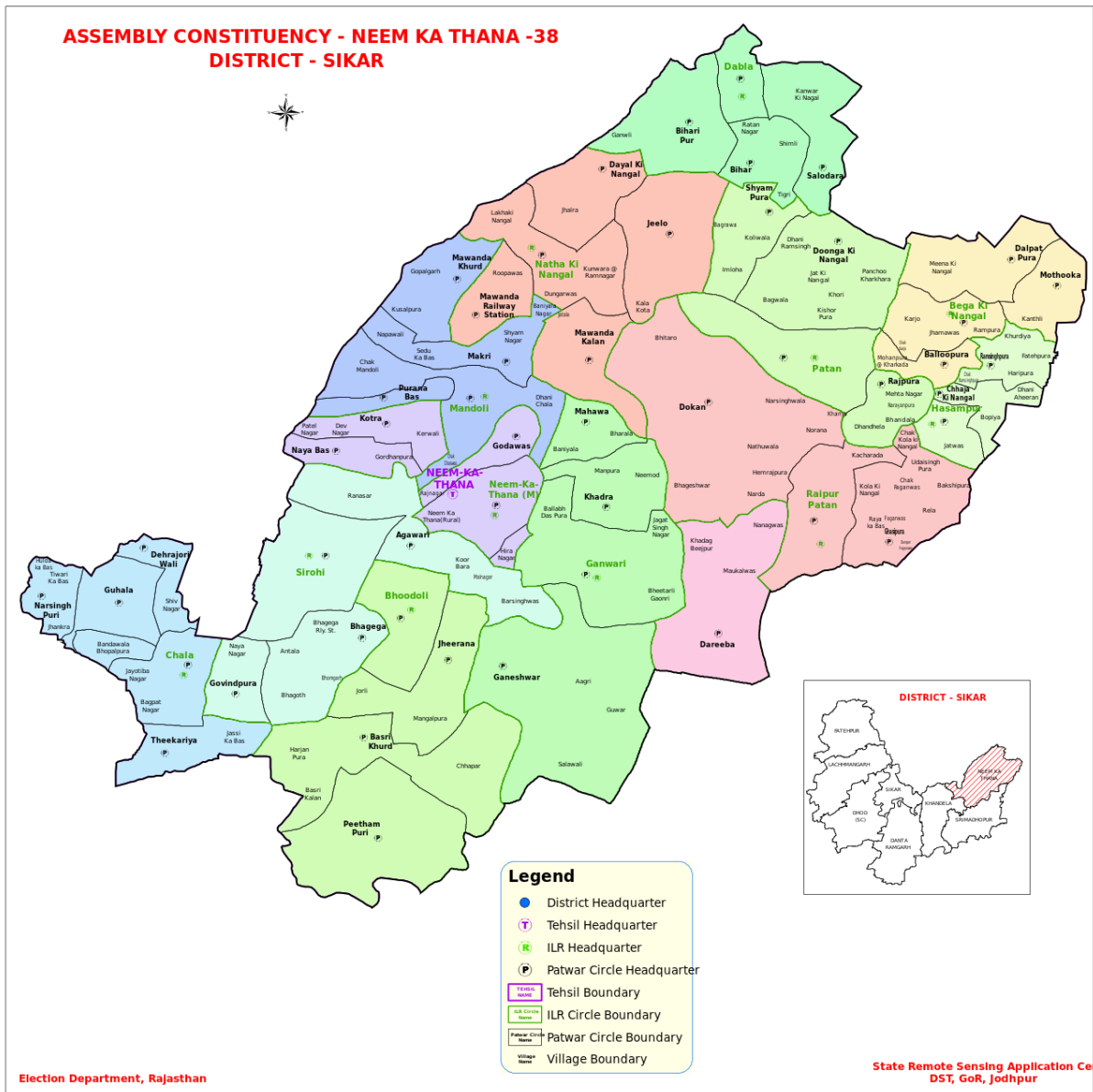


Fig. 1

There are two main Reserve in the Neem Ka Thana Range: -

1: - Mansa Mata Conservation Reserve, Udaipurwati: -

Section of the Wildlife (Protection) Act 1972, the entire forest land of Kankaria Man, an area of 102.31 square kilometres (10231 hectares) of protected forest block adjoining Udaipurwati town and 18 surrounding villages in Udaipurwati tehsil of Neem Ka Thana district by the state government Under the provision of 36A, keeping in view the natural and zoological importance related to ecology and fauna, vegetation, land structure, has been declared as Shamansa Mata Conservation Reserve on 18.11.2019.

Approval of the management plan for the period from 2020-21 to 2029-30 in order to develop this conservation reserve area as a tourist destination and to preserve the wildlife. Order No. 2069-75 dated 21.12.2020 of Principal Chief Conservator of Forests and Chief Wildlife Warden, Rajasthan, Jaipur is approved.

In this management plan, security wall, housing, water storage, development of tree plantation, staff management facility, interpretation centre for propagation of wildlife, solar system to develop water sources in Mansa Mata Conservation Reserve area for protection of wildlife. Renovation of old water conservation

structures, renovation of old Johad, Bawdi, fort, anictus, construction of rescue centre, ecotrails, watch towers, viewpoints, sign boards, entrance gate, purchase of vehicles etc. are proposed.

With the execution of the work according to the approval of the management plan, the objectives of conservation of wildlife in the Mansa Mata Conservation Reserve area will be fulfilled. Under the budget announcement for the year 2021-22 in the Mansa Mata Conservation Reserve by the Department of Tourism, Government of Rajasthan, work is being done to develop the Mansa Mata Temple in the form of tourism



Fig. 2



Fig. 3

2: - Bansiyal Khetri Bagore Conservation Reserve, Khetri: -

Khetri Bansyal Conservation Reserve is a 7,000 Hectare protected area in Neem Ka Thana district of Rajasthan. The conservation reserve has been set up in 2019 and the main attraction is Leopard.

Apart from leopard, the reserve also has Indian fox, blue bulls, sambhar etc.

In 2017, Rajasthan State Government had announced launching of in 8 Wildlife Sanctuaries of the state including Khetri Bansyal Conservation Reserve in Neem Ka Thana.



Fig. 4

Status of Neem Ka Thana Wild Life Reserve

The Neem Ka Thana was declared ‘Reserved Area’ for the protection of wild animals in 2019. Over 100-150 leopards are found in reserve area of Neem Ka Thana Range. This is the natural home of leopards. There is indication that the population of leopards is on the way of increase at Neem Ka Thana Range. The main problem of the area are as follows: -

1. Cutting of trees and degradation of forest.
2. Uncontrolled grazing.
3. Man made element such as road, building, watch hut, etc.
4. Hunting of animals.
5. Developments around Sanctuary.
6. Lack of infrastructure facilities like drinking water for animals, proper feeding.

Climatic Conditions

In Neem Ka Thana Range, the wet season is hot, muggy, and partly cloudy and the dry season is warm and mostly clear. Over the course of the year, the temperature typically varies from 47°F *or above* 109°F.

The best time of year to visit Neem Ka Thana Range for hot-weather activities are from early April to early May and from mid-September to late October.

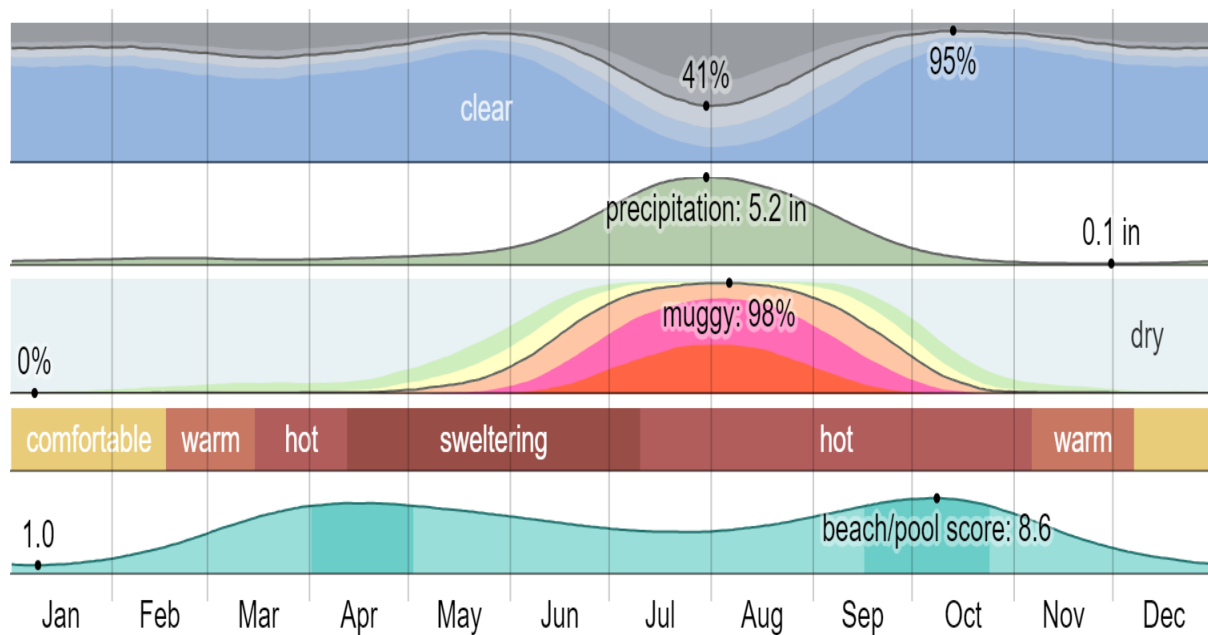


Fig. 5

The hot season lasts for 2.7 months, from April 1 to July 5, with an average daily high temperature above 96°F. The hottest month of the year in Neem Ka Thana Range is June, with an average high of 101°F and low of 82°F.

The cool season lasts for 2.4 months, from December 6 to February 17, with an average daily high temperature below 75°F. The coldest month of the year in Neem Ka Thana Range is January, with an average low of 48°F and high of 69°F.

Clouds: -

In Neem Ka Thana Range, the average percentage of the sky covered by clouds experiences extreme seasonal variation over the course of the year.

The clearer part of the year in Neem Ka Thana Range begins around September 1 and lasts for 10 months, ending around July 2.

The clearest month of the year in Neem Ka Thana is October, during which on average the sky is clear, mostly clear, or partly cloudy 94% of the time.

The cloudiest part of the year begins around July 2 and lasts for 2 months, ending around September 1.

The cloudiest month of the year in Neem Ka Thana Range is August, during which on average the sky is overcast or mostly cloudy 49% of the time.

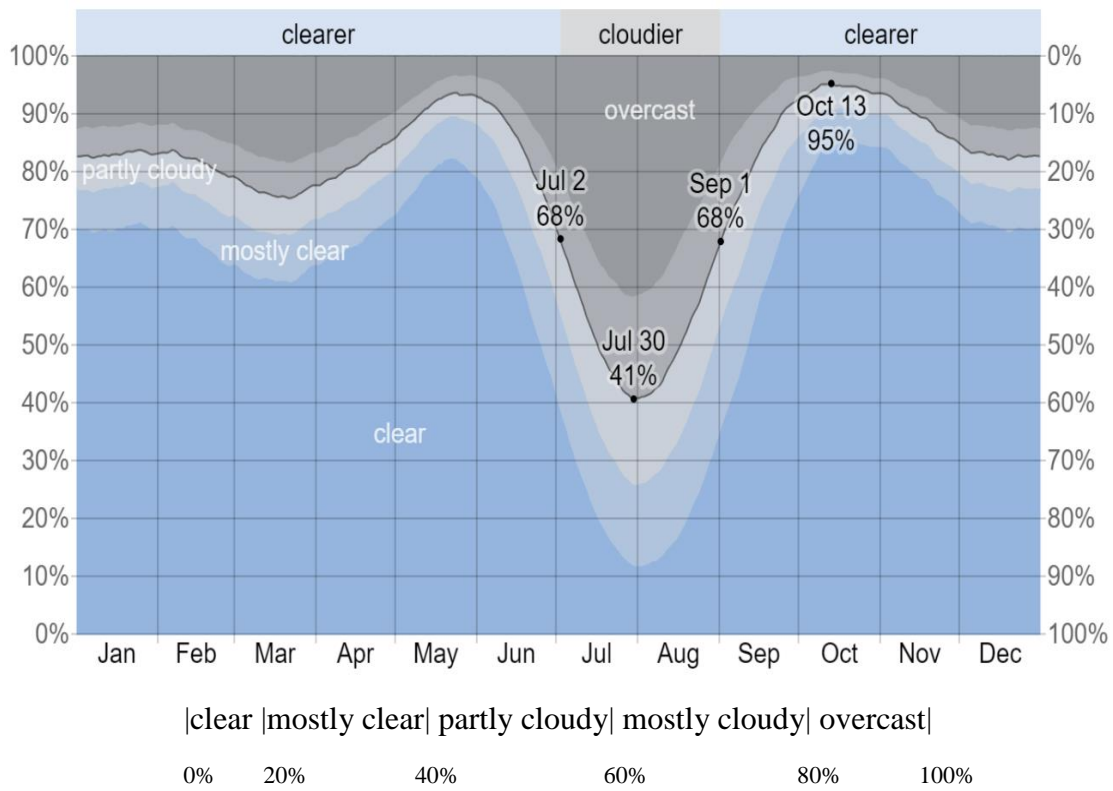


Fig. 6

Fraction	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cloudier	17%	18%	23%	19%	9%	15%	48%	49%	18%	6%	11%	17%
Clearer	83%	82%	77%	81%	91%	85%	52%	51%	82%	94%	89%	83%

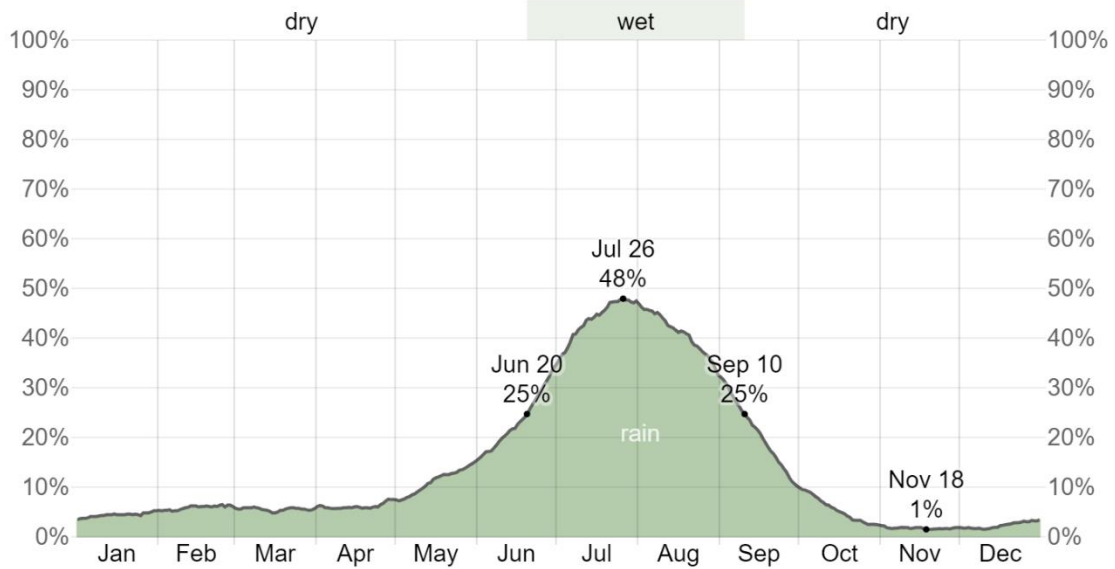
Precipitation: -

A wet day is one with at least 0.04 inches of liquid or liquid-equivalent precipitation. The chance of wet days in Neem Ka Thana varies significantly throughout the year.

The wetter season lasts 2.7 months from June 20 to September 10, with a greater than 25% chance of a given day being a wet day. The month with the most wet days in Neem Ka Thana Range is July, with an average of 13.5 days with at least 0.04 inches of precipitation.

The drier season lasts 9.3 months, from September 10 to June 20. The month with the fewest wet days in Neem Ka Thana Range is November, with an average of 0.5 days with at least 0.04 inches precipitation.

Among wet days, we distinguish between those that experience rain alone, snow alone, or a mixture of the two. The month with the most days of rain alone in Neem Ka Thana Range is July, with an average of 13.5 days. Based on this categorization, the most common form of precipitation throughout the year is rain alone, with a peak probability of 48% on July 26.



The percentage of days in which various types of precipitation are observed, excluding, excluding trace quantities: rain alone, snow alone, and mixed.

Fig. 7

Days	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Of Rain	1.4d	1.7d	1.7d	1.8d	3.5d	7.0d	13.5d	12.7d	6.3d	1.7d	0.5d	0.7d

Rainfall: -

to show variation within the months and not just the monthly totals, we show the rainfall accumulated over a sliding 31-days period centered around each day of the year. Neem Ka Thana Range experiences extreme seasonal variation in monthly rainfall.

The rainy period of the year lasts for 5.5 months, from April 29 to October 13, with a sliding 31-days rainfall of a least 0.5 inches. The months with the most rain in Neem Ka Thana is July, with an average rainfall of 4.8 inches.

The rainless period of the year lasts for 6.5 months, from October 13 to April 29. The month with the least rain in Neem Ka Thana Range is November, with an average rainfall of 0.1 inches.

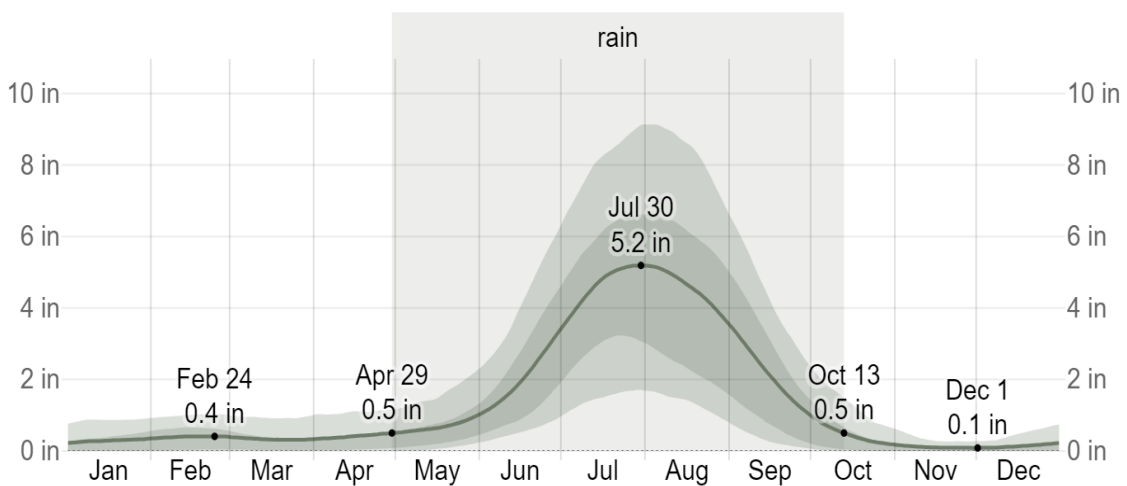


Fig. 7

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall	0.3"	0.4"	0.3"	0.4"	0.6"	1.9"	4.8"	4.7"	2.2"	0.4"	0.1"	0.1"

Humidity: -

We base the humidity comfort level on the dew point, as it determines whether perspiration will evaporate from the skin, thereby cooling the body. Lower dew points feel drier and higher dew point feel more humid. Unlike temperature, which typically varies significantly between night and day, dew point tends to change more slowly, so while the temperature may drop at night, a muggy day is typically followed by a muggy night.

Neem Ka Thana Range experiences extreme seasonal variation in the perceived humidity.

The muggier period of the year lasts for 4.1 months, from June 1 to October 5, during which time the comfort level is muggy, oppressive, or miserable at least 24% of the time. The month with the most muggy days in Neem Ka Thana Range is August, with 29.1 days that are muggy or worse.

The month with the fewest muggy days in Neem Ka Thana is January, with 0.0 days that are muggy or worse.

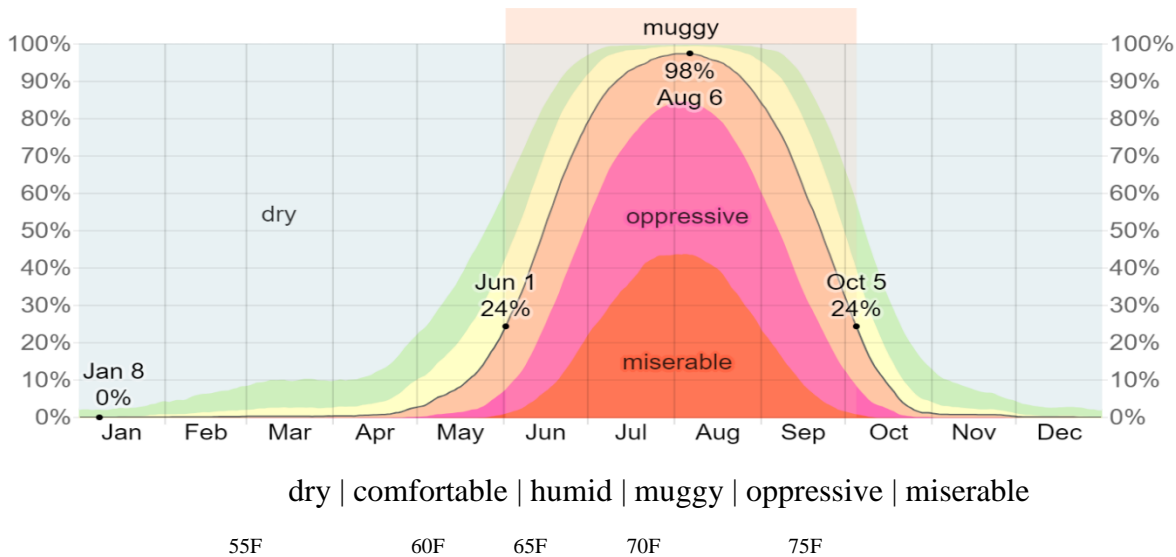


Fig. 8

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Muggy Days	0.0d	0.0d	0.1d	0.3d	3.1d	15.4d	28.4d	29.1d	18.3d	3.4d	0.2d	0.0d

Wind: -

This section discusses the wide area hourly average wind vector (speed and direction) at 10 meters above the ground. The wind experienced at any given location is highly dependent on local topography and other factors, and instantaneous wind speed and direction vary more widely than hourly average.

The average hourly speed in Neem Ka Thana experiences significant seasonal variation over the course of the year.

The windier part of the year lasts for 3.8 months, from April 13 to August 7, with average wind speed of more than 7.5 miles per hour. The windiest month of the year in Neem Ka Thana Range is June, with an average hourly wind speed of 9.3 miles per hour.

The calmer time of year lasts for 8.2 months, from August 7 to April 13. The calmest month of the year in Neem Ka Thana Range is November, with an average hourly wind speed of 5.4 miles per hour.

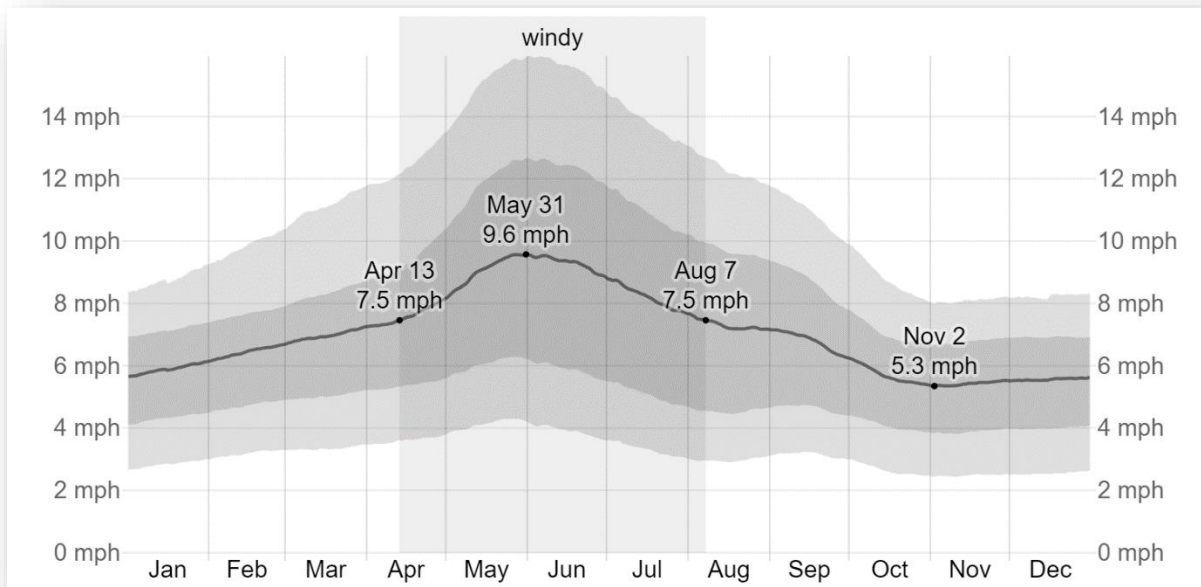


Fig. 9

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind Speed(mph)	5.9	6.4	7.0	7.6	9.1	9.3	8.2	7.3	6.8	5.7	5.4	5.6

The predominant average hourly wind direction in Neem Ka Thana Range varies throughout the year.

The wind is most often from the west for 6.4 months, from March 28 to October 8, with a peak percentage of 72% on May 28. The wind is most often from the north for 5.6 months, from October 8 to March 28, with a peak percentage of 49% on January 1.

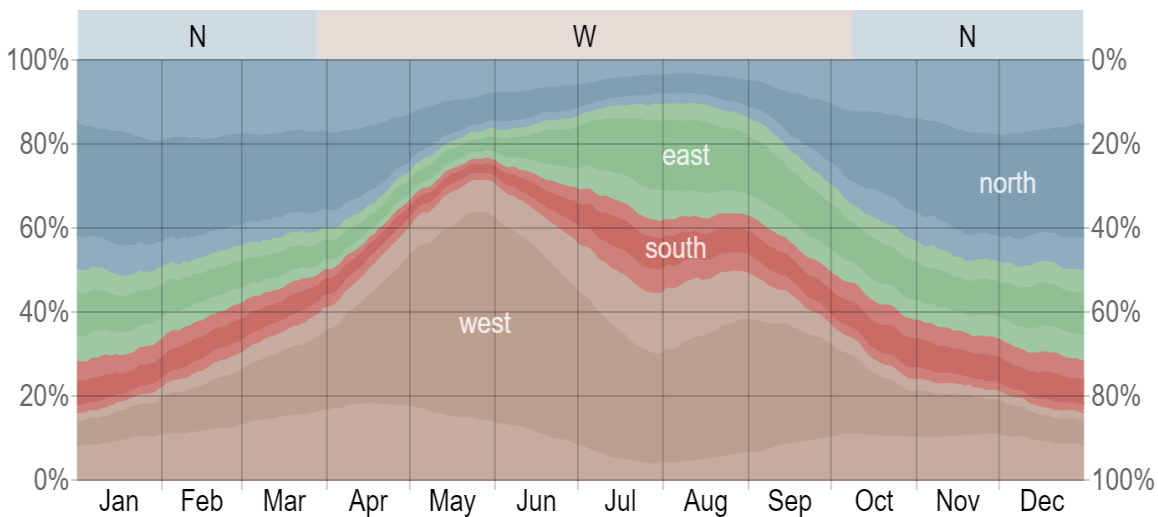


Fig. 10 (Wind Direction in Neem Ka Thana Range)

Water Resource

Main source of water for human as well as wildlife is rain water. And the rain water is sufficient only for 3-4 months up to Nov-Dec. Water is a limiting factor in this region. Reserve is also having a network of artificial water supply system. An underground storage tank with a good amount of capacity has been constructed and it is filled with water supplied by PHED system. Few water holes of the reserve are connected through pipe line networks. Water is pumped from this storage tank to different water holes during scarcity days.

Underground water of the area is at very low level. In the Neem Ka Thana Range there is main source of water is only rain water source. And in the reserve area of Neem Ka Thana there are no artificial water resources like electrified wells except one passing through this reserve area. As we know water is an essential and life saving thing for human as well as animals. The main source of water is rain, and well is also a source with is to be developed by the humans.

Floral Diversity

The study area falls under 5 tehsils of Neem Ka Thana Range: Neem Ka Thana, Patan, Sri Madhopur (formerly under Sikar district) and Khetri, Udaipurwati (formerly under Jhunjhunu district).

The major trees were Khejri (*Prosopis cineraria*), Babool (*Acacia nilotica*) and few shrubs of Bilayati baool (*Prosopis juliflora*) as dominant vegetation. Total 31 species of trees belong to 14 families are enumerated from the study area. Total 21 shrub species belong to 15 families are enumerated from the study area.

The dominant shrub community in this area was represented by *Prosopis juliflora*, *Calotropis procera*, *C. gigantea* (Akoda), Kaner (*Thevetia peruviana*), *Ipomoea fistulosa* and *Abutilon indicum*, etc. Total 24 herbaceous species belongs to 13 family were recorded from the study area. Total 5 species of climbers/ twiners belongs to 3 families are recorded from the area.

Among the enumerated flora in the study area, none of them were assigned any threat category by Red data book of Indian Plants. The most commonly spotted bird species of this area were Cattle Egret, Intermediate Egret, Red-wattled Lapwing, Rock Pigeon, Eurasian Collared-Dove, Spotted Dove, Chestnut-headed Bee-eater, Bank Myna and Common Myna.

The Indian Peafowl was observed which is listed as schedule –I as per IWPA, 1972 and others listed as schedule IV as per IWPA, 1972. The reptile, Common Garden Lizard, Common Indian Monitor, House Gecko and Fan-Throated Lizard, Rosebelly, Worm-eating Snake and Himalayan Wolf Snake were observed; Indian Cobra and Russell's viper were provided protection as per Schedule-II of Wild life Protection Act, (1972). Common Mongoose, Jackal and Monkey were observed which are protected under schedule II and Nilgai is Schedule-II animal as per Wildlife Protection Act 1972. Common Indian monitor is schedule-I as per Indian Wildlife Act and should be protected. Impact on wildlife due to mining activity is assessed along with mitigation measures.

Faunal Diversity

The Neem Ka Thana Range supports a variety of faunal groups including many unique faunal elements. The wild animals which are found in the Neem Ka Thana Range: - Reptile, Common Garden Lizard, Common Indian Monitor, House Gecko and Fan-Throated Lizard, Rosebelly Worm-eating Snake and Himalayan Wolf Snake. And the Indian Cobra and Russell's viper were provided protection as per Schedule-II of Wilf life Protection Act, (1972).

The Neem Ka Thana Range lies on the way of the passage of many migratory birds such as harriers. Commonly seen harriers are Cattle Egret, Intermediate Egret, Red-Wattled Lapwing, Rock Pigeon, Eurasian Collared-Dove, Spotted Dove, Chestnut-headed Bee-eater, Bank Myna and Common Myna. Other birds found in the Neem Ka Thana Range include House Sparrow, Demoiselle Cranes, Crested lark, King vulture, Cinereous vulture, and White backed vulture etc.

The Neem Ka Thana Range is a unique protected area which bears fair population of leopard in a small area. In the real sense it is a Leopard Reserve. The wild animals found in the Neem Ka Thana Range are Leopard, Chinkara, Fox, Jackel, Neelgay, Jungle Cat, Hare etc. Beside these animals there are many species, which migrate from other parts of the country during winter. Detailed accounts of the species found in the reserve area.

Migration Pattern of Animals

The wild animals exhibit phenomenon of local migration within the Neem Ka Thana Range and to neighbouring areas. The migration is mostly for water, but sometimes animals migrate for food also. During summer the wildlife migrates and confine near the water holes. The carnivores migrate outside the reserve area during night. Few migratory birds also visit the area and leave it again in late February. Migration of exotic fauna is regular phenomena in the reserve area.

Rearing Habits

In Neem Ka Thana Range there are few trees on the plane land. Grasses in certain scattered patches are found with low density. Due to these the herbivorous animals are face difficulties for their food and space for shelter. And also wild animals and other animals faces water scarcity in the summer season, because in the summer days the temperature goes very high that's why the water level goes down.

Conclusion

The aim of the present study was to assess the threatened ecosystem of the Neem Ka Thana Range. This Study provides a vista of the reserve area in term of its ecological. As the area is limited, a better management by the state forest department could be an initiative to protect the biological diversity.

This situation leads toward a serious question as how to manage their population? In the absence of large predators there is no natural check on their increasing population. This situation can threaten the ecological balance of the sanctuary. Due to overcrowding of the species, there is severe shortage of food during summer (required outside supply of fodder), frequent raiding of nearby agricultural fields during food shortage and mass mortality of the species in recent years as a result of weather shocks (in the form of drought or high temperature). Both outside supply of fodder and raiding of agricultural fields create problems for both forest department as well as local people. The population trend of species is increasing since last one decade with more then 4-5 per cent growth rate.

The Reserve area and its management staff are fully devoted to keep species population safe and healthy, and results are also showing their efforts. But at the same time, a serious and urgent need of present time is to increase the size of reserve area or shift few more plant, birds and animals species to similar nearby areas and make those areas as satellite part of this reserve area. Attempts should be done to keep these areas connected by a corridor for populations to migrate in between. Thus, some initiatives would be welcomed if government pays attention and will be helpful in maintaining the ecological balance of the region.

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