REPORT

BY

THE EXPERT COMMITTEE

ON

The Directions of Hon'ble NGT Order

Dated 07.11.2019 in OA No. 312/2016

(MA no. 2012/2019 & MA no. 227/2019)

For

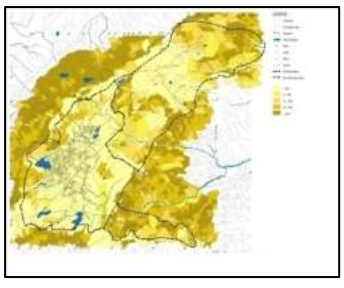
ECO-SENSITIVE ZONE

&

ZONAL MASTER PLAN-2030

for

MOUNT ABU, RAJASTHAN



December 2020

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CHAPTER 1

1.0 Background

Aravalli Hills, where Mount Abu is situated, are of peculiar beauty that is difficult to believe if one has seen only the sand dunes of Jaisalmer in Rajasthan. Considered as the 'oasis of the desert' for being home to some rivers, lakes, waterfalls, etc., this hill destination is respite from the scalding heat of Rajasthan which is around 66% desert.

Mount Abu area of Rajasthan has been notified as Eco-Sensitive Zone by MoEF&CC vide Notification S.O. No. 1545 dated 25.06.2009. The said Eco-sensitive Zone is situated between 24°33′ 42″ and 24°39′ 00″ North latitude and between 72°41′ 36″ and 72°48′ 06″ East longitude in Sirohi District of southern Rajasthan and the configuration of land is hilly and rugged with high altitudinal variation ranging from 300 meter to 1727 meter above mean sea level. Gurushikar, the highest peak of the Aravalli, is the highest peak between the Himalayas and the Nilgiris.

As detailed in the section 3(1) of the Notification S.O. No. 1545 dated 25.06.2009; A Zonal Master Plan for the Eco-sensitive Zone had to be prepared by the State Government within a period of two years from the date of publication of this notification and submitted for approval to the Central Government in the Ministry of Environment, Forests and Climate Change. Accordingly Zonal Master Plan duly approved by MoEF&CC was notified vide letter dated 28.09.2015

A public interest litigation (PIL) No 312/2016 Dt. 31.5.2016 was filed by Dr. Arun Kumar Sharma against Ministry of Environment, Forest & Climate Change in the Hon'ble National Green Tribunal, challenging the Zonal Master Plan of Mount Abu 2030. It states *"The notified ZMP 2030 is not consistent with the ESZ Notification dated 25.06.2009 in as much as the said plan fails to discourage construction activities at or near the heritage sites, conserve the existing water bodies, permits change of land use by illegal structures. Rock climbing has also been permitted, including sport climbing by fixing permanent anchors. Construction has been allowed on green tracks to benefit some builders."*

Main contention raised on behalf of the applicant is that comparison of land use plan annexed to Mount Abu ZMP for the year 2010 and the proposed land use plan annexed to the ZMP 2030 shows land use change which is inconsistent with the ESZ notification, 2009. In particular, reference has been made to the following points in the said plan:-

1. Inside Salim Ali Bird Sanctuary
2. Aranya Village

3. Behind Magan ji
4. Hill Sahil
5. Sunset Road Scheme
6. Sunrise Housing
7. Arna Village
8. Mohanpura
9. Hetam ji
10. Near STP Plant

1.1 Constitution of the Committee

In view of the above, the Hon'ble NGT vide its order no. M.A. No. 212/2019 & M.A. 227/2019 dated 7.11.2019 constituted a Special Expert Member Committee, which was assigned dual assignments of assessing the effect on environment and ecology due to project in question and activities in the Mount Abu at large. The Committee was to be of the following members:

1. An Expert of Ecology from G.B. Pant National Institute of Himalayan Environment, Almora, Uttarakhand to be nominated by the Director of Institute.
2. A senior Scientist from MOEF & CC, to be nominated by the Secretary, MOEF & CC.
3. A senior Scientist from the Indian Council of Forestry Research and Education, Dehradun
4. Senior Scientist from Wadia Institute of Himalayan Geology, Dehradun, to be nominated by the Director.
5. Scientist/ Senior official from the Central Pollution Control Board, New Delhi.
6. Representative of School of Planning and Architecture, New Delhi.
7. Member Secretary, Rajasthan Pollution Control Board, shall be a member and Nodal Officer, who shall ensure the compliance.

In follow-up to the above judgment, the concerned organization/department nominated the following members as the Expert Members, who subsequently attended the first meeting on 16th December 2019 at Conference Hall, Rajasthan State Pollution Control Board, Jaipur which was presided by Smt. Shailaja Deval, then Member Secretary, Rajasthan State Pollution Control Board being the Nodal Officer.

1. Dr. G.C.S. Negi, Scientist-G, G.B. Pant National Institute Himalayan Environment Almora, Uttarakhand
2. Sh. Pankaj Verma, Scientist-E, Senior Scientist from MOEF&CC, New Delhi

3. Dr. G. Singh, Scientist G & Head, Division of Forest Ecology & Climate Change/ Dr. Bilas Singh, AFRI, Jodhpur
4. Dr. K. Luirei, Scientist-E, Wadia Institute of Himalayan Geology, Dehradun
5. Sh. Ajay Aggarwal, A.D., Central Pollution Control Board, New Delhi
6. Dr. Meenkshi Dhote, School of Planning and Architecture, New Delhi

MoEF & CC vide its email dated 22.07.2020 has informed that Sh. Lalit Bokolia, Director, ESZ Division will be member of the committee on behalf of the Ministry instead of Sh. Pankaj Verma.

1.2 Mandate & Scope

In pursuance to the Hon'ble NGT orders, the mandate of the Committee is as below:

"The Committee will undertake comparison of ZMP 2030, in terms of letter of MoEF&CC dated 28.09.2015 and ESZ Notification dated 25.06.2009 and point out the aberrations in same besides comparing ZMP 2030 map with reference to pre-existing 2010 map in the light of ESZ notification. Thirteen (13) locations noted above must also be specifically looked into. The Expert Committee may also look into the suggestions relating to prohibiting use of plastics, burning of garbage/ or any other waste, proper laying of high tension lines for protecting animals and birds life particularly in Salim Ali Bird Sanctuary area, preventing forest fire, conservation of Nakki lake and water quality management, silting and operation of Solid Waste processing plant in accordance with Solid Waste Management Rules, 2016 (with reference to sanctuary area), any other issues relating to environment management which may become a part of ZMP 2030, including observations of this Tribunal in Kasuali case.

The Committee will also look into the points of concern raised by the applicant in reference to conversion of green areas to non-green areas, permissibility of construction on higher degree slopes, conservation of rocks, water bodies and wildlife and other heritage sites, the issue of water scarcity, carrying capacity of Mount Abu with regard to number of tourists and vehicles to be permitted having regard to the availability of the infrastructure without relying upon future projection, as required in terms of ESZ notification."

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Chapter 2

2.0 About the Study Area

According to the published report on 'Zonal Master Plan (ZMP) 2030 - Volume I, Mt. Abu ESZ, Govt. of Rajasthan' the Mount Abu Eco-Sensitive Zone (ESZ) consists of Mount Abu town and 12 villages (Jawai, Oriya, Achalgarh, Salgaon, Arna, Sanigaon, Goagoan, Hetamji, Delwara, Torna, Dhundai and Machgaon). Out of these 12 villages, 7 villages exist within municipal boundary, whereas 5 are outside the municipal boundary. The extent of ESZ lies between 24° 33′ 42″ N to 24° 39′ 00″ N latitude and 72° 41′ 36″ E to 72048′06″ E longitude. The ESZ spread over an area of 47.30 sq. km with a population of 24,242 persons in 2001 (Table 1). Present study has been carried out within the extent of Mt. Abu ESZ (i.e. bounding box created with above coordinate range). Two buffers (100 m & 200 m radius) have been formed around the 10 identified sites within ESZ.

Table 1

Population of Mount Abu eco-sensitive and municipality areas

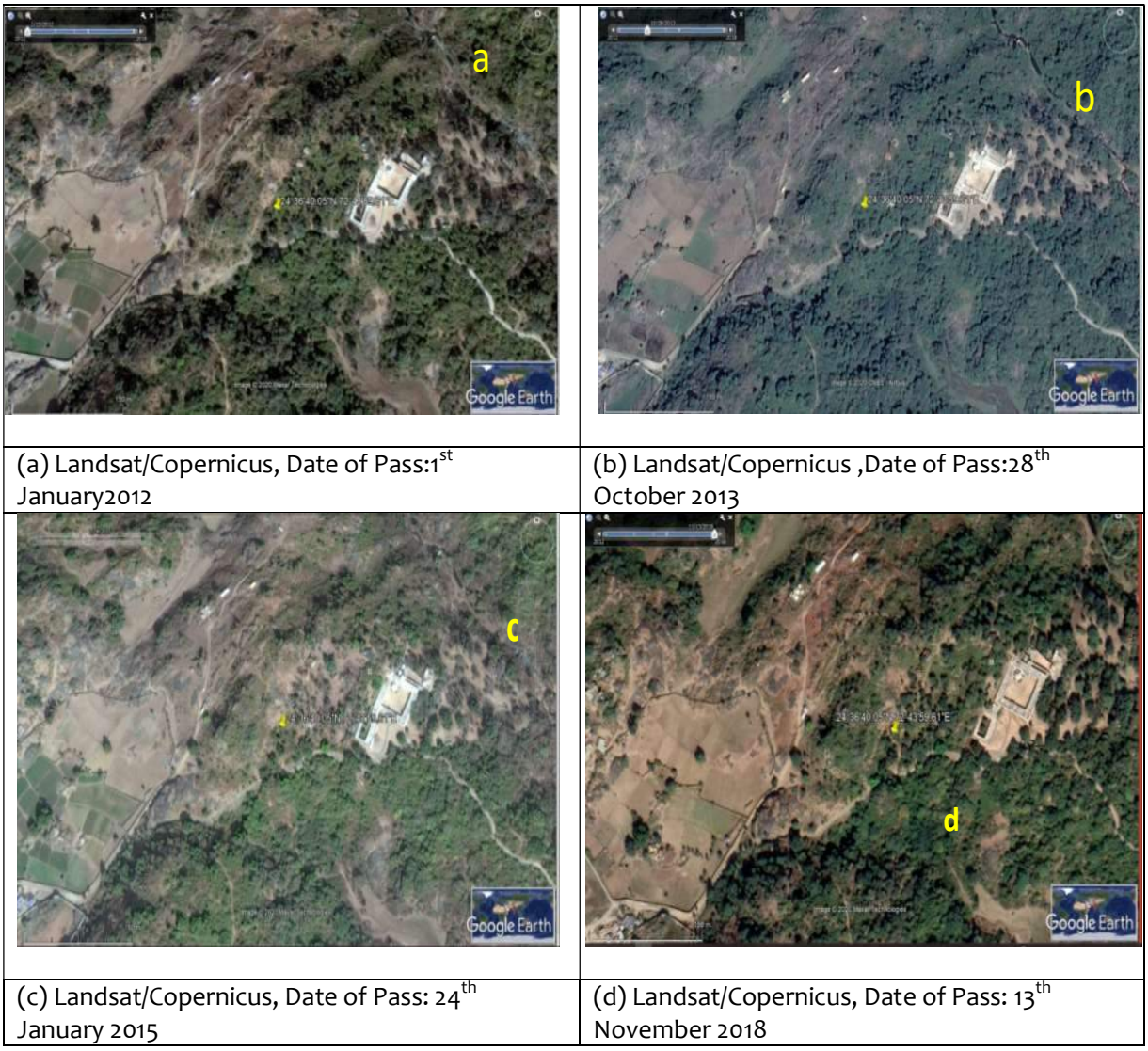
Study Area	Area (sq. km)	Population in 2001	Population in 2011 (as per Census of India)	Projected Population in 2030
Eco-Sensitive Area	47.30	24,242	NA	NA
Mount Abu Municipal Area	21.41	22,045	22,943	NA

Fig. 1: Location of Mt. Abu Eco-Sensitive Zone

(Source: ZMP2030 - Volume I, Mt. Abu ESZ, Govt. of Rajasthan)

2.1 Spatio-Temporal Changes at 10 Identified Points inside Mt. Abu ESZ as Viewed through Satellite Images

Land use refers to the purpose the land serves such as agriculture, recreation or wildlife habitat. Change in land use and land cover can be detected at the global to local scales by coarse to very high resolution sensors of various Earth-orbiting satellites. 10 identified points inside Mount Abu Eco-Sensitive Zone have been viewed through high resolution satellite images as available in Google Earth (Fig. 2 to Fig. 11). It appears from the satellite images that there exist a good to very good vegetation cover during the study period (2009 to 2020). Changes in land use are found to be insignificant after the notification issued by the Ministry of Environment, Forest and Climate Change dated 25.06.2009 which declared the Mount Abu as the Eco-Sensitive Zone (ESZ).



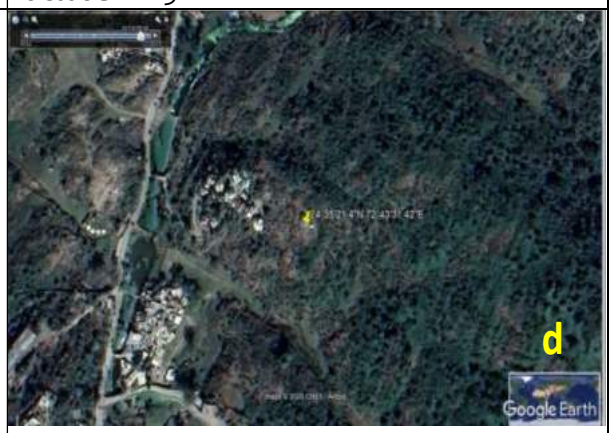
(a) Landsat/Copernicus, Date of Pass:1st January2012	(b) Landsat/Copernicus ,Date of Pass:28th October 2013
(c) Landsat/Copernicus, Date of Pass: 24th January 2015	(d) Landsat/Copernicus, Date of Pass: 13th November 2018

Fig. 2: Images for temporal changes in Salim Ali Bird Sanctuary area.

(a) Landsat/Copernicus, Date of Pass: 15th January 2012

(b) Landsat/Copernicus, Date of Pass: 28th October 2013

(c) Landsat/Copernicus, Date of Pass: 24th January 2015



(d) Landsat/Copernicus, Date of Pass:15th October 2018

(e) Landsat/Copernicus, Date of Pass: 28th April 2019

Fig. 3 : Images of temporal changes in next to Aranya Village area.

(a) Landsat/Copernicus, Date of Pass: 15th January 2012

(b) Landsat/Copernicus, Date of Pass: 28th October 2013

(c) Landsat/Copernicus, Date of Pass: 24th January 2015

(d) Landsat/Copernicus, Date of Pass: 15th October 2018

(e) Landsat/Copernicus, Date of Pass: 28th April 2019

Fig. 4: Images of temporal changes behind Maganji Mountain area

(a) Landsat/Copernicus, Date of Pass: 15th January 2012

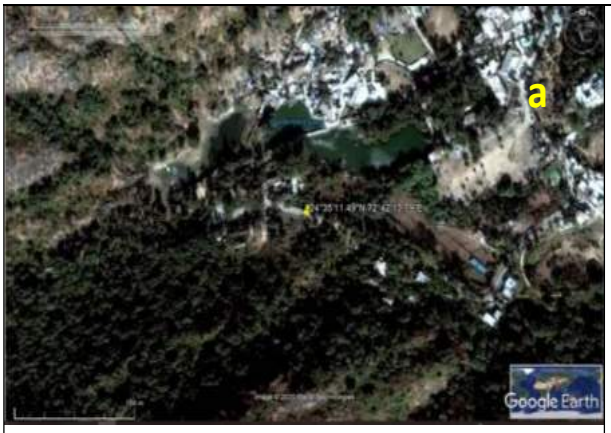
(b) Landsat/Copernicus, Date of Pass: 28th October 2013

(c) Landsat/Copernicus, Date of Pass: 24th January 2015

(d) Landsat/Copernicus, Date of Pass: 15th October 2018

(e) Landsat/Copernicus, Date of pass: 28th April2019

Fig. 5: Images of temporal changes in Hill Sahil area.



(a) Landsat/Copernicus, Date of Pass: 15th January 2012

(b) Landsat/Copernicus, Date of Pass: 28th October 2013

(c) Landsat/Copernicus, Date of Pass: 24th January 2015

(d) Landsat/Copernicus, Date of Pass: 15th October 2018

(e) Landsat / Copernicus, Date of Pass: 28th April 2019

Fig. 6: Images of temporal changes Sunset Road Scheme area

(a) Landsat/Copernicus, Date of Pass: 15th January 2012

(b) Landsat/Copernicus, Date of Pass: 28th October 2013

(c) Landsat/Copernicus, Date of Pass: 24th January 2015

(d) Landsat/Copernicus, Date of Pass: 15th October 2018

(e) Landsat/Copernicus, Date of Pass: 28th April 2019

Fig.7: Images of temporal changes Sunrise Housing Society area.

(a) Landsat / Copernicus, Date of Pass: 15th January 2012

(b) Landsat/Copernicus, Date of Pass: 28th October 2013

(c) Landsat/Copernicus, Date of Pass: 24th January 2015

(d) Landsat/Copernicus, Date of Pass: 15th October 2018

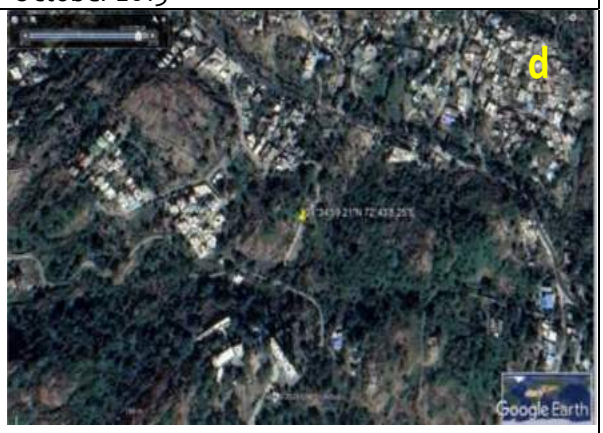
(e) Landsat/Copernicus, Date of pass: 28th April 2019

Fig. 8: Images of temporal changes Arna Village area.

(a) Landsat/Copernicus, Date of Pass: 15th January 2012

(b) Landsat/Copernicus, Date of Pass: 28th October 2013

(c) Landsat/Copernicus, Date of Pass: 24th January 2015



(d) Landsat/Copernicus, Date of Pass: 15th October 2018

(e) Landsat/Copernicus, Date of pass: 28th April 2019

Fig. 9: Images of temporal changes Mohanpura Village area.

(a) Landsat/Copernicus, Date of Pass: 15th January 2012

(b) Landsat/Copernicus, Date of Pass: 28th October 2013

(c) Landsat/Copernicus, Date of Pass: 24th January 2015

(d) Landsat/Copernicus, Date of Pass: 15th October 2018

(e) Landsat / Copernicus, Date of Pass: 28th April 2019

Fig. 10: Images of temporal changes Hetamji Village area

(a)Landsat/Copernicus, Date of Pass: 15th January 2012

(b). Landsat/Copernicus, Date of Pass: 28th October 2013

(c) Landsat/Copernicus, Date of Pass: 24th January 2015

(d) Landsat/Copernicus, Date of Pass: 15th October 2018

(e) Landsat / Copernicus, Date of Pass : 28th April 2019

Fig. 11: Images of temporal changes Near STP plant area.

2.1.1 Satellite Data Used

Satellite data of various spatial resolutions namely, Landsat (30 m), Sentinel 2 (10 m) and Cartosat-1 (2.5 m) have been analyzed for the period 2009 -2020. Maximum vegetation cover is generally found after the rainy season. Satellite data used include Landsat-5 (14th October 2009), Landsat-8 (15th October 2015), Sentinel 2B (25th October 2019), Sentinel 2B (18th January 2020).

Landsat has been designed and operated by NASA, USA. It provides moderate resolution multispectral data of the Earth's surface on a global basis. Landsat 8 satellite was launched in February of 2013 with a 16-day repeat cycle. Sentinel-2 has been developed, and is being operated by ESA (European Space Agency). It provides multi-spectral data (with 13 bands in the visible, near infrared, and short wave infrared part of the spectrum), revisiting every 5 days with spatial resolution of 10 m, 20 m and 60 m in various bands. Cartosat-1 was launched on 5 May 2005 by the Indian Space Research Organization (ISRO). It has two panchromatic cameras with 2.5 m spatial resolution to acquire two images simultaneously for near instantaneous stereo data.

2.1.2 Climate

Sirohi district is located on the eastern edge of semi-arid part of Rajasthan and therefore, the climate varies between dry and partially sub-humid. Maximum average temperature in this district is around 47°C during summer months of March to June and minimum average temperature is 1 °C in winters. The temperature during winter season drops significantly to the range of 0-5 °C. The monsoon season brings fairly good rains as indicated by the average annual rainfall of 797 mm in the district (average of last 15 years rainfall data, 2005-2019). The annual rainfall gradually decreases from southern part to northern part. The maximum average rainfall is 1488.6 mm at Mt. Abu. The annual rainfall gradually decreases from southern part to northern part. The district experiences either mild or normal drought once in two years. Severe type of drought has been recorded very rarely. On the whole district has dry climate. Maximum temperature is 47^{o}C and average temperature is 23^{o}C (Source: Indian Meteorological Department).

Table 3

Rainfall data in mm for last 15 years as per IMD

S. No.	Year	Annual Rainfall (mm)
1.	2005	774.31
2.	2006	1377.33
3.	2007	779.49
4.	2008	445.37
5.	2009	406.3
6.	2010	878.33
7.	2011	972.43
8.	2012	673.13
9.	2013	743.09
10.	2014	604.66
11.	2015	942.41
12.	2016	848.95
13.	2017	1340.51
14.	2018	353.44
15.	2019	824.23
Average		797.59

(Source: IMD)

2.1.3 Physical Profile

The Aravalli range is disconnected in south-western parts and spread in the form of cluster of hills in Sirohi district in Rajasthan and Banaskantha district in Gujarat. The prominent feature is the isolated hills mass of Abu. It has been separated from the main Aravalli range by the wide valley of west Banas River and a narrow plateau (6 km), nearly 1200 m above mean sea level. The elevation within the Mt. Abu sanctuary varies from 300 m at the foothills to 1722 m at Guru Shikhar, the highest peak in Aravallis, and the north western side exhibiting a sharp rise. Within the ESZ, altitudinal variation ranges from 700 m to 1700 m south to north. The town lies on the larger main plateau (1150 m elevation) but the villages like Oriya and Achalgarh are located on the elevated plateau (1400 m elevation) in the north.

According to ZMP 2030, the slope map of ESZ was prepared at 100 m contour interval. It shows the existing town and the villages are located on < 5% slope. The slope map of municipality area (with 20 m contour interval) displays that densely built up areas are limited to <5% slope. It has been suggested in ZMP 2030 that the areas with

- 0-10% slope-least sensitive, and suitable for development,
- 10-20% slope- marginally suitable for developmental activities like expansion of village settlements,
- 20-35% slope- only suitable for recreational spaces, lodges and hotels, and

- >35% slope- highly sensitive, and should be treated as restricted zone to be preserved in its pristine state.

Digital Elevation Model (DEM) is a 3D representation of a terrain. DEM generated from Cartosat-1 stereo data shows elevation variations (m) from 245 m to 1657 m above mean sea level (Fig. 12).Slope and aspect have been derived from the DEM, and represented in Fig. 13 &14. Area covered under various categories of slope within 100 m and 200 m radius buffer zones have also been calculated (Table 3 & 4)

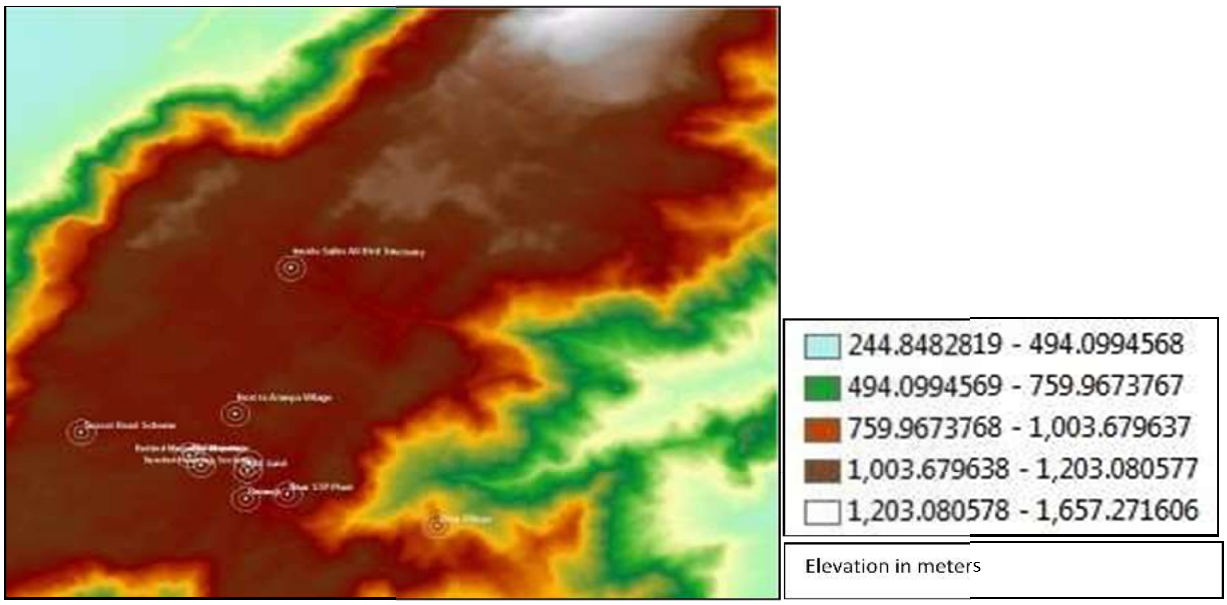


Fig. 12: Variation of elevation (m) of Mount Abu area.

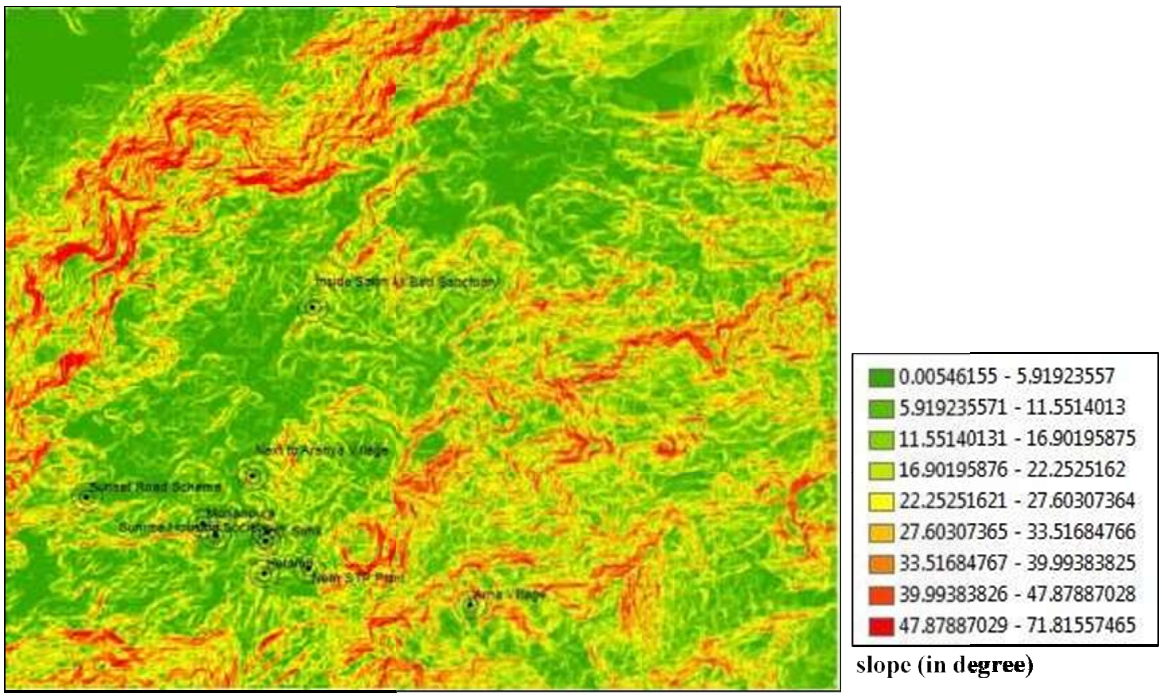


Fig. 13: Variation of slope (in degree) categories in Mount Abu area.

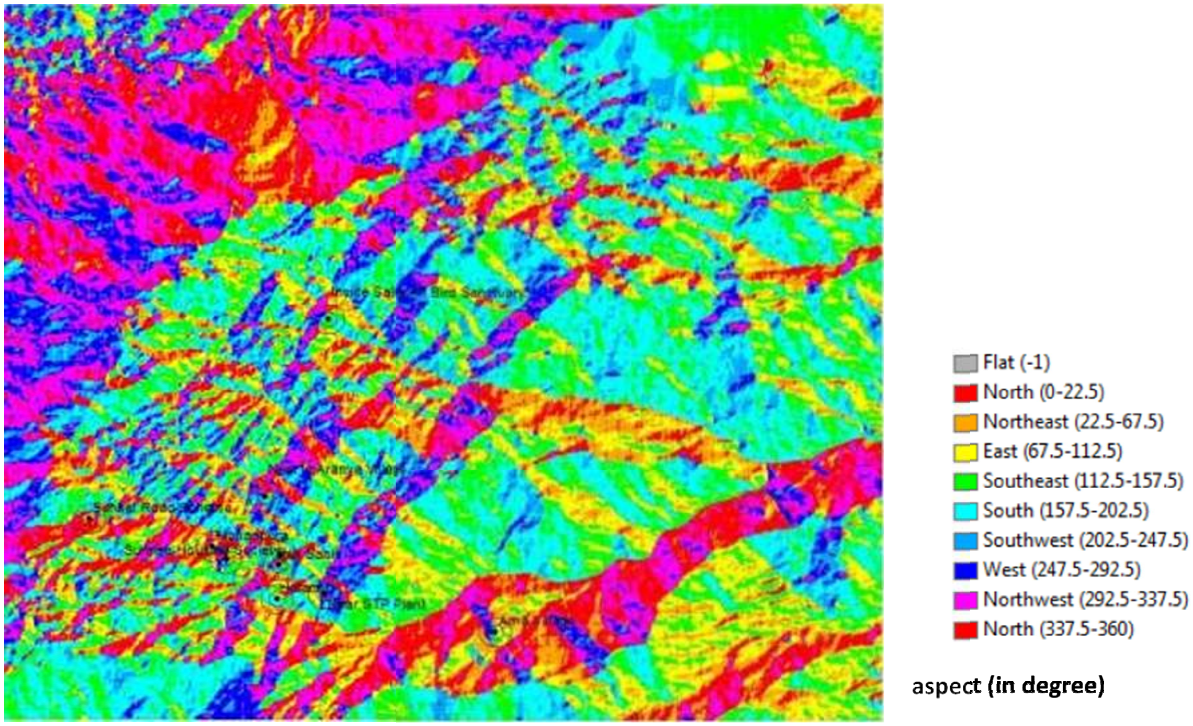


Fig. 14: Variation of aspect in Mount Abu area (in over 360 degree).

Table 3

Area (ha) under various slope categories (°) within 100 m buffer zones of different sites

Sl. No.	Name of the Site	Area undervarious slopecategories within100 mbuffer (ha)								
		0°-5°	5°-10°	10°-15°	15°-20°	20°-25°	25°-30°	30°-35°	35°-40°	>40°
1	Inside Salim Ali Bird Sanctuary	0.180	0.614	0.939	0.695	0.619	0.092	-	-	-
2	Next to Aranya Village	0.418	0.532	0.654	0.644	0.256	0.132	0.195	0.243	0.066
3	Behind Maganji's Mountain	0.944	0.872	0.666	0.312	0.260	0.086	-	-	-
4	Hill Sahil	0.580	0.868	0.972	0.544	0.176		-	-	-
5	Sunset Road Scheme	1.270	0.976	0.491	0.324	0.062	0.018	-	-	-
6	Sunrise Housing Society	0.148	1.098	1.161	0.638	0.093	0.000	-	-	-
7	Arna Village	0.503	0.666	0.798	0.594	0.279	0.168	0.130	0.002	-
8	Mohanpura	0.413	1.119	0.986	0.336	0.256	0.030	-	-	-
9	Hetam ji	0.398	0.801	0.523	0.719	0.482	0.140	0.050	0.026	
10	Near STP Plant	0.573	0.704	0.816	0.428	0.499	0.076	0.044	-	-

Table 4

Area under various slope categories (°) within 200 m buffer zones of different sites

Sl. No.	Name of the site	Area under various slope categories within 200 m buffer zone (ha)

		0°-5°	5°-10°	10°-15°	15°-20°	20°-25°	25°-30°	30°-35°	35°-40°	>40°
1	Inside Salim Ali Bird Sanctuary	0.840	3.001	3.394	2.075	2.434	0.701	0.119	-	-
2	Next to Aranya Village	1.427	2.498	3.551	3.298	0.890	0.309	0.274	0.252	0.066
3	Behind Maganji's Mountain	1.833	3.959	3.267	1.634	1.196	0.384	0.175	0.103	0.013
4	Hill Sahil	2.027	3.218	3.473	2.101	0.925	0.678	0.121	0.021	-
5	Sunset Road Scheme	3.361	3.286	1.831	1.570	1.140	0.756	0.454	0.166	-
6	Sunrise Housing Society	1.856	3.739	3.777	1.848	0.972	0.282	0.090	-	-
7	Arna Village	1.187	1.625	1.694	1.850	2.301	2.033	0.986	0.526	0.362
8	Mohanpura	2.179	3.445	2.899	1.785	1.121	0.654	0.372	0.098	0.011
9	Hetam ji	1.086	2.974	2.805	2.762	1.720	0.777	0.388	0.053	-
10	Near STP plant	1.550	2.386	4.219	2.553	1.439	0.255	0.163	0.001	-

2.1.4 Geological Inputs of Site-Specific Investigation

1. Objectives And Methodology

The township of Mount Abu is located in the Eco-Sensitive Zone (ESZ) of Sirohi District in the southern region of Rajasthan. This region is hilly and rugged with altitudinal variation ranging from 300 m to 1727 m. Therefore, any developmental projects must be implemented carefully so that the risk of loss of life and property associated with natural hazards should be minimum. Furthermore, the risk related to natural hazards in any area is in the direct link to the carrying capacity.

Therefore, the site-specific investigations have been carried out considering the following objective as per the norms of the ESZ zone to assess the possibility of the hazard in the investigated sites and to present the recommendations for minimizing the risk of lives and property.

2. Geological Set up of Mount Abu

Geologically, Mount Abu represents batholiths (Fig. 15). It means it is a big body of granitic rocks, made up of magma which cooled deep in the subsurface. The primary rock types in the Mount Abu batholiths are medium-grained granites and granite gneisses. Rhyolites and mafic dikes intrude them at places. Both of the granitoid types are co-magmatic, i.e., related to a single event of magmatism that happened in the Earth's history at ~780-750 million years ago. This magmatism is popularly known as Malani Magmatism (Malani Igneous Suite). The granite rocks in the Mount Abu batholith are

characterized as felsic igneous rocks, i.e., the magma of these rocks is enriched in silica, aluminum, and potassium. The rocks of Mount Abu are surrounded by older rocks of Sirohi Group that is in juxtaposition with the Mesoproterozoic Delhi Supergroup (more than 1000 Ma old) in the east and 873-800 Ma older Erinpura granites in the west. In the visited sites, the granitic rocks are massive (i.e., lacking any internal structures), hard, and tough. Although strength-wise, these bedrocks, in general, are suitable for constructional activities provided, the construction shall be performed on stable slopes (less than the angle of repose) and have thin soil covers. Thus, each site was inspected by considering these factors so that the risk of loss of lives and property is minimized.

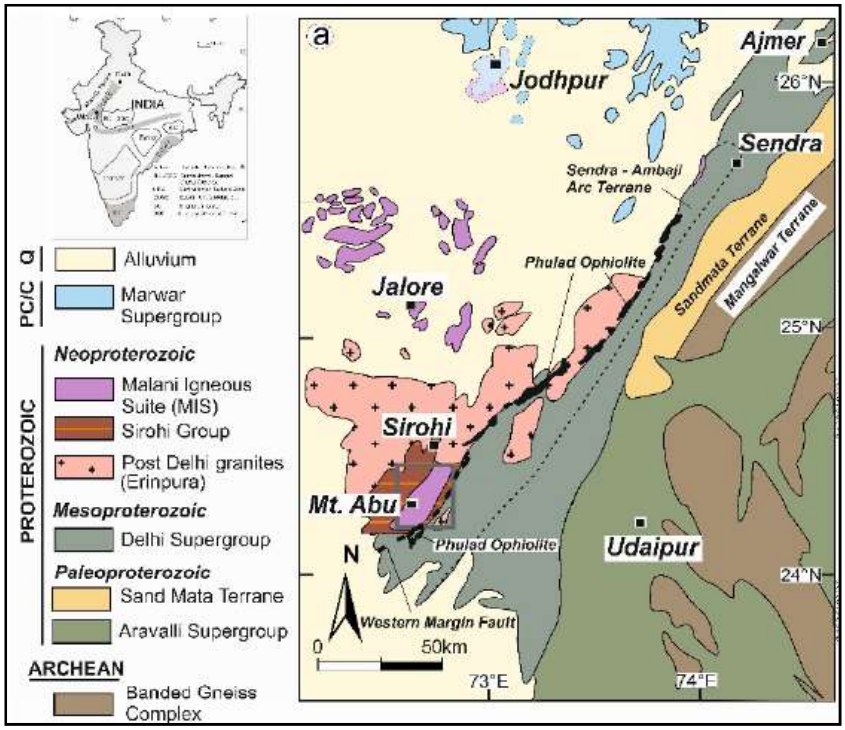


Fig. 15: Simplified geological map of the Mount Abu and surrounding regions along with the Lithostratigraphy.

(Source: Journal Geological Society of India, vol. 87, 2016, pp. 35-42)

3. Hazard Profile of Mount Abu

The ESZ of Mount Abu lies in the seismic zone II in the Seismic Zonation (hazard) Map of India, as shown in Fig 16. This Zone II means that the ESZ of Mount Abu is a tectonically stable region, and the risk associated with the earthquake hazard is low. Seismically, the surrounding areas of Sirohi District and the overall state of Rajasthan are one of the least vulnerable regions in India. Mostly, all the earthquakes in this region are low to moderate magnitude (Fig. 17). The seismicity is mainly due to the continued convergence to the Indian plate towards Tibet. The seismic Zonation based on the record of earthquakes suggests that the ESZ of Mount Abu is a low-risk zone.

Although the region of ESZ of Mount Abu is seismically stable, the area is susceptible to landslides and related mass movement phenomena, including rock fall due to its terrain and steep slopes at places.

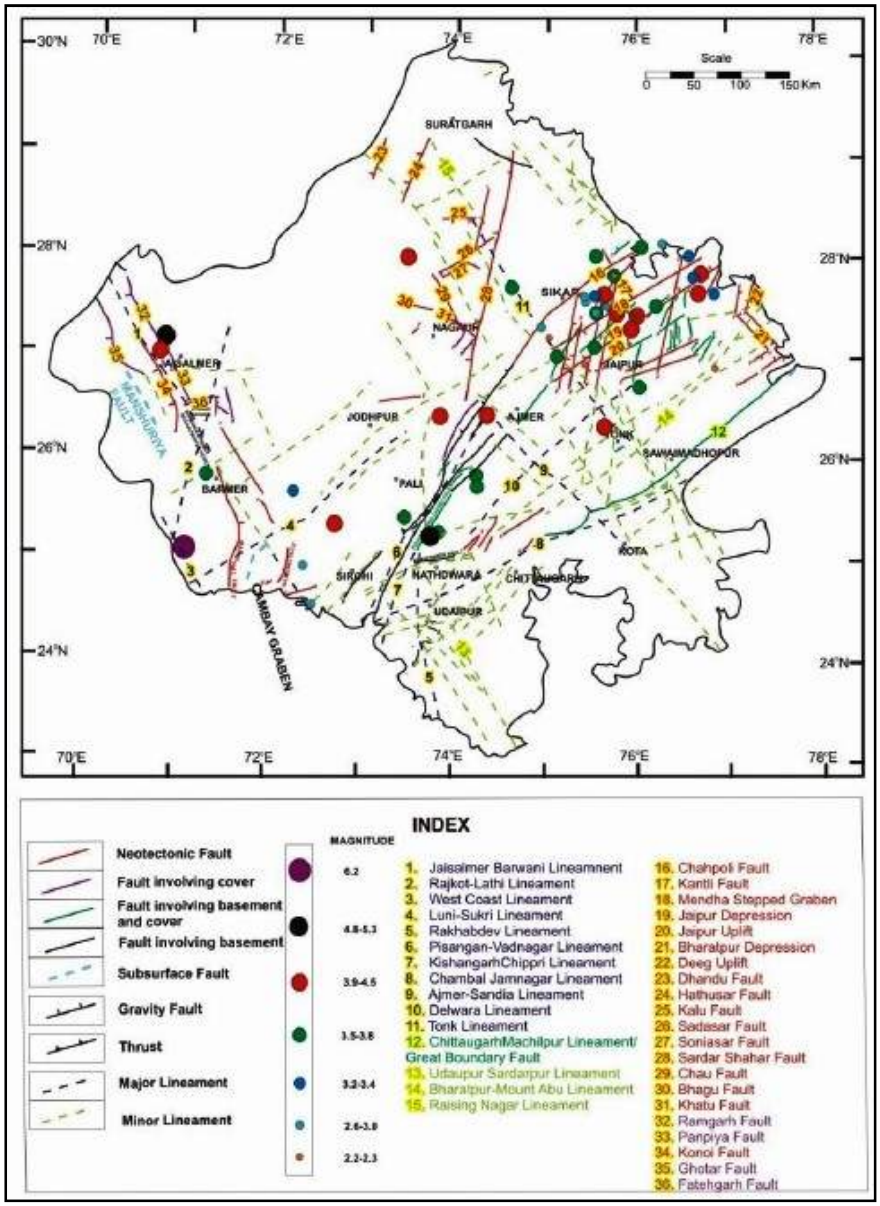


Fig 17: Map of Rajasthan showing an overlay of Lineaments, Faults and Earthquake occurrences during last 15 years

(Source: Kumar and Pandit, 2020, Iranian Journal of Earth Sciences, Vol. 12, No. 1, 2020, p. 1-9)

4. Field Observations

The site-specific investigations have been carried out at ten sites namely Inside Salim Ali Bird Sanctuary, Aranya Village, Behind Maganji's, Hill Sahil, Sunset Road Scheme, Sunrise Housing Society, Arna Village, Mohanpura, Hetamji, Near STP Plant. The site-wise inputs

considering the objectives mentioned above, as per the norms of the ESZ zone, are given below:

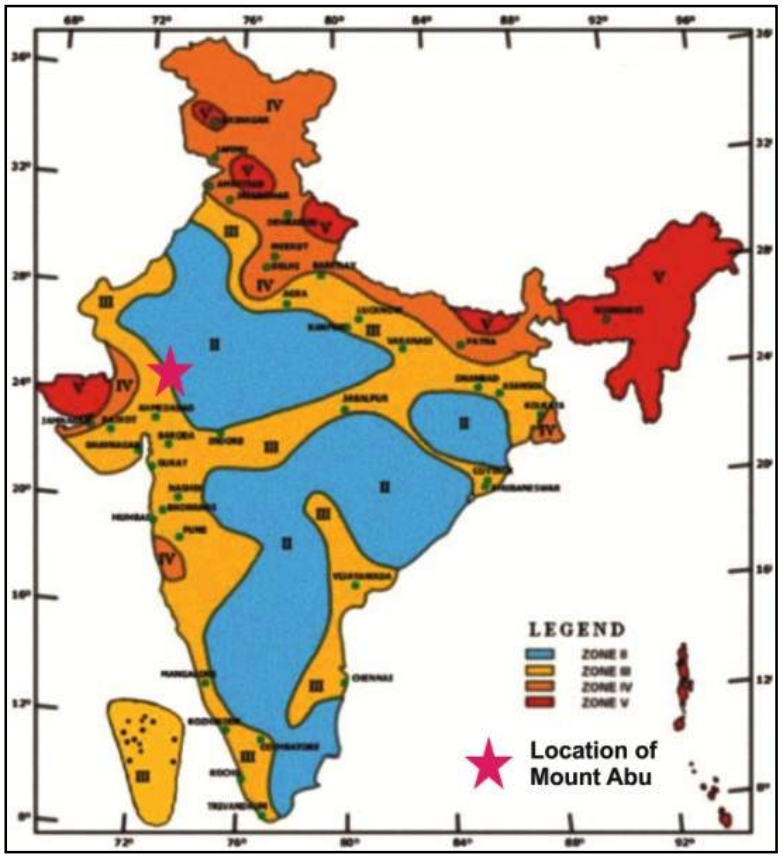


Fig. 16: Location of Mount Abu in the zone II of the Seismic Hazard Zonation Map of India.
(source: Bureau of Indian Standards, 2002)

This must be monitored by the body of the local state government. The site is also close to the habitat of the wild animals. Thus, a proper buffer zone per the norms of ESM must be considered during any construction.

Before the start of the construction at the suitable sites, the approval from the local State Ground Water Board must be ensured for the supply of the water considering the carrying capacity.

Site Specific observations:

S. No.	Location	Observation
1.	Inside Salim Ali Bird Sanctuary	This site is considered for the residential buildings in the ZMP 2030. The location is N 24°36' 40.05"; E 72° 43' 59.61" (± 5m). This site is having slope mostly greater than 20 degree. This land is fragile in terms of soil cover and more prone to erosion. The site is highly vegetated and lies adjacent to the forest block and Mount Abu

S. No.	Location	Observation
		Sanctuary (Fig. 18).
2.	Aranya Village	This site is considered for residential buildings in the ZMP 2030. The location is N 24°35' 21.40"; E 72° 43' 31.42" (± 3m). Although this site is having a slope mostly less than 20 degree and is stable in terms of erosion (Fig. 19a). Soil cover is thin and intact (Fig. 19a). Geologically, the site may be suitable for proposed construction as the basement rock is massive Granite. But, the location lies at the top of the hillock (Fig. 19b), and the approach to the site covers the steep slope of >20°-30°. Approach road has to be constructed in the steeper slopes (>20°-30°), and this may destabilize the surrounding area where already houses are existing. The triggering of any type of landslide due to constructional activity may pose danger to the lives and property of the residents. It also seems a lot of electrical energy will be consumed to fulfill the needs of the water supply for a longer span of lifetimes at this location due to the limited source of water supply in the ESZ zone of Mount Abu. Even the scope for sewage and solid waste disposal is also limited.
3.	Behind Magan Ji's	This land has been described as residential/commercial in the ZMP 2030 (GPS location N 24°34'53.79"; E 72° 43' 14.15"; ± 3m). Geologically, the slope at this location is less than 20 degree. The rock type at this location is massive granite, and the soil cover is very thin (Fig. 20). Thus, this site is stable and less prone to any erosion. This site is owned by the municipal council of Mount Abu and is within the developed area falling in the municipal limits.

S. No.	Location	Observation
4.	Hill Sahil	This land is described as residential in the ZMP 2030 (GPS location N 24°34'50.77"; E 72° 43' 37.53"; ± 3m). The slope at this location is mostly steep (> 30 degree) (Fig.21a). Most of the land at this is highly vegetated and fragile in terms of soil cover (Fig. 21a) even at places where the slope is gentle (Fig. 21b).
5.	Sunset Road Scheme	This land is described as residential in the ZMP 2030 (GPS location N 24°35'11.49"; E 72° 42' 13.79"; ± 3m). This site has a slope of less than 20 degree and is stable with the granite as basement rock. This site is partly built-up. This site is close to the forest land. Therefore, the ESZ criteria of a buffer zone with forest and water stream must comply before the start of any construction activity.
6.	Sunrise Housing Society	This site is described as residential in the ZMP 2030 (GPS location N 24°34'55.26"; E 72° 43' 38.12"; ± 3m). The site lies adjacent to the already existing houses (Fig. 22a). The slope at this site is mostly less than 20 degree (Figs. 22a-22c). The basement rock is granite and is well exposed at this location with very thin soil cover (Fig. 22a-22d). The site is near a local natural stream (*Nala*). Therefore, the ESZ criteria of the buffer zone with water stream and forest must be complied before any constructional activity as per norms.
7.	Arna Village	This site is proposed for the residential buildings and lies adjacent to the already existing houses (Fig. 23). The location is N 24°34' 21.32" (± 3m). This site is having slope of less than 20 degree and is stable in terms of erosion. Soil cover is thin and intact. At present, the land is vacant and is also well connected with the Abu Road-Mount Abu road.
8.	Mohanpura	This site is described as residential as well as commercial in the ZMP 2030 (GPS location N 24°34'35.72"; E 72° 43' 36.81"; ± 3m). The slope is mostly less than 20 degree at this site (Figs. 24a and b). The soil

S. No.	Location	Observation
		cover is thin, and the basement rock granite is well exposed at this location (Figs. 24a and b). The site is less prone to any natural geological hazard.
9.	Hetam Ji	This site is considered for residential settlement for the expansion of the local population in the ZMP 2030. At this site two domains of the landscape have been identified (I) domain with of low slopes having slopes <20 degree that is geologically stable and suitable for construction (Fig. 25a) and the domain with high slopes (that even reach >30 degree) that is not geologically unstable for construction (Fig. 25b). The areas with the steep slopes are also rich in vegetation with thick soil covers making the landscape more prone to erosion and instability. The domain with low-slope that lies adjacent to the Abu Road-Mount Abu road cut may be permitted for construction based on geology (Fig. 12a). But, this domain of low slope is covered with the luxuriant growth of natural Phoenix sylvestris (Khajoor Tree) and any construction shall lead to deforestation caused by felling of these trees. This act of deforestation may spoil the ecosystem of this region.
10.	Near STP Plant	This site is considered for the (i) tourism center (ii) residential buildings in the ZMP 2030. The tourism center is proposed at a land where the slopes are less than 20° and are geologically stable. But, the proposed site for residential buildings covers the land of low slopes that are geologically stable (Fig. 26a) as well as the land with a high slope domain that is not geologically stable for construction (Fig. 26b). At this site, the bedrock is hard and compact with negligible weathering. In the stable slope region, no prominent fractures/joints are developed that may cause instability. .

Fig.18 Site of Inside Salim Ali Bird Sanctuary showing high vegetation and thick soil cover.

Fig. 19 Site of Aranya Village showing (a) less slope with granite basement, (b) location is at the hillock showing that the constructional activity for the approach road at slope >20-30° or even at the stable slope zone may trigger a landslide and may pose danger to the lives of people and properly of local existing residents.

Fig.20 Location of Behind Maganjis showing the topography with less slope and thin soil cover and exposure of granite at places.

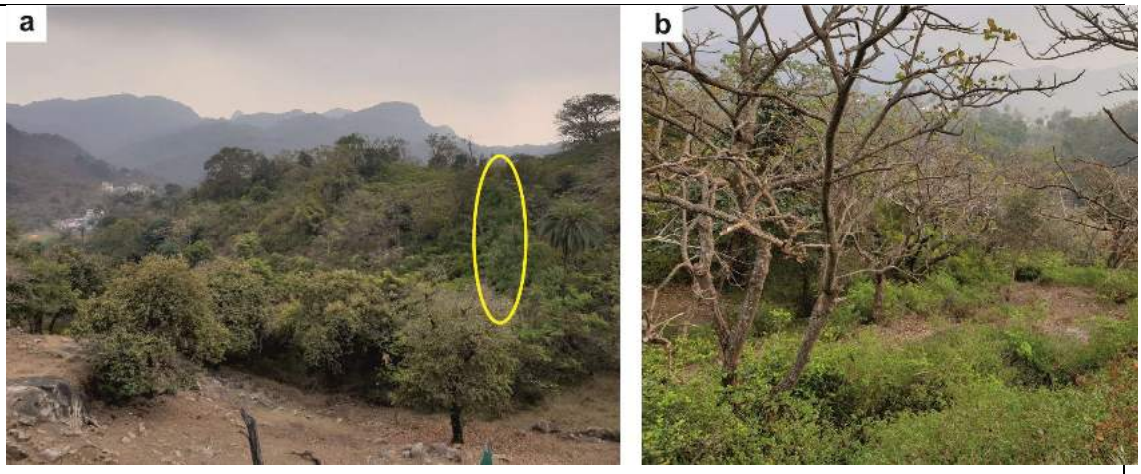


Fig.21 (a) Location of Hill Sahil showing the high-slope (>30 degree) topography; ellipse representing the steepness of the slope; (b) Highly vegetated topography along with thick soil cover at places where the slope is comparatively less.

Fig 22. (a) Location of Sunrise Housing Society adjacent to the already existing houses (a-c) gentle slope at this site is mostly less than 20 degree (d) basement rock granite and is well exposed at this location with very thin soil cover (a-c).

Fig. 23 Proposed site of Arna Village in the Zonal Master Plan 2030.

Fig 24 Mohanpura location showing the well exposed granitic basement with the low slope and thin soil cover in both figures (a) and (b).

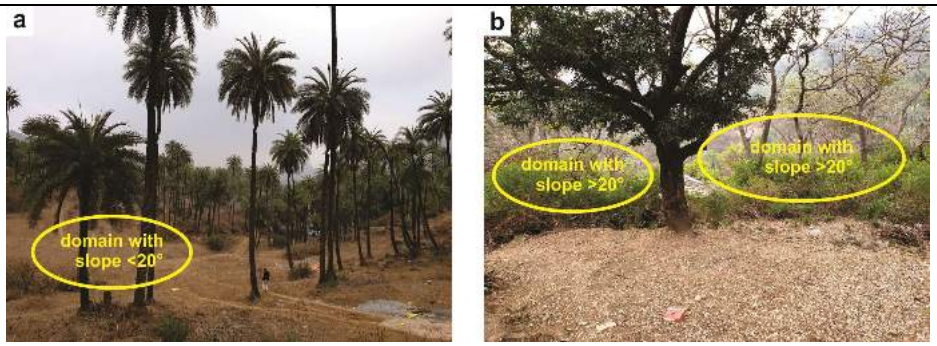


Fig. 25 Site of Hetamji (a) The low slope domain suitable for construction (b) Hillock having slope >20 degree.

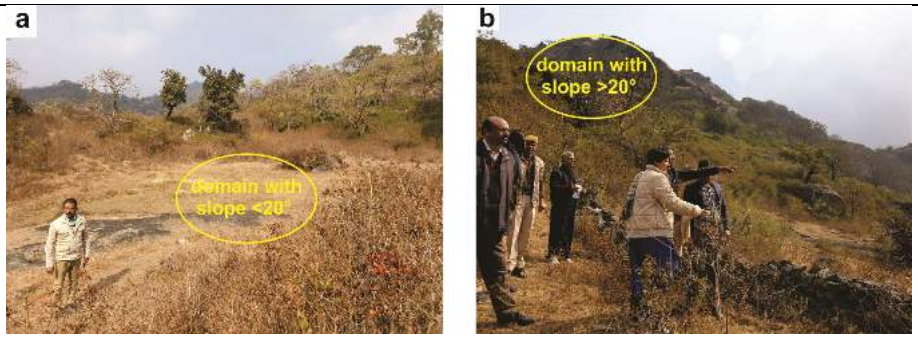


Fig. 26 Proposed site for construction near STP Plant. (a) The low slope stable domain suitable

for construction (b) Hillock having unstable slope >20-30 degree.

2.1.5 Vegetation Cover/Density

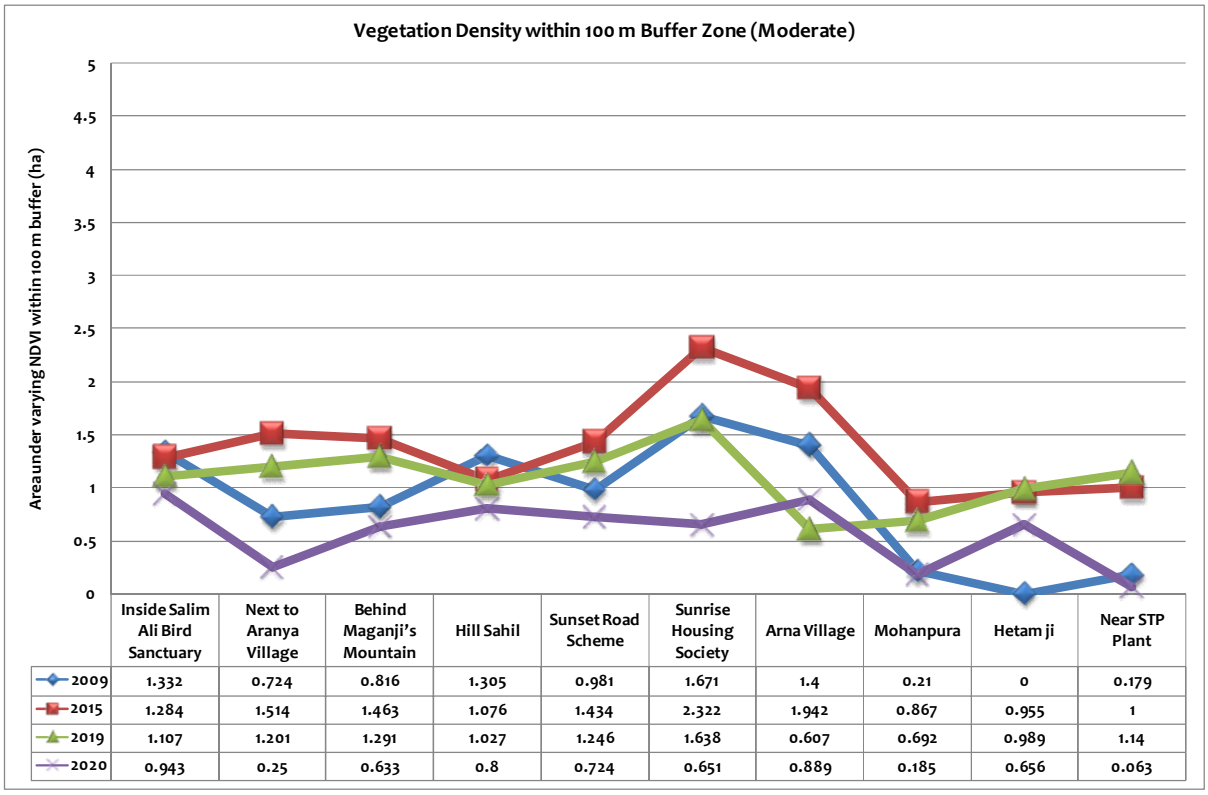
Land use/land cover change over a time period can be measured reliably through the use of remote sensing satellite data. A multispectral satellite image consists of several bands of data. Each band of the image may be displayed as one band at a time as a grey scale image, or in combination of three bands at a time as a colour composite image for visual display. If a multispectral image consists of the three visual primary colour bands such as red, green and blue, the three bands may be combined to produce a "true colour" image. False Colour Composite (FCC) scheme for displaying multispectral image includes combination of R (NIR band), G (red band) and B (green band). FCC allows vegetation to be detected readily in the image. In this FCC, vegetation appears in different shades of red depending on the types and conditions of the vegetation, which has a high reflectance in the NIR band. Clear water appears dark-bluish (higher green band reflectance), whereas the turbid water appears cyan (higher red reflectance due to sediments) compared to clear water. Bare soils, roads and buildings may appear in various shades of blue, yellow or grey, depending on their composition. NDVI was also used to assess the density/ vegetation cover of the region.

NDVI imply "Normalized Difference Vegetation Index". It is computed by the formula:

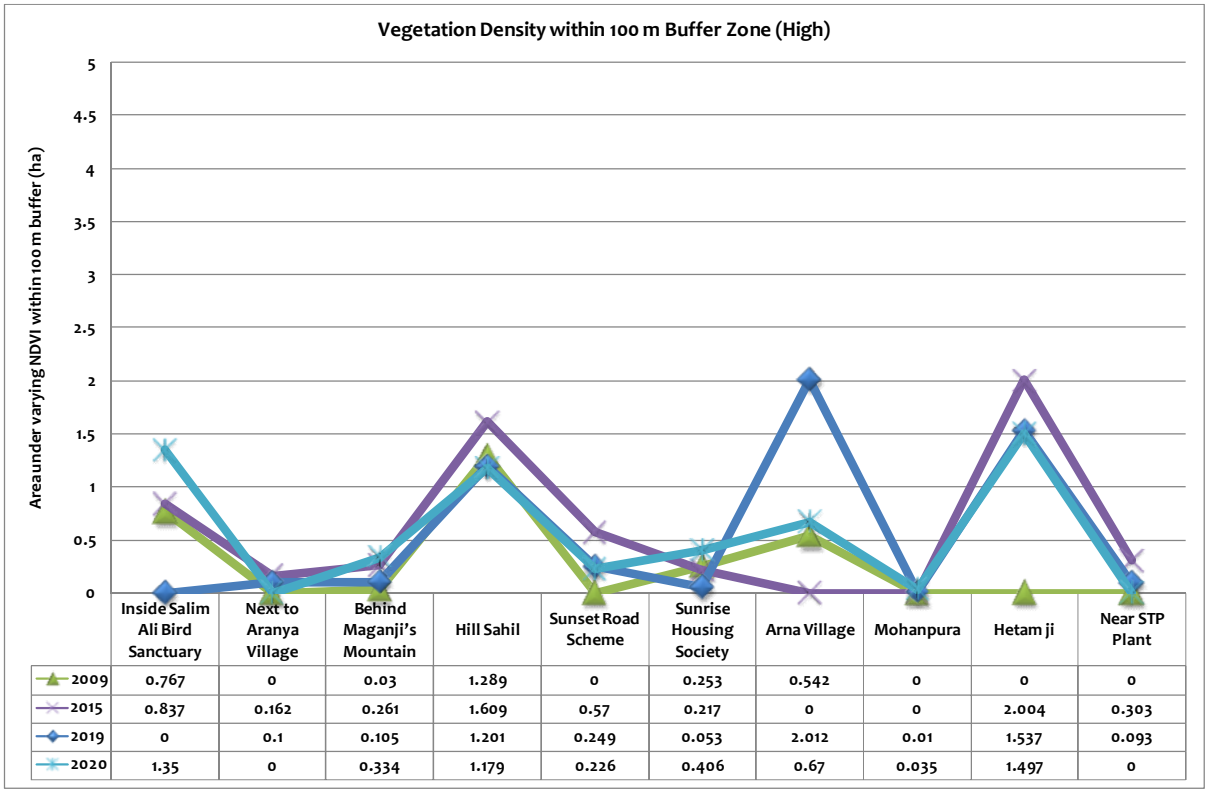
$$NDVI = (NIR - Red) / (NIR + Red)$$

It is based on the fact that chlorophyll absorbs strongly the red wavelength (R) and reflects strongly near infrared (IR) light. So the greener (or more vigorous) is the vegetation, the bigger will be the Index (closer to 1). False Colour Composite (FCC) and NDVI variation in different years are given in Figure 18. Area covered under various categories of NDVI within 100 m and 200 m radius buffer zone around each disputed site has been calculated (Figure 27a & 27b).

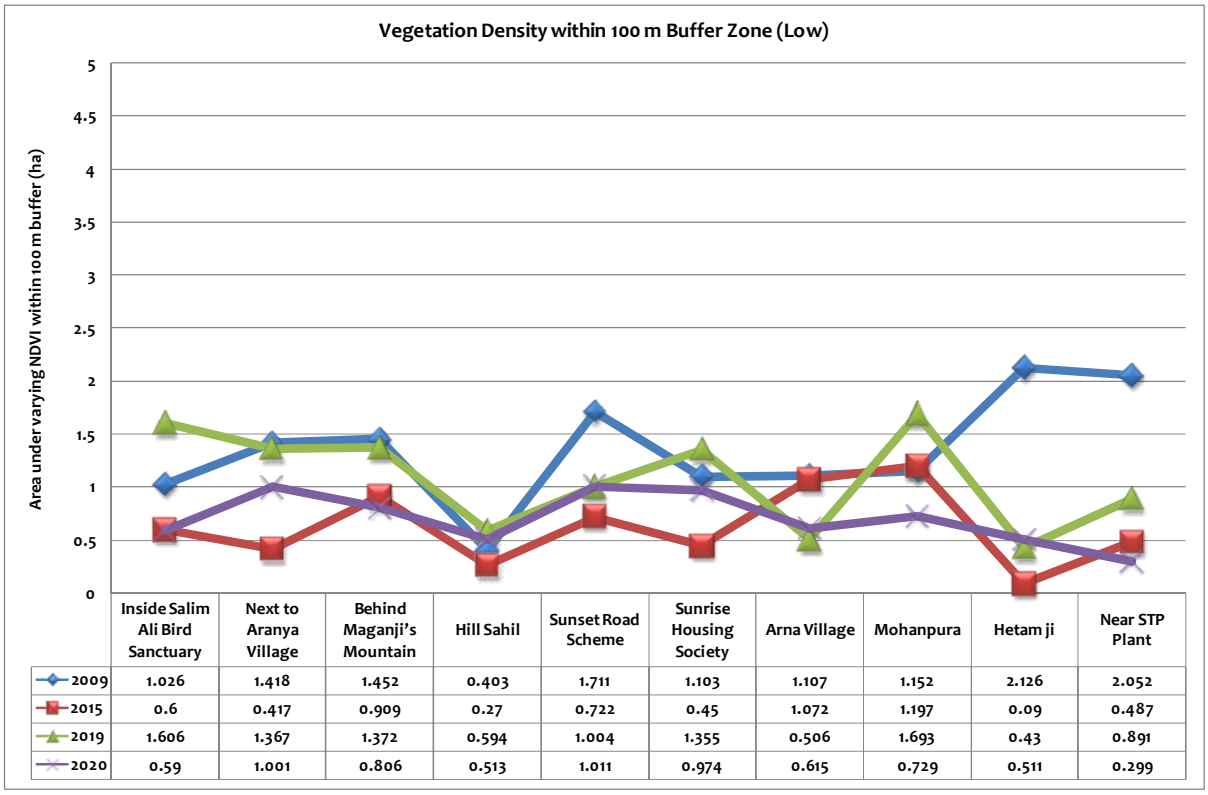
Table 27 a:
Area under varying vegetation density within 100 m buffer zone of different villages



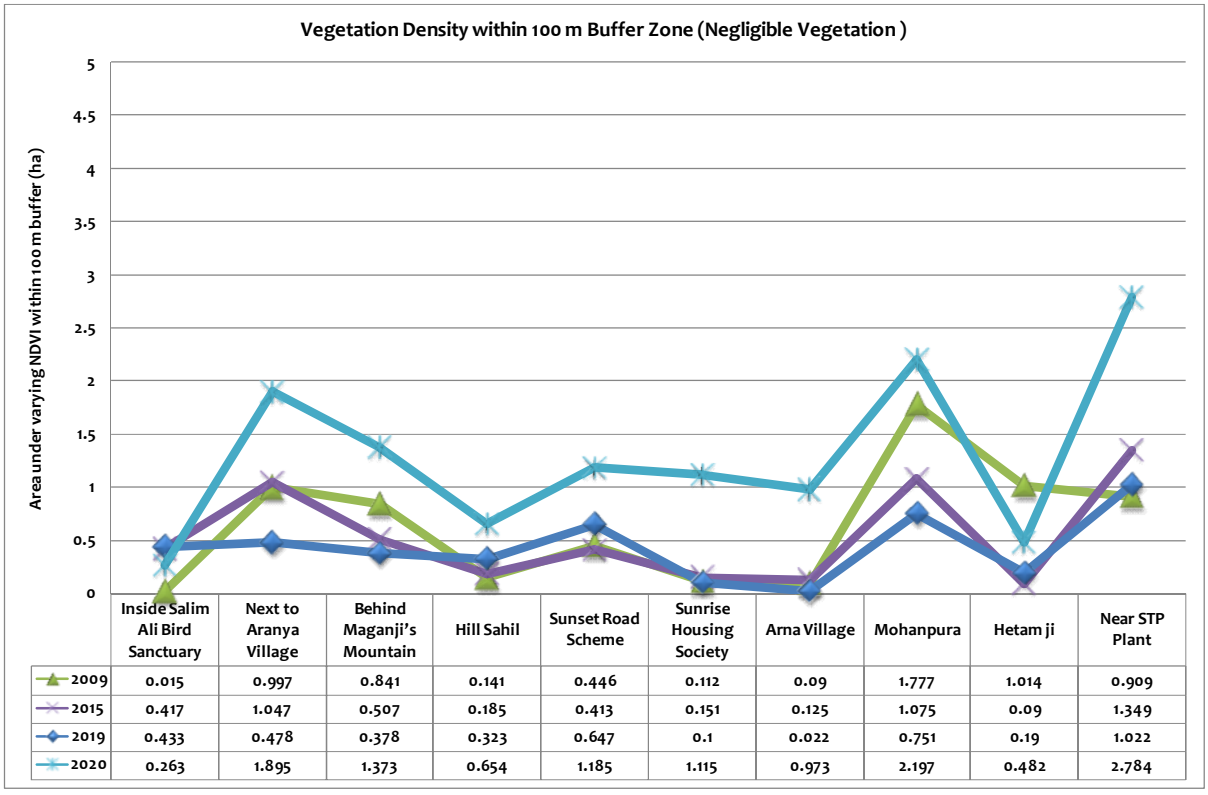
	Inside Salim Ali Bird Sanctuary	Next to Aranya Village	Behind Maganji's Mountain	Hill Sahil	Sunset Road Scheme	Sunrise Housing Society	Arna Village	Mohanpura	Hetam ji	Near STP Plant
2009	1.332	0.724	0.816	1.305	0.981	1.671	1.4	0.21	0	0.179
2015	1.284	1.514	1.463	1.076	1.434	2.322	1.942	0.867	0.955	1
2019	1.107	1.201	1.291	1.027	1.246	1.638	0.607	0.692	0.989	1.14
2020	0.943	0.25	0.633	0.8	0.724	0.651	0.889	0.185	0.656	0.063



	Inside Salim Ali Bird Sanctuary	Next to Aranya Village	Behind Maganji's Mountain	Hill Sahil	Sunset Road Scheme	Sunrise Housing Society	Arna Village	Mohanpura	Hetam ji	Near STP Plant
2009	0.767	0	0.03	1.289	0	0.253	0.542	0	0	0
2015	0.837	0.162	0.261	1.609	0.57	0.217	0	0	2.004	0.303
2019	0	0.1	0.105	1.201	0.249	0.053	2.012	0.01	1.537	0.093
2020	1.35	0	0.334	1.179	0.226	0.406	0.67	0.035	1.497	0

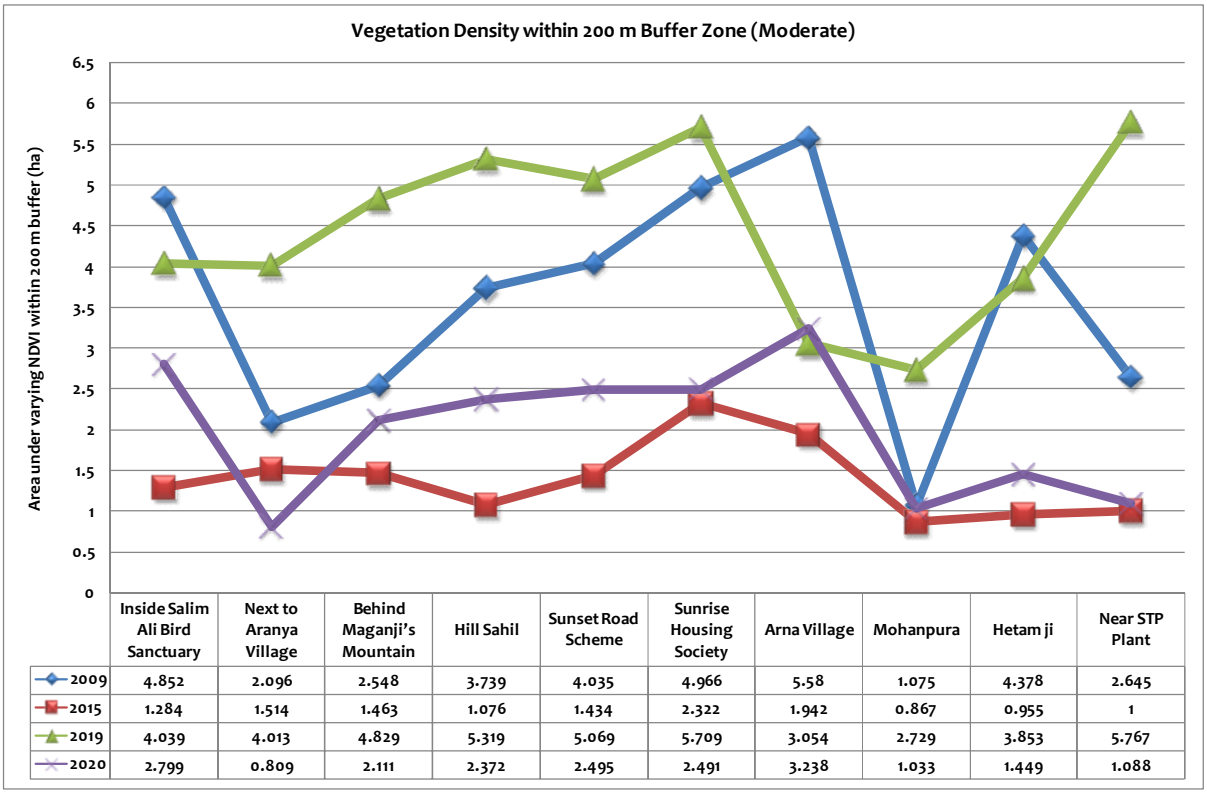


	Inside Salim Ali Bird Sanctuary	Next to Aranya Village	Behind Maganji's Mountain	Hill Sahil	Sunset Road Scheme	Sunrise Housing Society	Arna Village	Mohanpura	Hetam ji	Near STP Plant
2009	1.026	1.418	1.452	0.403	1.711	1.103	1.107	1.152	2.126	2.052
2015	0.6	0.417	0.909	0.27	0.722	0.45	1.072	1.197	0.09	0.487
2019	1.606	1.367	1.372	0.594	1.004	1.355	0.506	1.693	0.43	0.891
2020	0.59	1.001	0.806	0.513	1.011	0.974	0.615	0.729	0.511	0.299

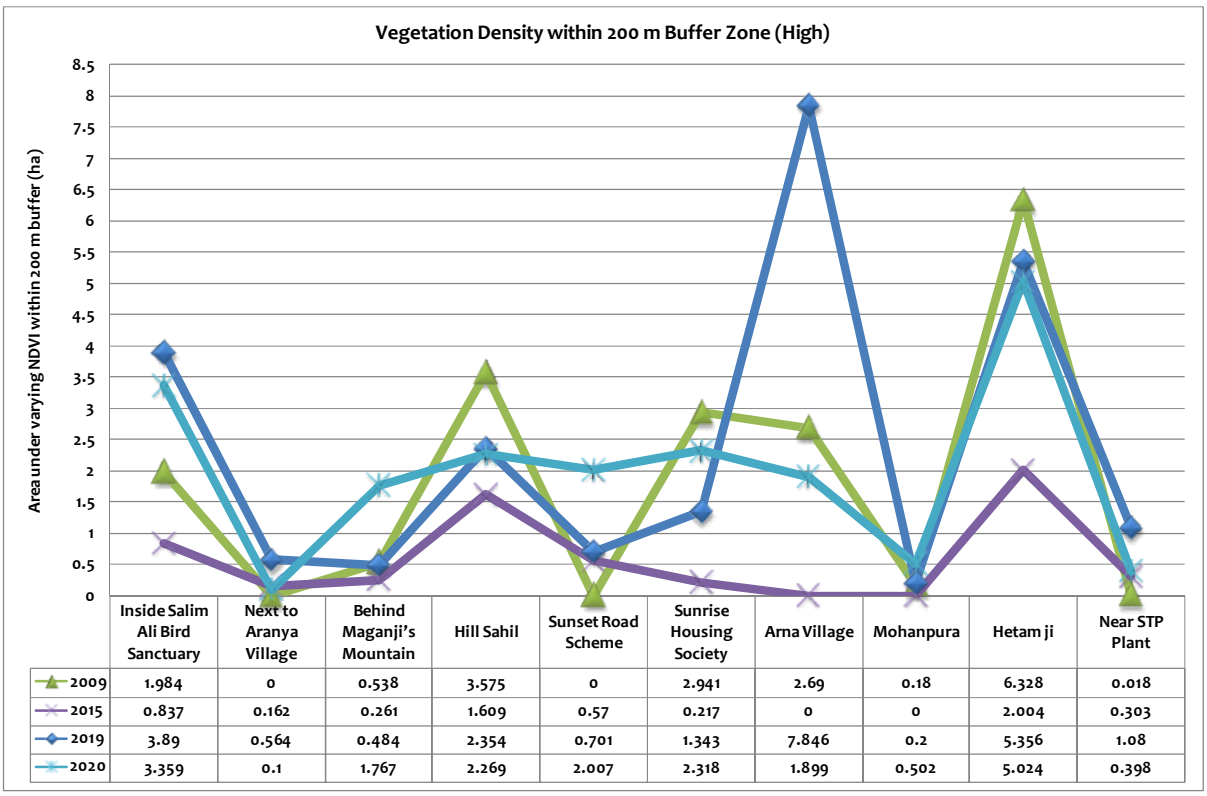


	Inside Salim Ali Bird Sanctuary	Next to Aranya Village	Behind Maganji's Mountain	Hill Sahil	Sunset Road Scheme	Sunrise Housing Society	Arna Village	Mohanpura	Hetam ji	Near STP Plant
2009	0.015	0.997	0.841	0.141	0.446	0.112	0.09	1.777	1.014	0.909
2015	0.417	1.047	0.507	0.185	0.413	0.151	0.125	1.075	0.09	1.349
2019	0.433	0.478	0.378	0.323	0.647	0.1	0.022	0.751	0.19	1.022
2020	0.263	1.895	1.373	0.654	1.185	1.115	0.973	2.197	0.482	2.784

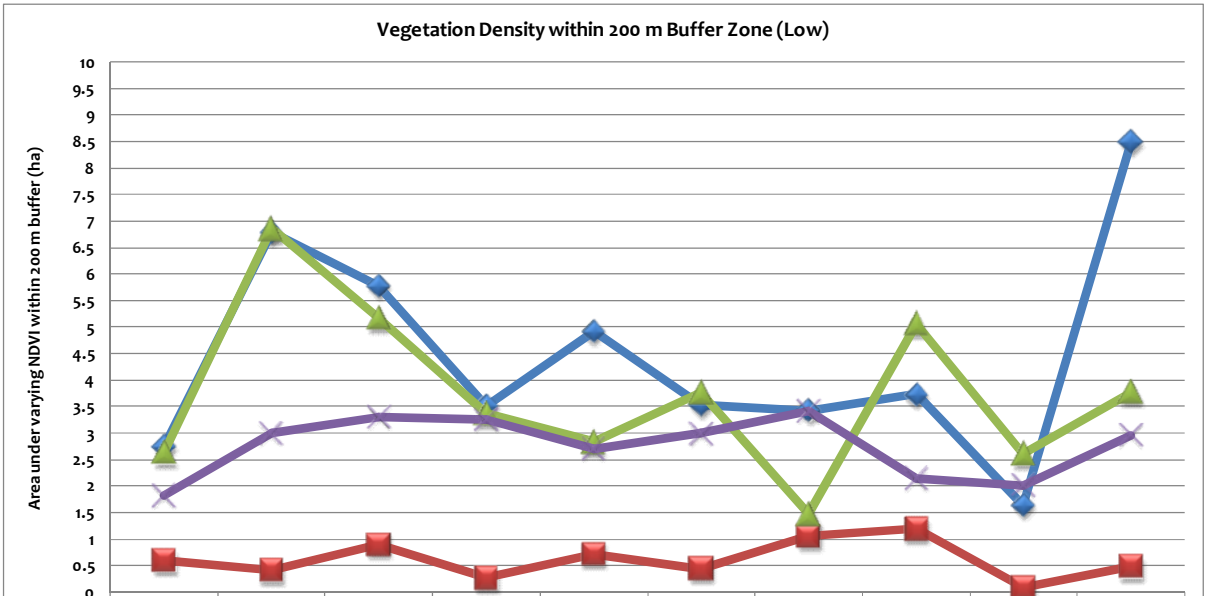
Fig 27 b:
Area under varying vegetation density within 200 m buffer zone of different villages



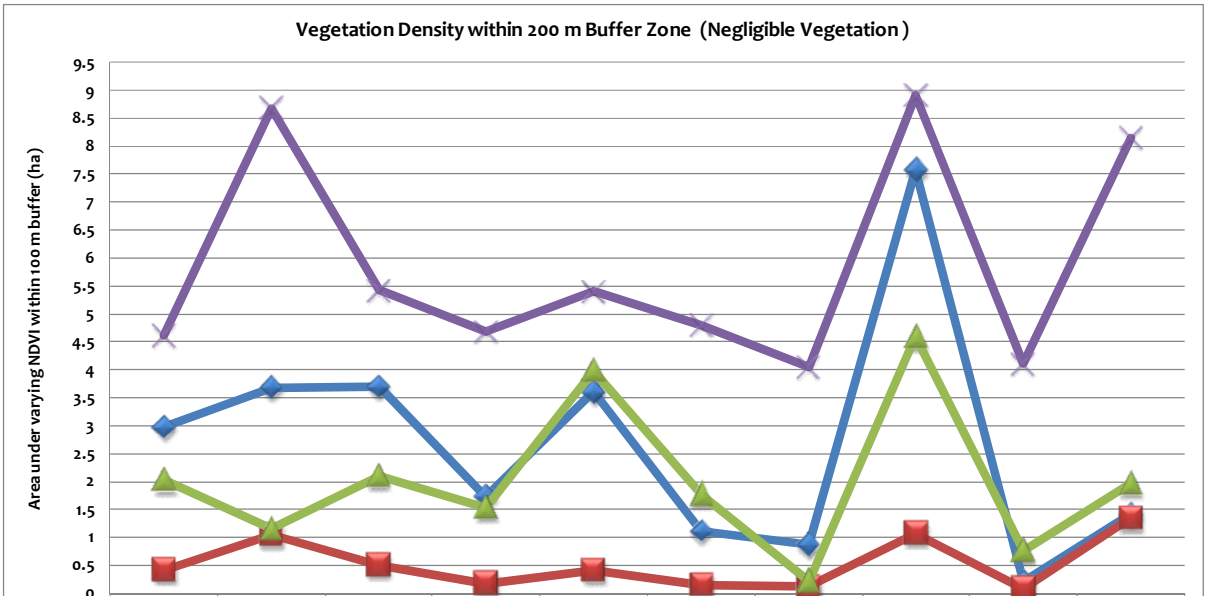
	Inside Salim Ali Bird Sanctuary	Next to Aranya Village	Behind Maganji's Mountain	Hill Sahil	Sunset Road Scheme	Sunrise Housing Society	Arna Village	Mohanpura	Hetam ji	Near STP Plant
2009	4.852	2.096	2.548	3.739	4.035	4.966	5.58	1.075	4.378	2.645
2015	1.284	1.514	1.463	1.076	1.434	2.322	1.942	0.867	0.955	1
2019	4.039	4.013	4.829	5.319	5.069	5.709	3.054	2.729	3.853	5.767
2020	2.799	0.809	2.111	2.372	2.495	2.491	3.238	1.033	1.449	1.088



	Inside Salim Ali Bird Sanctuary	Next to Aranya Village	Behind Maganji's Mountain	Hill Sahil	Sunset Road Scheme	Sunrise Housing Society	Arna Village	Mohanpura	Hetam ji	Near STP Plant
2009	1.984	0	0.538	3.575	0	2.941	2.69	0.18	6.328	0.018
2015	0.837	0.162	0.261	1.609	0.57	0.217	0	0	2.004	0.303
2019	3.89	0.564	0.484	2.354	0.701	1.343	7.846	0.2	5.356	1.08
2020	3.359	0.1	1.767	2.269	2.007	2.318	1.899	0.502	5.024	0.398



	Inside Salim Ali Bird Sanctuary	Next to Aranya Village	Behind Maganji's Mountain	Hill Sahil	Sunset Road Scheme	Sunrise Housing Society	Arna Village	Mohanpura	Hetam ji	Near STP Plant
2009	2.749	6.785	5.778	3.516	4.926	3.546	3.429	3.735	1.646	8.49
2015	0.6	0.417	0.909	0.27	0.722	0.45	1.072	1.197	0.09	0.487
2019	2.633	6.859	5.182	3.383	2.84	3.759	1.473	5.071	2.611	3.778
2020	1.826	3.006	3.3	3.266	2.699	2.995	3.417	2.15	2.022	2.967



	Inside Salim Ali Bird Sanctuary	Next to Aranya Village	Behind Maganji's Mountain	Hill Sahil	Sunset Road Scheme	Sunrise Housing Society	Arna Village	Mohanpura	Hetam ji	Near STP Plant
2009	2.979	3.684	3.7	1.735	3.604	1.111	0.865	7.574	0.213	1.411
2015	0.417	1.047	0.507	0.185	0.413	0.151	0.125	1.075	0.09	1.349
2019	2.03	1.157	2.097	1.536	3.981	1.781	0.22	4.592	0.773	1.968
2020	4.608	8.677	5.414	4.685	5.391	4.788	4.039	8.908	4.098	8.14

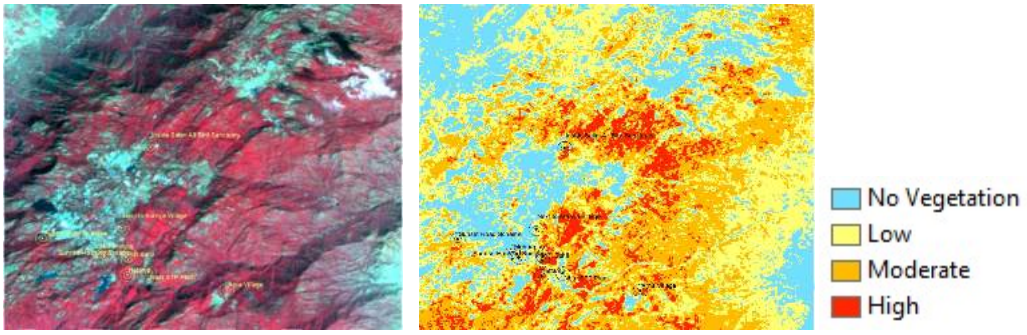


Fig. 28. (a) False Colour Composite (FCC), and (b) variation in vegetation density during 2009.

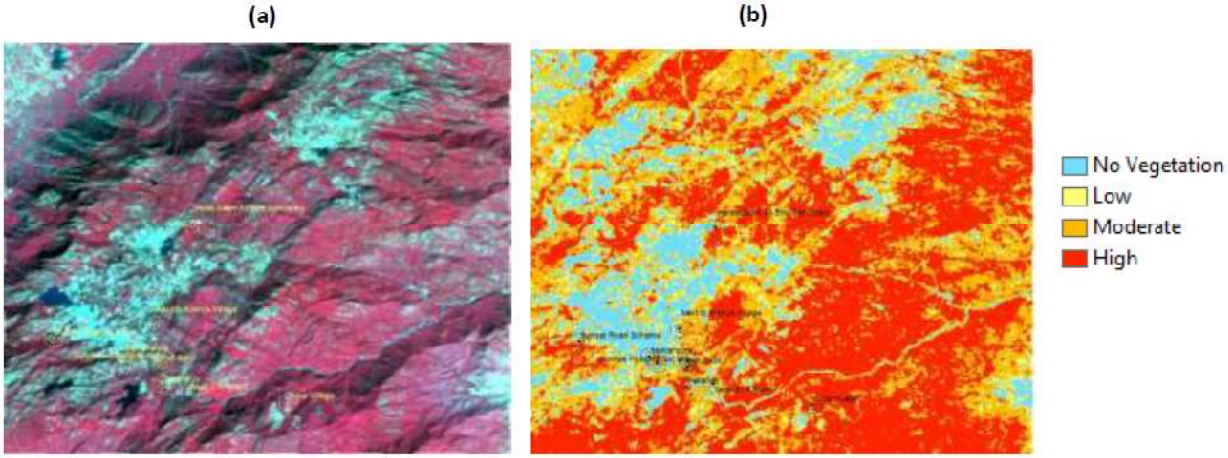


Fig. 29. (a). False Colour Composite (FCC) and (b) variation of vegetation density during 2015.

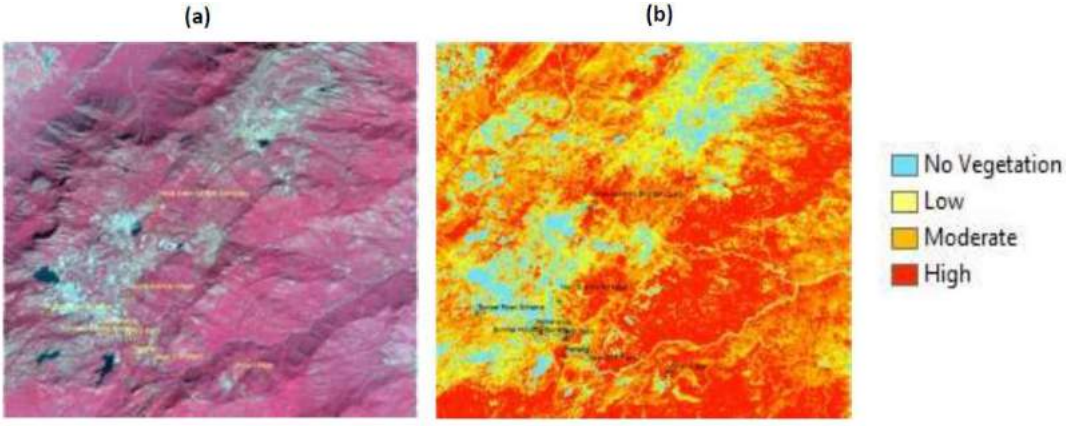


Fig. 30: (a) False Colour Composite (FCC) and (b) variation of vegetation density during 2019

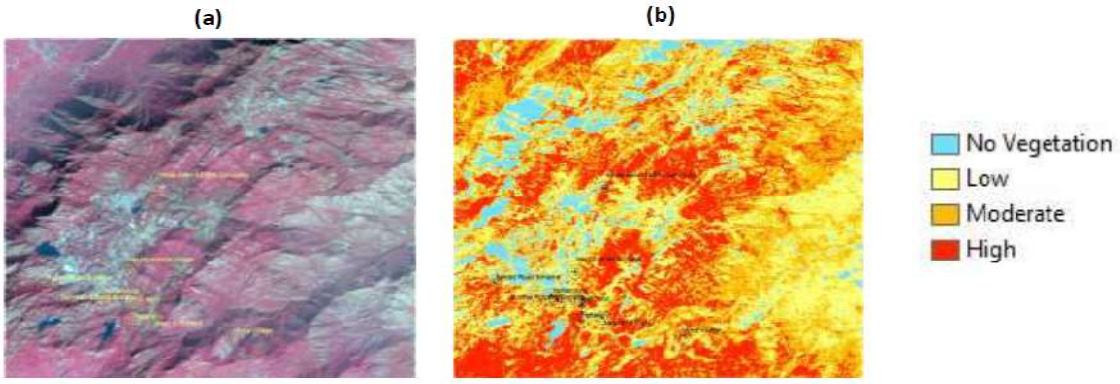


Fig. 31: (a) False Colour Composite (FCC) and (b) variation of vegetation density during 2020

2.1.6 Limitation of Remote Sensing and GIS based Analysis

KML or Shape file for the boundaries of the identified sites were not available. Hence, analysis has been carried out for tentative areas around the sites (i.e. within buffer zones of 100 m & 200 m radius). Freely available moderate to coarse resolution satellite imageries available during 2009-2020 have been used.

DEM has been generated from Cartosat-1 stereo data. CartoDEM is created using Augmented Stereo Strip Triangulation (ASST) software. The seamless CartoDEM generation is an automatic process and makes use of limited Ground Control Points (GCPs) in long stereo strip pairs using dense feature matching, Triangulated Irregular Network (TIN) modeling and automatic long strip. The automatic generation of DEM has inherent problems like water-body irregularities, hill-top distortions, plain-area sinks and residual mosaics; and these are corrected in the Tile Editing (TE) system. The vertical accuracy achieved is 8 m (LE90), whereas the horizontal accuracy attained is 15 m (CE90) for ortho data.

Satellite data (Landsat & Sentinel) have significant potential to assess vegetation cover over large areas (even inaccessible) repetitively in short time with reasonably good accuracy. A few specific limitations are mainly related to saturation of the optical signal at high biomass density, cloud cover and availability of radiometrically consistent multi-temporal dataset. Application of advanced classifier algorithms or acquiring high-resolution imagery cannot solve all problems that are encountered during vegetation extraction from remote sensed data, but will improve the results.

2.1.7 Field Photographs

Field photos of 10 identified sites taken during the field visit of Expert Committee (16-17 January 2020) as below:

Photographs has been updated however the name of location is required






Figure 22: Field Photographs

The summary of events regarding Mt. Abu ESZ notification and ZMP 2030 is given as ***Annexure – 1.***

2.2 Demographic profile

Mount Abu municipality is located in Sirohi district of Rajasthan state. It has population of 22,943, of which 12,557 are males and 10,386 are females as per Government of India Census 2011 (source: https://www.census2011.co.in/data/town/800557-mount-abu-rajasthan.html). Population density of Mount Abu Municipality is 1,072 people per sq km as compared to 200 people per sq km for Rajasthan state population density. In addition, it is also a popular hill station, where large number of tourists visit every year. Population growth over the years has

been on the higher side, and this is set to continue in the coming years. The overall population growth rate of the state is 21.3% during 2001-2011, while it was 28.3% during 1991-2001.

2.2.1 Population outside Municipal Area in ESZ

According to ZMP 2030 - Volume I, Mt. Abu ESZ, Govt. of Rajasthan, the five villages outside the municipal area in ESZ namely, Achalgarh, Arna, Jawai, Oriya and Salgaon together accounted for nearly 2200 people in 2001. Amongst these five villages, Oriya followed by Salgaon was the most populous villages with 891 and 638 persons, respectively in 2001 (Table 5). Oriya has the second highest population growth which could be on account of abundant flat land available for development.

Table 5

Trends in population distribution in villages outside municipal area (1961-2001)

Village	1961	1981	1991	2001	2011*	2030*	% decadal growth 1991-2001	% decadal growth 2001-2011*	% decadal growth 2011 -2030*
Achalgharh	343	214	224	324	343	469	44.64	5.86	36.73
Arna	641	122	140	197	220	299	40.71	11.67	4.1
Jawai	1398	117	131	147	184	190	12.21	25.17	3.2
Oriya	2024	463	611	891	1159	1490	45.83	30.07	28.56
Salgaon	463	118	168	638	554	1322	279.76	13.16	138.62
Total/Mean (applies for column 7-9)	4870	1034	1274	2197	2460	3770	72.45	11.97	53.25%

***** *'Population as reported in 2011 Census' and 'projected population in 2030' can be added in two separate columns. Accordingly % decadal growth during 2001-2011 can be calculated (Source: ZMP 2030- Volume I, Mt. Abu ESZ, Govt. of Rajasthan)*

It may be noted at the time of formulating the ZMP 2030, the 2011 Census figures were not available and 1991-2001 growth rates were referred to. Achalgarh, Oriya and Salgaon were showing higher growth in 1991-2001.

2.3 Population Density

The population of Mount Abu stood at 22,045 in 2001 and has increased by more than five times from population size of 4165 in 1931. There has not been much growth in population during 1901-1951, but during 1951-1961 a rapid increase in population was observed primarily due to administrative changes, which took place during this period. From 1961-2001, the town developed as an important tourist place as well as a center for educational facilities thereby showing a consistent rising trend in population growth.

Table 6

GROWTH TRENDS OF POPULATION OF MOUNT ABU MUNICIPAL AREA (1931-2001)

Year	Population	Decadal Growth
1931	4165	
1941	4316	+ 3.6%
1951	4439	+ 2.85%

1961	8076	+81.93%
1971	9840	+21.84%
1981	12713	+29.20
1991	15593	+22.65%
2001	22045	+ 41.38%
2011	22943	+ 04.07 % Sharp decrease due to ban in construction imposed in area from 2002 onwards

Source: Primary Census Abstract, 1961-2001

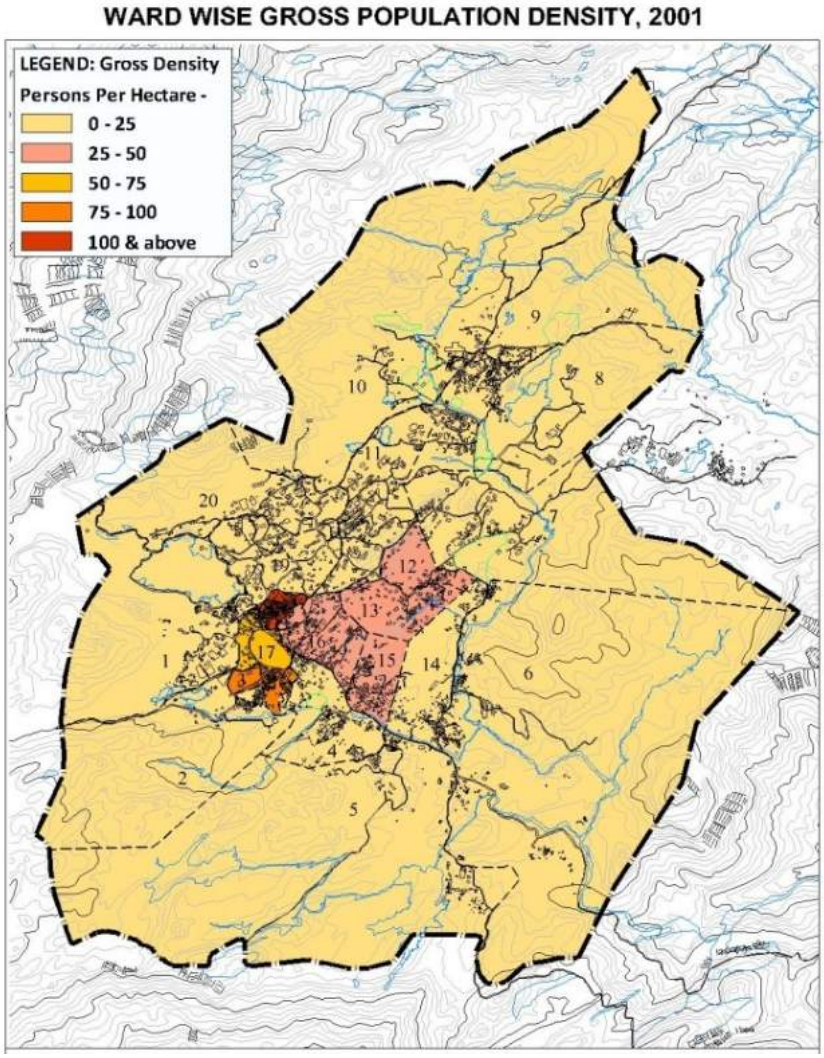


Fig.33: Ward wise population density in Mount Abu municipality area.

2.3.1 City Level Population Density

The gross population density of Mount Abu Municipal area is about 10 people per hectare (pph), which is low than the prescribed standard of 45 pph for hill stations (as per UDPFI guidelines). This is mainly due to the presence of forest and rocky outcrops in most of the area.

2.3.2 Ward Level Population Density

According to 2001 census, Mount Abu Municipal Area has 20 wards. As observed from the ward wise Gross Population Density Map of 2001, there is large variation in the Gross Density Pattern at the ward level. Ward 18 has the highest gross density of 141 pph, whereas the outer wards like 5, 6 and 10 show a low density of 2 pph.

The city is dense at the core and the density decreases as one move outside from the core area. This is due to lack of net developable land. Residential density is more at the fringes than at the core. Low net density wards are 13, 14 and 19 where density varies from 53 to 60 pph. The wards situated in the south-east of the town have low net density as these areas mainly comprise of forest lands and rocky outcrops.

Table No. 7

Ward wise demography of the Mount Abu area

Sl. No.	Name of village	No of household	SC population	ST population	Total population
1.	Ward No. 1	248	247	391	1215
2.	Ward No. 2	288	580	198	1522
3.	Ward No. 3	245	232	81	1306
4.	Ward No. 4	175	294	64	884
5.	Ward No. 5	189	57	541	817
6.	Ward No. 6	261	105	77	1237
7.	Ward No. 7	336	229	289	1430
8.	Ward No. 8	370	200	197	1681
9.	Ward No. 9	262	190	588	1424
10.	Ward No. 10	191	38	176	835
11.	Ward No. 11	159	143	128	1213
12.	Ward No. 12	164	177	162	786
13.	Ward No. 13	184	127	234	856
14.	Ward No. 14	168	171	253	832
15.	Ward No. 15	347	874	308	1548
16.	Ward No. 16	182	160	143	933
17.	Ward No. 17	113	50	5	665
18.	Ward No. 18	207	409	21	1221
19.	Ward No. 19	227	315	142	1164
20.	Ward No. 20	252	369	343	1374
Grand total		4568	4967	4341	22943

2.4 Housing and property analysis

Area under Residential Land use forms 39% of the total developed area and 0.8% of the Municipal Area. The residential areas are distributed around the original village settlements like Machgaon, Sanegaon, Torna, Goagaon, Delwara, Dundhai and Hetamji. Residential bungalows of government servants and defence personnel are in the civil station and military station areas. Some of the old bungalow compounds have been used for residential schemes - these are also in the civil station. Residential schemes are also near Delwara, Dundai and in the south of MDR60. Low density residential area is present near Windermere Lake and on north of Nakki Lake. Around main bazaar from State Bank to railway quarters and from Jain Vardhaman Mahavir centre to the church are high density areas. In this, about 178 ha areas are in residential use.

2.5 Village settlement & Tribal habitations

Rajasthan is home to many tribes, who have very interesting history of origin, customs and social practices. The two types of tribes that can be traced in Sirohi District are Bhils & Grasiyas. Bhils are the largest and probably the oldest inhabitants of this land. Bhil word is derived from the Greek word "BEEL" that means 'String used of BOW'. The primitive nature of

Bhils is confirmed by the facts that their description can be found in the oldest epics and religious books like Mahabharata, the Ramayana and the Puranas. Garasias are a Rajput tribe found along the Abu Road area of Southern Rajasthan. District Sirohi has a high proportion of tribal population (23.4%), the group called Garasias.

Mount Abu Eco-sensitive Zone is located in the Abu Road Tehsil of Sirohi district in Rajasthan. Rajasthan consists of 32 districts. Sirohi is situated at the south-west part of Rajasthan. It is bordered on the west by Jalor District, on the north by Pali District, on the east by Udaipur District, and on the south by Banas Kantha District of Gujarat. It is the third smallest district in the state. It has an area of about 5139 sq kms which is almost 1.52% of the area of Rajasthan. The district had a population of 850,756 (2001 census), with a population density of 166 persons per km^2. Sirohi district is a part of Jodhpur Division. The town of Sirohi is the District headquarter. It has five sub-divisions and five tehsils- Sirohi, Sheoganj, Pindwara, Abu Road and Reodar. Abu Road sub-division consists of two statutory towns (Abu Road UA and Mount Abu Municipality) and 81 villages of which 78 are inhabited and 3 are uninhabited.

2.6 Scheduled Tribe Population

The schedule tribe population growth trends in villages lying outside the municipal area in ESZ of Mount Abu. The share of ST population is highest in Salgaon, where ST population share is 27.12% of the total village population.

The data provided in District Census Handbook, Series 09, part XII A, village and Town Directory in its Appendix VII B gives ranges of Schedule Tribe Population

YEAR	ACHALGARH	ARNA	JAWAI	ORIYA	SALGOAN
2011	11-20%	11-20%	Nil	11-20%	21-30%%

2.7 Scheduled Caste Population

The schedule caste population growth trends in villages lying outside the municipal area in ESZ of Mount Abu. The share of SC population is highest in Achalgarh sharing 24.69% of the total village population.

The data provided in District Census Handbook, Series 09, part XII A, village and Town Directory in its Appendix VII A gives ranges of Schedule Caste Population

YEAR	ACHALGARH	ARNA	JAWAI	ORIYA	SALGOAN
2011	21-30%	Nil	Nil	Less than 5%	Less than 5%

2.8 Heritage and cultural infrastructure

This entire ESZ is an exceptionally significant, having multi-layered cultural landscape with a continuing sacred dimension, which has evolved and been consciously shaped by the people

over a documented period of more than a thousand years. It is a testimony to enduring continuities and respectful synthesis between indigenous and introduced approaches and innovations for sustainable utilization and development of the distinctive resource base of the area.

It has been termed as the 'Hill of Wisdom' and the 'Olympus of Rajasthan', mentioned by Megasthenes and in the map of Pliny, Arbud or the Mt. Abu area was considered as a place of great sanctity and learning– a 'moksha-tirtha' or place of pilgrimage (literally a place of crossing, and also a 'confluence of art and beauty' – secluded spot amongst natural surroundings, suitable for meditation). Abu was also associated with conceptions of 'landscape mandalas or cosmograms of sacred sites' emerging around the geo-morphological heritage, significant topographical and landscape features, which were subsequently sanctified by links with the names of various deities, sages and saints, religious or spiritual acts (such as 'yajnas' or 'tapas'), the construction of important 'celestial shrines' of different faiths- Vaishnava, Shaiva, Sakta, Jains as well as sacred places of the Bhils and Garasiyas, and Sufi shrines.

The unparalleled range, diversity and significance of the heritage components of the defined cultural landscape (tangible, intangible, biotic and abiotic) and their complex inter-linkages that characterize this plateau area, are an embodiment of the historic contribution of human interactions and cultural approaches, which safeguarded, enhanced and enriched significant aspects of the Abu Eco Sensitive Zone, ensuring its balanced and harmonious development till fairly recently. The cultural heritage, therefore, constitutes an invaluable resource, and is integral to the formulation of an effective strategy for sustainable conservation and guided development of this Eco Sensitive Zone, within the Sirohi district.

A total number of 258 heritage components of the cultural landscape have been identified in the ESZ area, encompassing heritage typologies of historic routes and cultural corridors, sacred centres, complexes and precincts with their built heritage, water systems, sacred groves, irrigated terraced fields and vernacular settlements in addition to the designed historic urban landscape of the Mt Abu civil and military stations.

On the basis of analysis of a chronological sequence of historic maps of the ESZ from 1870 to 1920 Survey Plans of the Mt Abu Civil & Military Stations, supported and verified through detailed fieldwork and primary surveys of the 2011 situation, settlement patterns and 258 heritage resources of considerable historical, archaeological, cultural, social, architectural and aesthetic, ecological, environmental, scientific, functional, economic, recreational and educational value have been identified and delineated on maps. The significant character

zones and their buffer zones have been defined and delineated on the basis of the distribution and concentration of different types of heritage resources and their attributes.

2.8.1 Inventory of Heritage Resources & Existing Resource Utilization – Cultural Resource Mapping

The inventory formats and datasheets have been developed and compiled as the basis for the listing and classification of the heritage resources, as well as for the delineation of the various heritage zones and sub-zones. The heritage resources that have been included in the inventory are not only integral to understanding and defining the identity of the Abu Eco-Sensitive Zone, but are also of immense architectural, ecological, archaeological, historical, socio-cultural, functional, economic, educational and recreational value to the citizens of Mt Abu as well as numerous visitors and pilgrims. A systematic process of identification and delineation of the heritage resources has been followed, as it is a primary requirement for integration of the heritage resources of the Eco-Sensitive Zone into the planning and management process.

These inventories include sections related to the significance as well as the current status of the heritage resource in terms of its condition, level and type of usage and priority for their conservation intervention.

Table 8
List of Heritage sites

Sl. No.	Name of Heritage	Sl. No.	Name of Heritage
1.	Jaipur Palace	2.	Fatah Palace
3.	Alwar Kothi	4.	Bikaner Palace
5.	Holiday Home	6.	Palanpur Palace
7.	Dholpur House	8.	Uniyara House
9.	Limdi Kothi	10.	Pokran House
11.	Pokran House	12.	Survey of India House
13.	State Community Health Mount Abu	14.	Sirohi Kothi
15.	Udaygarh Palace	16.	Kernaat Palace
17.	Kishangarh House	18.	Sunrise Palace (Bharatpur Kothi)
19.	Khendla House	20.	Sikar Kothi
21.	Chiruti House	22.	St. Xavier's Church
23.	St. Anns Church	24.	Sophia School (Khtari House)
25.	St. Mary High School	26.	St. Walter School
27.	Kama Rajputana Resort	28.	Shelmani Daak Bungalow
29.	Midest Daak Bungalow	30.	Eagle Nest
31.	Palm View Bungalow	32.	Jodhpur House
33.	Hill Sahil	34.	Hill View Bungalow
35.	Takhmawala Bungalow	36.	Akkhe Villas
37.	Lake House	38.	Polo Pavilion

Sl. No.	Name of Heritage	Sl. No.	Name of Heritage
39.	Purjan Niwas	40.	Ibhrahim Hall
41.	Sanand House	42.	East View Bungalow
43.	Dell Bungalow	44.	Kathiyawaadi Kothi
45.	Bohro Ki Masjid	46.	Jama Masjid, Mount Abu
47.	Lords Villa	48.	Jaisalmer House
49.	State Jodpur Judiciary House	50.	P.W.D Post Bungalow, Delwara
51.	Shakti Bungalow	52.	Mushkil Aasan (Mount Hotel)

2.9 Existing Situation: Area, Heritage Resources & Priorities for Sustainable Conservation & Development

Table no. 9

Municipal Area of Mount Abu

S. No.	Municipal Area of Mt Abu (inc. Dilwara)	Development Pattern	Heritage Resources
	Identified precincts/ zones and streetscapes		
1	Nakki Lake N.E. Zone (Nakki Lake Watershed- No build Zone)	Area developed to the east and north of the Nakki Lake between 1870 & 1920. Very low density sensitively sited, single- storeyed pitched roof, buildings within a scenic landscape characterized by rock formations and watercourses.	Grade I - 10 Grade II - 14 Grade III - 2 Public facilities such as the Adams Memorial Hospital, few, but very significant historic bungalows, religious structures watercourses, nature trails, & viewpoints.
	Nakki Lake S.W. (Nakki Lake Watershed- No build Zone)	Area to the west and south of the Nakki Lake, largely developed between 1870 and 1920. Sparse, sensitively sited, Vakalat & Palace landmark buildings prominently located within the scenic landscape, with rock formations and watercourses, and religious complexes on the banks of the Nakki Lake.	Grade I -2 Grade II - 6 Grade III - 5 Important pilgrim facilities such as the Dhuleshwar Mahadeo & Raghunathji Temples, some historic bungalows, watercourses, nature trails, and viewpoints, visual axes and view sheds.
2	Arbud Devi Zone (Nakki Lake Watershed- No build Zone & Forest Area)	Largely forested area, to the north of the Nakki Lake, contiguous with the Nakki Lake N.E. Zone to the west and the Dilwara Zone to the east. Almost no construction with the exception of a few prominent historic buildings (post 1920) located on the slopes, and the Arbud Devi Shakti Pith with the important geological formation of the Arbud Devi Pahar and some religious buildings.	Grade I*- 2 Grade I - 7 Grade II - 5 Grade III - 1 Important pilgrim destination such as the Arbud Devi cave temple and Shakti Pith, located within a forested scenic landscape, also sacred to the Bhils, pilgrim trails & watercourses; with some historic landmark buildings such as Limbdi House, & viewpoints, visual axes

S. No.	Municipal Area of Mt Abu (inc. Dilwara)	Development Pattern	Heritage Resources
			and viewsheds.
3	Dilwara (Pilgrim Destination & HeritageTourism)	Largely forested area contiguous with the Arbuda Devi Zone to the west, mainly to the north of the Abu-Dilwara Road, defined on the northern side by a prominent ridge and flat grassland/ agricultural land along the watercourse (tributary of the KhulGarh Nallah) on the west. Dilwara Temple Complex (11th CE) and the adjacent Rasio Balama/ Kanya Kumari Complex (6th CE) are important sacred complexes, and there is also a small village abadi.	Grade I*- 5 Grade I - 3 Grade II - 7 Grade III - 1 Globally significant pilgrim destination of the Dilwara Jain Temple complex, the adjacent Rasio Balama /Kanya Kumari Complex (6th CE), numerous cave temples located within the forested scenic landscape, also sacred to the Bhils, pilgrim trails & watercourses; concentration of extremely significant built heritage, sacred groves & viewpoints, visual axes and viewsheds.
4	Bazaar Zone	Compact, relatively small and densely built –up area occupied by the historic bazaar street dates to the early 19th century and the initial establishment of the Mt Abu Civil Station. Extent, alignment and footprint of buildings similar to that indicated in the 1870 Map. One of the streets radiating out from the old 'church square', to the south of the main ridge road Located within the core of Mt Abu Municipal area.	Grade I - Grade II - 7 Grade III Retains some significant examples of mixed use typologies such as Shop-houses with projected first floors constructed according to a definite module, as well as an unusual Bohra prayer hall, which imparts an interesting character to the streetscape. Most of historic buildings along the narrow bazaar street have been periodically reconstructed.
5	Civil Station – Bungalow Zone	Low density development of 'bungalow-compound complexes', significant landmark buildings such as the Raj Bhavan & Agency Office buildings, as well as important facilities of the Hill Resort such as the Polo ground, library, school, club, church, hotel, sports facilities, picturesquely dispersed within an undulating scenic landscape, with distinctive ridges as sites of landmark buildings, watercourses and rock formations as significant features of the cultural landscape.	Grade I - 20 Grade II - 42 Grade III – 7 + 4 Large number of significant historic bungalows with compounds and ancillary buildings, some from the pre 1870 period, and the majority from between 1870 and 1920. This zone, in terms of its landscape structure, development pattern and large number of historic buildings exemplifies a distinctive type of heritage hill station that evolved in the central part of India, and is of great significance.

S. No.	Municipal Area of Mt Abu (inc. Dilwara)	Development Pattern	Heritage Resources
6	Military Station /Cantt Zone	Located to the north east of the Civil Station, the Military Station was relocated on the higher ground in this area from an earlier site in the proximity of the Nakki Lake that was considered unhealthy and abandoned. The development pattern in this area is low density, with the character of a small, picturesque cantonment in the hills, including bungalow compounds, barracks for convalescing soldiers, and imposing institutional landmark buildings sited on high points in the landscape.	Grade I - 6 Grade II - 4 Grade III – 1 +13 Large number of imposing institutional - hospital buildings, of well constructed masonry, with pitched roofs and large landscaped compounds; historic barracks, officers bungalows, and other specialized buildings of the 19th century (1844-1920's) are located in this zone. In terms of the development pattern, landscape structure, and large number of historic buildings, this zone is typical of a distinctive military station intended for recuperating soldiers.
7	Approach & Environs	Area along the Old Cart Road that can be characterized as a cultural corridor with a distinctive landscape; and individual buildings and complexes on the outskirts of the historic Civil and Military Stations of Mount Abu, as well as on the forest slopes just outside the municipal area.	Grade I - 7 Grade II - 5 Grade III – 6 +14 Significant in terms of the diverse, scenic landscape along the approach road with its interwoven watercourse and distinctive vegetation and rock formations; as well as numerous, large, architecturally significant complexes located within a distinctive landscape of great aesthetic and ecological value. Numerous religious complexes of great ecological and cultural value located along the many pilgrim trails on the slopes of the plateau.

Table no. 10

Eco Sensitive Area

Sl. No.	Eco- Sensitive Area	Development Pattern	Heritage Resources
Identified precincts and streetscapes			
1	Achalgarh Kshetra & Abadi	Pilgrim destination with a unique concentration of a diversity of heritage components - 6th century temple complex of Achaleshwar Mahadeo situated at the base of the hill on which the 15th century fortified settlement of Achalgarh, (planned by Rana Kumbha's architect Mandan) is located. Two distinct historic village abadi areas with a heritage character within the fortified area. Important Jain religious complex – the 14th cent. Chaumukha Shrine and saktipitha of Chamunda Devi located on the hill. Important water system, baolis, gardens, groves and cave hermitages characterize this area. One of the chain of three forts constructed by Rana Kumbha to guard the route between Malwa, Gujarat and Mewar, as well as mythologically significant due to its association of a landscape feature (fissure and rock formation) with Achaleshwar Mahadeo	Grade I - 25 Grade II - 7 Grade III – 4 + 4 Heritage components include the large historic temple complex, garden and baoli of Achaleshwar Mahadeo; rockcut caves and architecturally significant palace/ hermitages, traditional water harvesting system of interconnected water reservoirs believed to have been made by the architect Mandan in the 15th century for Rana Kumbha, and which ensured that this area was self sustaining in the past. The historic village abadi area within the fortification has been abandoned, houses relocated outside. A unique double-storeyed rock cut cave hermitage at the top of the hill has unusual mural paintings and calligraphy characteristic of the 16th century.
2	Oriya Village	One of the historic villages, sited on the Oriya plateau that emerged in the 14th century.	Grade I - 1 Grade II - 3 Grade III - +2
3	Jawai Village	One of the historic villages, sited between Oriya & Gurushikhar that emerged in the 14th century. Jawai is a small, picturesque hamlet with beautiful terraced fields nestled between rock outcrops with a number of watercourses and ponds.	The entire village could be characterized as a heritage village, on the slopes of the hills. There is a tank known as Naugera Talao to its east and the Gauria Mata temple on the way to Gurushikhar.
4	Gurushikhar	The highest point of the Aravalli's, this peak is also associated with important religious places located on it.	Grade I - 5 Grade II - 1 Grade III

2.10 Water availability

The plateau of Mount Abu has a variety of water systems – lakes (both natural and manmade), streams, springs and waterfalls. The most important lake of Mount Abu is Nakki Lake. The other important lakes are mini Nakki lake, Trevors tank, Jawai lake. Runoff is absent in Nakki lake catchment because of presence of various landuse. Problem of siltation and

eutrophication is taking place in the lake. Similar case is seen in almost all the lakes except Trevors tank.

Abu hills fall between the Banas and Sipu sub basin. Banas River originates from Aravalli hills and descends in a South-western direction through Rajasthan state and travels through Banaskantha and Mehsana district of Gujarat. Little Rann of Kachchh is the outfall of Banas river. Banas Basin is situated between 23030' & 24055' North latitude and 71015' to 73015' East longitude. The direction of flow of ground water is from Northeast to South west. The average depth of ground water is 10 - 15 mbgl. Water use in the Mount Abu Eco-sensitive Zone (MAEZ) can be broadly categorized as: (i) domestic, (ii) Hotels, (iii) industrial, (iv) livestock, etc. In the MAEZ, domestic use including hotels is the predominant use of water.

2.10.1 Major Water Management Initiatives needed for Mount Abu Eco-Sensitive Zone

The entire Mount Abu Eco-Sensitive Zone is hilly terrain with Rocky Surface, which falls under either or combination of consolidated sedimentary rock, crystalline rock, Phyllite / schist, quartzite. These formations have very less groundwater recharge capacity. The economic exploitation is very difficult in the area, therefore, suffered with server water scarcity. There is not much agriculture and hence the demand for agriculture is quite low. The Run-off water, which is estimated at 5.5 MCM, could be a potential source to meet the growing water demand of the area, which is estimated at about 5 MCM in next 20 years. The two dams, which are supplying water at the moment, are not adequate to meet the future demand. Moreover transporting water from the reservoirs is energy intensive. Thus, it is important that rainwater harvesting is given up top most importance to meet the present and future demand of the area.

2.10.2 Water recharge by run-off collection ponds

Historically all settlements on Mount Abu Plateau had a water management plan, by tapping run-off and recharged strata. The Achalgarh Kshetra has historic ponds to collect rain water and run-off. The ponds have been located on the basis of the terrain and recharge potential. The proximity to faults, permeable substrata has been the guiding factors.

During the British Period a system of wells along the storm water channels was planned to provide water all round water all round the year. Some of these wells still exist and hold water. Wells in some hotel complexes have been maintained. Others are in state of neglect. These can be revived after feasibility studies. Care should be taken not to concertize them as the water infiltration will be impaired. The brick masonary should be retained.

It has been observed that in many areas, especially near Gurushikhar, where run-off is higher, there are places where water collects during rain and drains off quickly after the down pour.

These are the potential areas ponding, as they are recharge areas- for recharging the ground water, and for soil water moisture conservation.

2.11 Biodiversity profile of planning area along with existing wildlife corridors

Biological environment is the environment, where the life form can exist Biological environment includes the Habitat (place where the organism lives) and natural surroundings of all flora and fauna (living organism) of the particular area. Both biotic and abiotic components make environment livable for the human beings and other life forms on the earth.

Biological diversity is a key to healthy ecosystems. Biodiversity is also the basis of innumerable environmental services that keep us and the natural environment alive – ranging from the provision of clean water and watershed services to the recycling of nutrients, pollination and carbon sequestration. Biodiversity (Species diversity) is the most characteristic feature of the nature, which includes ecological communities (viz., animal and plant species).

The flora of Mount Abu consists of 112 plant families comprising 449 genera and 820 species (Mehta, 1979). Mount Abu is the only place in Rajasthan where one can find orchids. Three species of wild roses (family Rosaceae) and 16 species of ferns (Pteridophyta) have also been reported from this area. The vegetation of the area is predominantly Tropical Dry Deciduous forest type according to Champion and Seth (1968), with relict patches of Dry Tropical Riverine Forests along the water courses and valleys at higher altitudes. The vegetation here is sometimes also classified as broad leaved hill forest and is unique to Mount Abu Wildlife Sanctuary of Sirohi district, because of xeromorphic subtropical thorn forest in the foothills to subtropical evergreen forests at the higher levels.

The area is characterized by tropical dry forests and is rich in rare, endemic, endangered species, some of which are of medicinal importance. Eastern side of the hill has sparse vegetation, while the western side has dense vegetation cover. Areas with southern aspect have sparse vegetation than the northern aspect. The detailed of the flora has been incorporated in Table no. 14.

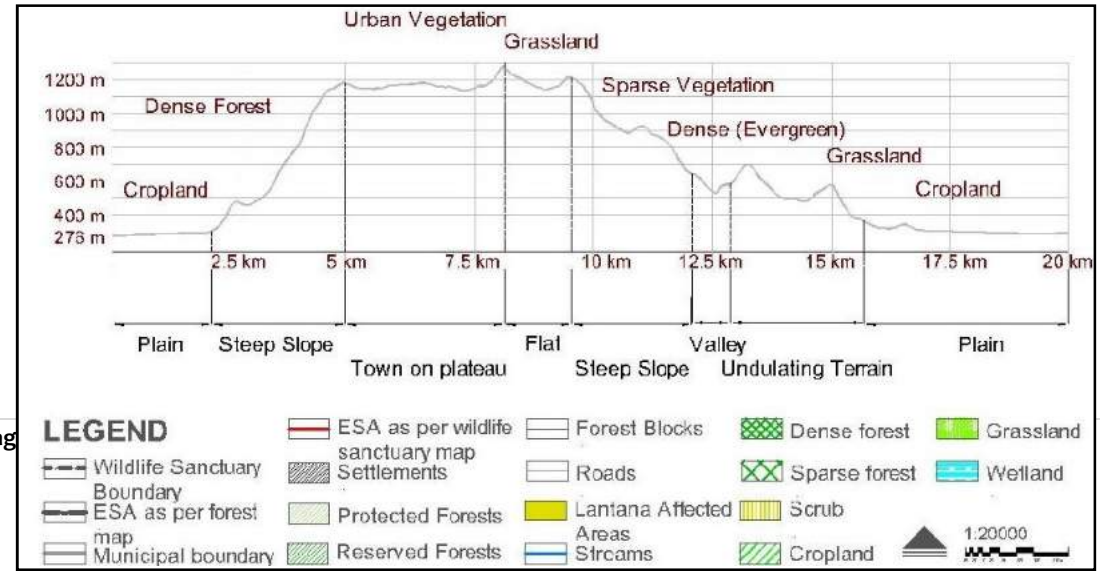


Table: 11

Inventory of floral diversity in Mount Abu Areas: based on actual sighting and inputs from locals and Perused from Secondary Data.

Sl. No.	Scientific name	Local name	Family	Core Zone	Buffer Zone
Trees					
1.	*Acacia catechu*	Khair	Fabaceae	-	+
2.	*Acacia nilotica*	Babool	Fabaceae	+	+
3.	*Acacia senegal*	Kumta	Fabaceae	-	+
4.	*Adina cordifolia*	Haldu	Rubiaceae	-	+
5.	*Aegle marmelos*	Bel	Rutaceae	-	+
6.	*Ailanthus excelsa*	Aldu	Simaroubaceae	-	+
7.	*Albizia amara*	Krsihna siris	Fabaceae	-	+
8.	*Albizia lebbeck*	Siris	Fabaceae	-	+
9.	*Albizia odoratissima*	Black Siris	Fabaceae	-	+
10.	*Albizia procera*	Safed Siris	Fabaceae	-	+
11.	*Alstonia scholaris*	Saptaparni	Apocynaceae	-	+
12.	*Anogeissus latifolia*	White Dhaura	Combretaceae	-	+
13.	*Anogeissus pendula*	Black Dhaura	Combretaceae	-	+
14.	*Anthocephalus cadamba*	Kadamb	Rubiaceae	-	+
15.	*Azadirachta indica*	Neem	Meliaceae	+	+
16.	*Balanites aegyptiaca*	Hingot	Zygophyllaceae	-	+
17.	*Bauhinia malabarica*	Amli	Fabaceae	-	+
18.	*Bauhinia racemosa*	Kachnar	Fabaceae	-	+
19.	*Bombax ceiba*	Kapok	Malvaceae	-	+
20.	*Boswellia serrata*	Salar	Burseraceae	-	+
21.	*Butea monosperma*	Palash	Fabaceae	+	+
22.	*Buchanania lanzan*	Achar	Anacardiaceae	-	+
23.	*Callistemon lanceolatus*	Bottle brush	Myrtaceae	-	+
24.	*Careya arborea*	Kumbhi/ Wild Guava	Lecythidaceae	-	+
25.	*Cassia fistula*	Amaltas	Fabaceae	-	+
26.	*Cassia siamea*	Kasod	Fabaceae	-	+
27.	*Casuarina equisetifolia*	Saru tree	Casurinaceae	-	+
28.	*Cocos nucifera*	Coconut	Arecaceae	-	+
29.	*Cordia dichotoma*	Goonda	Boraginaceae	-	+
30.	*Dalbergia latifolia*	Kala Shisham	Fabaceae	-	+
31.	*Dalbergia sissoo*	Shisham	Fabaceae	+	+
32.	*Delonix regia*	Gulmohar	Fabaceae	+	+
33.	*Dichrostachys cinerea*	Khairi	Mimosaceae	-	+
34.	*Diospyros melanoxylon*	Tendu	Ebenaceae	-	+
35.	*Emblica officinalis*	*Amla*	Phyllanthaceae	-	+
36.	*Eucalyptus globulas*	Safeda	Myrtaceae	-	+
37.	*Ficus benghalensis*	Bad	Moraceae	-	+
38.	*Ficus carica*	Common fig/ Anjeer	Moraceae	-	+
39.	*Ficus glomerata*	Gular	Moraceae	-	+

Sl. No.	Scientific name	Local name	Family	Core Zone	Buffer Zone
40.	*Ficus hispida*	Hairy fig	Moraceae	-	+
41.	*Ficus racemosa*	Gular	Moraceae	-	+
42.	*Ficus religiosa*	Peepal	Moraceae	-	+
43.	*Gmelina arborea*	Sewan/Gambhar	Verbenaceae	-	+
44.	*Hardwickia binata*	Anjan	Fabaceae	-	+
45.	*Lagerstroemia indica*	Saona	Lythraceae	-	+
46.	*Lannea coromandelica*	Mohin/Gundal	Anacardiaceae	-	+
47.	*Madhuca indica*	Mahua	Sapotaceae	-	+
48.	*Mangifera indica*	Mango	Anacardiacae	+	+
49.	*Mimusops elengi*	Maulsiri	Sapotaceae	-	+
50.	*Moringa oleifera*	Senjana	Moringaceae	-	+
51.	*Murraya koenigii*	Kari patta	Rutaceae	-	+
52.	*Peltophorum pterocarpum*	Yellow Gulmohar	Fabaceae	-	+
53.	*Phoenix sylvestris*	Khajur	Arecaceae	+	+
54.	*Pithecellobium dulce*	Jungle jalebi	Fabaceae	-	+
55.	*Polyalthia longifolia*	Ashok	Annonaceae	-	+
56.	*Pongamia pinnata*	Karanj	Fabaceae	-	+
57.	*Prosopis cineraria*	Khejri	Fabaceae	+	+
58.	*Prunus amygdalus*	Badam	Rosaceae	-	+
59.	*Pterocarpus marsupium*	Bija	Fabaceae	-	+
60.	*Salvadora oleoides*	Bada Peelu	Salvadoraceae	-	+
61.	*Sapindus emarginatus*	Aritha	Sapindaceae	-	+
62.	*Saraca indica*	Sita ashok	Fabaceae	-	+
63.	*Syzygium cumini*	Jamun	Myrtaceae	+	+
64.	*Tamarindus indica*	Imli	Fabaceae	+	+
65.	*Tecomella undulata*	Rohida	Bignoniaceae	-	+
66.	*Tectona grandis*	Sagwan	Lamiaceae	-	+
67.	*Terminalia arjuna*	Arjun	Combretaceae	-	+
68.	*Terminalia bellirica*	Bahera	Combretaceae	-	+
69.	*Thespesia populnea*	Paras Peepal	Malvaceae	-	+
70.	*Terminalia tomentosa*	Saja	Combretaceae	-	+
71.	*Wrightia tinctoria*	Kapar/Khirni	Apocynaceae	-	+
Shrubs					
72.	*Achras sapota*	Chiku	Sapotaceae	-	+
73.	*Adhatoda vasica*	Ardusa	Acanthaceae	-	+
74.	*Agave americana*	Ram bans	Asparagaceae	-	+
75.	*Bougainvillea glabra*	Bougainvillea	Nyctaginaceae	+	+
76.	*Annona squamosa*	Sitaphal	Annonaceae	-	+
77.	*Calotropis gigantea*	Safed Aak	Apocynaceae	-	+
78.	*Calotropis procera*	Aak	Apocynaceae	-	+
79.	*Capparis decidua*	Ker	Capparaceae	-	+
80.	*Carissa carandas*	Karonda	Apocynaceae	-	+
81.	*Cestrum nocturnum*	Night Jasmine	Solanaceae	-	+
82.	*Datura metel*	Kala Dhatura	Solanaceae	-	+
83.	*Datura stramonium*	Safed Dhatura	Solanaceae	-	+
84.	*Euphorbia neriifolia*	Thor	Euphorbiaceae	-	+
85.	*Hibiscus rosa sinensis*	Gudhal	Malvaceae	+	+
86.	*Holarrhena antidysenterica*	Indrajao	Apocynaceae	-	+

Sl. No.	Scientific name	Local name	Family	Core Zone	Buffer Zone
87.	*Ipomoea carnea*	Besharam	Convolvulacae	-	+
88.	*Jatropha curcas*	Ratanjot	Euphorbiaceae	-	+
89.	*Lantana camara*	Raimunia	Verbenaceae	-	+
90.	*Lawsonia inermis*	Heena	Lythraceae	-	+
91.	*Nerium indicum*	Red Kaner	Apocynaceae	+	+
92.	*Opuntia ficus indica*	Naagphani	Cactaceae	-	+
93.	*Phoenix acaulis*	Date palm	Arecaceae	-	+
94.	*Platycladus orientalis*	Morpankhi	Cupressaceae	+	+
95.	*Prosopis juliflora*	Vilayati babool	Fabaceae	-	+
96.	*Psidium guajava*	Amrud	Myrtaceae	-	+
97.	*Ricinus communis*	Castor	Euphorbiaceae	-	+
98.	*Vitex negundo*	Negad (Tarvan)	Verbenaceae	-	+
99.	*Withania somnifera*	Ashwagandha	Solanaceae	-	+
100.	*Woodfordia fruticosa*	Dhawai	Lythaceae	-	+
101.	*Ziziphus mauritiana*	Mota Ber	Rhamnaceae	+	+
102.	*Ziziphus nummularia*	Chota Ber	Rhamnaceae	+	+
103.	*Ziziphus xylopyrus*	Jungli Ber	Rhamnaceae	-	+
Herbs					
104.	*Argemone mexicana*	Pili kater/ Satyanashi	Papaveraceae	-	+
105.	*Asparagus racemosus*	Shatawari	Asparagaceae	-	+
106.	*Cassia tora*	Pomaria (Takla)	Leguminosae	-	+
107.	*Crossandra infundibuliformis*	Priyadarsha	Acanthaceae	-	+
108.	*Curcuma aromatica*	Wild haldi	Zingiberaceae	-	+
109.	*Centella asiatica*	Brahmi	Apiaceae	-	+
110.	*Hygrophila serpyllum*	Sarpat	Acanthaceae	-	+
111.	*Indigofera tinctoria*	Bekari	Fabaceae	-	+
112.	*Leea indica*	Kukur jihwa	Vitaceae	-	+
113.	*Leptadenia reticulata*	Dori, Jhumka	Asclepiadaceae	-	+
114.	*Leucas aspera*	Chota halkusa	Lamiaceae	-	+
115.	*Musa paradisiaca*	Banana	Musaceae	-	+
116.	*Senecio grahamii*	Sonki	Asteraceae	-	+
117.	*Solanum surattense*	Bhurangani	Solanaceae	-	+
118.	*Tephrosia purpurea*	Sarphonk	Fabaceae	-	+
119.	*Tridax procumbens*	Khal- muriya	Asteraceae	-	+
120.	*Xanthium strumarium*	Adhashishi	Asteraceae	-	+
Climbers					
121.	*Butea superba*	Palasbel	Fabaceae	-	+
122.	*Cuscuta reflexa*	Amarbel	Convolvulaceae	-	+
123.	*Spatholobus roxburghii*	Bandoo lata	Fabaceae	-	+
124.	*Tinospora cordifolia*	Neem giloy	Menispermaceae	-	+
125.	*Vallaris solanacea*	Dudhi bel	Apocynaceae	-	+
126.	*Cissus repanda*	Pani bel/ Dekarbela	Vitaceae	-	+
Grasses					
127.	*Apluda mutica*	Bhangti	Poaceae	+	+
128.	*Cenchrus ciliaris*	Anjan	Poaceae	-	+
129.	*Chrysopogon fulvus*	Goria	Poaceae	-	+
130.	*Cynodon dactylon*	Doob ghas	Poaceae	+	+
131.	*Dendrocalamus strictus*	Bamboo	Poaceae	-	+

Sl. No.	Scientific name	Local name	Family	Core Zone	Buffer Zone
132.	*Dichanthium annulatum*	Karad	Poaceae	-	+
133.	*Eragrostis nigra*	Chiri bajara	Poaceae	-	+
134.	*Heteropogon contortus*	Soorwala	Poaceae	-	+
135.	*Parthenium hysterophorus*	Congress grass	Asteraceaea	-	+
136.	*Saccharum arundinaceum*	Hardy Sugar Cane	*Poaceae*	-	+
137.	*Saccharum munja*	Munj	*Poaceae*	-	+
138.	*Saccharum spontaneum*	Kans grass	*Poaceae*	-	+
139.	*Sehima nervosum*	Sien	Poaceae	-	+
140.	*Sorghum halepense*	Baru	Poaceae	-	+
141.	*Themeda quadrivalvis*	Rataida	Poaceae	+	+
Hydrophytes					
142.	*Eichhornia crassipes*	Belapani	Potendriaceae	-	+
143.	*Hydrilla verticillata*	Jhangi/ Kureli	Hydrochariataceae	-	+
144.	*Nelumbo nucifera*	Lotus	Nelumbonaceae	-	+
145.	*Nymphaea alba*	Water lily	Nymphaeaceae	-	+
146.	*Pistia stratiotes*	Jal kumbhi	Araceae	-	+
147.	*Trapa nactans*	Singhada	Lythraceae	-	+
148.	*Typha angustata*	Elephant grass	Typhaceae	-	+

(+) Shows: Presence of the species and (-) Shows: Absence of the species

Status of Rare, Endangered and Threatened **(RET) Species**

According to Botanical Survey of India, no Rare, Endangered and Threatened (RET) species of flora were found in the study area. *Anogeisus sericea* var *cericea* is endemic to this region.

RARE & ENDEMIC SPECIES	***Dicliptera abuensis, Carvia colloseeys, Ischaemun kingie, Convolvulus blateri, Ceropegia bulbosa*, etc.**
RED DATA SHEET IUCN	***Anogeisus sericea* var *sericea, Begonia tricocarpa, Crotolaria filipe, Indigofera constrata***
MEDICINAL PLANTS	***Markanganis akalkara, Salammisri, Safed Musli, etc.***
PREDOMINANT SPECIES	***Anogeisus pendula, Anogeisus latifolia, Anogeisus sericea, Boswelia serrata, Lannea coromondelica, Butea monosperma, Bamboo, etc.***
INVASIVE SPECIES	***Lantana camara, Parthenium hysterophorous, Prosopis juliflora***

Inventory of faunal diversity of Wild Life Sanctuary

The State Government vide notification dated 7.4.1960 declared the Mt. Abu area as "Reserved Area" under Section 5 of the Rajasthan Wild Animal and Birds (Protection) Act, 1951 and which is a deemed sanctuary under Section 56 of the Wild Life (Protection) Act, 1972. The notification includes areas of Nakki Lake and Mt. Abu town. The State Government has now, in supersession of the Notification dated 7.4.1960, issued a Notification dated 15.4.2008 pertaining to the Mt. Abu Wildlife Sanctuary. In the revised Notification the area of the sanctuary is shown to be about 326 sq. kms.

Table 12:
Inventory of Faunal Diversity of Wild Life Sanctuary, Mount Abu.

	Species Name and Code	Habitat Characteristic	Food Habits	Other Characteristics	Threats	Status
MAMMALS (HERBIVORES)	Pangolin	• Tropical mixed deciduous forests • Open land, scrub, grasslands • In close proximity to villages • Urban Cultivation	• Termites and ants are the primary food source	• Adapts wells to modified habitats • Has a medicinal value	• Poaching	I.U.C.N. Near Threatened
	Chinkara	• Inhabits areas including sand desert and dry	• Can go without water for long	• Avoid human habitation	• Poaching • Problems of feral	I.U.C.N. Least Concern (lower risk)

	Species Name and Code	Habitat Characteristic	Food Habits	Other Characteristics	Threats	Status
		scrub • Flat plains • Hills and light forest	periods and can get sufficient fluids from plants and dew • Grain, Fruit, Vegetation		dogs.	W.P.A Schedule I
	Langur	• Ranges from 100 to 1,700 in tropical rainforest, moist and dry deciduous forest • Near Human Habitats • Sacred groves and open scrub	• Feeds on leaves, fruits, buds and flowers	• Well adapted to cultivated areas • Arboreal semi-terrestrial • Group size varies from 15 to 150	• Habitat Loss • Urban Mitigation	I.U.C.N. Least Concern (lower risk) W.P.A Schedule II
	Sambar	• Thorn and arid forests • Deciduous forests grassland scrub • Evergreen forest • Undulating terrain	• Feeds on 130 to 180 species of plants • Fruits	• Highly tolerant of forest degradation • Highly sensitive to any sort of forest resource extraction activities	• Habitat loss • Poaching	I.U.C.N. Vulnerable W.P.A Schedule III
	Blue Bull	• Avoids dense forest and desert • Dry Deciduous forests • Agricultural areas • Arid areas and scrubland with irrigated agriculture	• Eats grasses, grain leaves, buds and fruit	• A crop menace causing large-scale damages to agriculture crops • Live close to waterholes	• Poaching	I.U.C.N. Least Concern W.P.A. Schedule III
	Mongoose	• Dry and thorn forests • Open Scrub • Near to the human settlements • Cultivated land • Rocky patches • Forest Edges	• Feeds on insects, snakes, small mammals, Birds, Reptiles, Fruits	• Most Common in disturbed areas near garbage dumps • Commensal with humans		I.U.C.N Least Concern (lower risk) W.P.A. Schedule IV
	Hare	• Short grasslands • Barren agricultural fields and crop	• Forbs and grasses constitute the		• Habitat Loss • Poaching	I.U.C.N. Least Concern (lower risk)

	Species Name and Code	Habitat Characteristic	Food Habits	Other Characteristics	Threats	Status
		fields. • Forest Roads • Open Scrub	bulk			W.P.A. Schedule IV
	Porcupine	• Tropical, temperate, shrub land • Rocky hillsides • Grassland and forests • Plantations and gardens	• Feeds on plants, shrubs and leaves • Gnaw on animal's bones for salt • Roots, Fruits, gain	• A board habitat tolerance	• Poaching	I.U.C.N. Least Concern (lower risk) W.P.A. Schedule IV
REPTILES (CARNIVORES)	Crocodile	• Freshwater habitats. • Rivers, lakes and wetlands.	• Feeds on fish reptiles and mammals.	• Terrestrial as well as freshwater		I.U.C.N. Not Listed W.P.A. Schedule I
	Monitor Lizard	• Desert areas to floodplains • Scrubland to forests • Moderate elevations	• Feeds on small mammals, amphibians	• Can also inhabit agricultural areas • Terrestrial as well as freshwater		I.U.C.N. Least Concern (lower risk) W.P.A. Schedule I
	Python	• Inhabits dry areas, from grassland to open forests • Agricultural land	• Feeds on rodents, amphibians	• Terrestrial as well as freshwater		I.U.C.N. Least Concern (Lower Risk) W.P.A. Schedule I
MAMMALS (HERBIVORES)	Leopard / Panther	• Deciduous and evergreen forests • Near Habitation • Dry scrubland and grasslands • Rugged hills and deep valleys	• Feeds on a greater diversity of prey-monkey, reptiles amphibians, birds, Cattle, Dogs	• Territory varies between 30 and 78 km^2	•Habitat Loss •Poaching •Human animal conflict •Decline in prey species	I.U.C.N. Near Threatened W.P.A. Schedule I
	Wolf	• Habitats with suitable food, high prey densities • Dry open Country • Desert and barren uplands	• Feeds on moose, deer, wild boar, caribou, elk (mammals) birds • Also eats smaller prey, livestock, carrion and garbage	• Territory size depends on the availability of prey varying from 25 to 90 square miles	•Habitat loss •Poaching •Human animal conflict	I.U.C.N Least Concern (lower risk) W.P.A. Schedule I

	Species Name and Code	Habitat Characteristic	Food Habits	Other Characteristics	Threats	Status
	Jungle Cat	• Habitats with water and dense vegetable cover • Reed swamps, marsh • Along riverbeds in grasslands and deciduous forests • Near Villages	• Feeds on small animals, insects, fruits and dates • Regularly scavenge carrion and remains of another animals kill	• Inhabits carves that can extend over a distance of 4 to 5 m	• Poaching	I.U.C.N. Near Threatened W.P.A Schedule II
	Hyena	• Dense thickets and scrub forests • Woodlands and grasslands • Rocky terrain • Near human habitation	• Feeds on small animals, insects, fruits and dates • Regularly scavenge carrion and remains of another animals kill	• Inhabits caves that can extend over a distance of 4 to 5 km	•Poaching	I.U.C.N. Near Threatened W.P.A. Schedule III
MAMMALS (OMNIVORES)	Sloth Bear	• Wet or dry tropical and deciduous forests • Scrublands and grasslands • Rugged hills and deep valleys	• Subsist primarily on termites, ants and fruits • Rarely prey on mammals • Fruits, Honey • Vegetation	• Avoid areas where human disturbance is high	• Habitat Loss • Poaching	I.U.C.N. Vulnerable W.P.A. Schedule I
	Ratel	• A wide variety of habitat types- • Montane Forests • Arid grasslands and semi-deserts • Moist Savannas	• Feeds on fish, birds, and reptiles particularly snakes. Invertebrates and insects • Fond of honey	• Adapted to survive in both wet and dry habitats • Range over areas up to 500 km^2	• Poaching for meat or for their pelts. • Many human activities.	I.U.C.N. Vulnerable W.P.A. Schedule I W.P.A. Schedule III
	Palm Civet	• Evergreen and deciduous forest • Agricultural areas • Around human habitations	• Feeds on fruits like mango, chiku • Feeds on mice, inserts small vertebrates and rodents	• Adaptive to habitats with sufficient foods, tall trees or rock crevices.	• Poaching for illegal trades.	I.U.C.N. Least Concern (lower Risk) W.P.A. Schedule III
	Jackal	• A wide variety of habitat types- • Forests and	• Feeds on birds, reptiles, amphibians	• Tolerance of dry habitats	• Poaching	I.U.C.N. Least Concern (lower Risk)

	Species Name and Code	Habitat Characteristic	Food Habits	Other Characteristics	Threats	Status
		mangroves • Agricultural areas • Rural and Semi urban habitats	and small mammals • Also intake fruits and other wastes • Carrion, insects			W.P.A. Schedule III
	Wild Bear	• Tropical rain forests • Temperate woodlands grasslands • Reed Jungles	• Feeds on fruit seeds, roots and tubers • Feeds on earthworms and fishes	• Often venture on to agricultural land to forage		I.U.C.N. Least Concern (lower Risk) W.P.A. Schedule III

NOTE: I.U.C.N. Red List Category

The International Union for Conservation of Nature provides a global approach for evaluating the conservation status of plant and animal species. The Categories being: Least Concern <Near Threatened <Vulnerable <Endangered <Critically Endangered <Extinct in the wild <Extinct. W.P.A. Wildlife Protection Act, 1972 categories wildlife into various Schedules from I to IV- according to the protection status, with Schedule I species having maximum protection to schedule IV having the least.

Leopard and Sloth Bear are distributed throughout the Wildlife sanctuary, Mt. Abu. Panther is the top most predator in the area. Tiger was reported up to 1970 and lions were present up to 1872. Crocodiles, pythons and several snakes are also found. Among invertebrates, crustaceans and insects are common. Butterflies, beetles and moths are also common in occurrence. Out of the 22 animal species, five, i.e. Leopard, Pangolin, Sloth bear, Hyena and Sambar falls under threatened or vulnerable category as per IUCN Red List Data. Places where these animals are frequently seen are Gaumukh, Palanpur point, Sunset point, Anadra point, Trevor tank, Salgaon, Achalgarh, Gurushikhar, Shergaon.

Inventory of Avi-faunal diversity of wild life sanctuary

Avifauna of the area consists of 121 species of terrestrial and water birds, which offers great opportunity for bird watching. The common birds of Abu hills are brown-headed Barbets, Jungle Babblers, Red-vented Bulbuls, Red-whiskered Bulbuls, Peafowl, Black-rumped Flameback, Common Iora, Coucal, White-throated Kingfishers, Plum-headed Parakeet, Spotted Dove, Treepie, Jungle Crow, Brahminy Starling, grey Tits, Black-lored Tits, Ashy Wren Warblers, Franklin's Prinia, Yellow-eyed Babbler, etc.

Endemic species: The White-browed Scimitar Babbler and The Eurasian Black Bird are unique to Mount Abu area.

The best bird trials in Abu hills are Kulgarh nullah trail, tiger trail, Balley's walk, Trevor's tank to Mini Nakki lake trail, Gurushikhar to oriya trek, Gaumukh to Gautum rishi trail (6 kms), Ganesh point to Anadra trail, Arna to Rishikesh trail. Sunset point area is an ideal place for watching birds.

Spatial location of few bird species:

Upper and lower Kodra dam, Nakki lake, wetland near the Alwar Palace, wetland near Safari cottages on the way to Achalgarh and many small check dams support a few species of Ducks and waders. The resident Red-wattled lapwing is omnipresent here. River Terns can be seen some times at Nakki Lake.

The Crested Serpent Eagle and Honey Buzzards are seen near Chippaberi to Achalgarh and Mini Nakki lake area. Flocks of Eurasian Hobby enter the Abu hill in October and can be seen commonly all over the Abu. Shikra is also seen in dense groves of Gaumukh to Achalgarh and Chippaberi areas. The Treepies, Pigmy Woodpeckers, Ioras, White-eye, White-bellied Drongos, Honey Buzzard, Shikra, Jungle Crows, (Koel not seen at Mt. Abu heights), Common Wood-shrike , Alexandrine Parakeet are a few species to be seen at Chippaberi and surrounding areas.

Tiger path is a place where Jungle Fowls and Red Spur Fowls, Treepies, Shikra, Hobby, Crested Serpent Eagle are found, in winters a variety of Warblers and Flycatchers are seen including the Tickell's Blue Flycatcher and Rufous morph of paradise Flycatcher. The Vultures have almost disappeared from Mt. Abu, the hills near Trevor's tank used to be the best haunt for the Longbilled Vultures nesting. List of Avifauna is given in table below:

Threats to birds: Human and vehicular disturbance from tourist inflow and growing traffic on road.

Table 13:
List of avifauna of wild life sanctuary, Mount Abu.

Sl.No.	English Name	Zoological Name
1.	Babbler common	*Turdoides caudatus*
2.	Babbler Jungle	*Turdoides striatus*
3.	Coppersmith Barbet	*Megalaima haemacephala*
4.	White Checked Barbet	*Megalaima virdis*
5.	Blue tailed bee eater	*Merops phillinpinus*
6.	Bee eaterblue checked	*Merops supercilliosus*
7.	Bee eater little green	*Meros oriental*
8.	Brain fever bird/howkcuckoo	*Cuculus varlus*
9.	Bulbul Red vented	*Pyenonotus cafer*
10.	Bulbul Red Whiskered	*Pyenonotus ecosus*
11.	Oriental Honey Buzzard	*Pernis ptilorhyncus*
12.	Bunting Creasted	*Melophus lathani*
13.	Brown rock chat	*Cercomela fusca*
14.	Coot-Common	*Fulica atra*
15.	Cormorant large	*Phalacarocorax carbo*
16.	Cormorant little	*Phalacaroorax niger*

Sl.No.	English Name	Zoological Name
17.	Greater Cousal	*Centrous sinensis*
18.	Crane Sarus	*Grus Antigone*
19.	Crow house	*Corvus splendens*
20.	Crow large billed	*Corvus macrorhynchos*
21.	Cuckoo	*Euchynamis scolopaceus*
22.	Cuckoo pied	*Clamator jacobinus*
23.	Little grebe Dab chick	*Podiceps ruficollis*
24.	Dove Laughing	*Streptopelis senegalensis*
25.	Dove Red Collarged	*Streptopelis tranqubarca*
26.	Dove Spotted	*Streptopelis chinensls*
27.	Black Drongo or king Crow	*Discrurus macrocerous*
28.	Hawk Eagle	*Spizaetus*
29.	Crested serpent Eagle	*Spilornis cheel*
30.	Eagle short toed snake	*Circaetus gallicus*
31.	Egret Cattle	*Bubulcus ibis*
32.	Egret Little	*Egret Garzette*
33.	Egret Median	*Egret intermedia*
34.	Falcon Larger	*Falco Biarmicus*
35.	Fly Catcher grey headed	*Cullalcapa ceylonensis*
36.	Flycatcher whitebrowed	*Rhepadura aureula*
37.	Flycatcher Paradise Asian	*Terisphone paradise*
38.	Flower Pecker thick billed	*Dicaeum agile*
39.	Flower pecker pale-billed	*Dicaeidae erythrohynchos*
40.	Geese Bar headed	*Anser indicus*
41.	Heron Indian Reef	*Egretta gularis*
42.	Black crowned Night-Heron	*Nyotirax nycticobx*
43.	Heron pond Indian	*Ardeola grayli*
44.	Eurassin Hoopooe	*Upupa epops*
45.	Black headed ibis	*Threskiorhis aethiopica*
46.	Iora Common	*Aegithine tiphia*
47.	Jacana Bronze Winged	*Metopedium indicus*
48.	Jacana Pheasanttatled	*Hydrophassainnus Chirurgus*
49.	Jungle Fow Red Spur	*Gallopardix spadicea*
50.	Jungle Fow Grey	*Callus sonneratil*
51.	Kestral	*Falco tinnunculus*
52.	King Fisher Little Blue	*Alcedo atthis*
53.	King Fisher Pied	*Ceryle rudis*
54.	King Fisher with Throated	*Haleyon smurnesis*
55.	Kite Black Winged	*Elanus careeuleus*
56.	Kite Balck	*Milvus Migrans*
57.	Lapwing Rad Watted	*Venellus indicus*
58.	Lapwing Yello Watted	*Vanellus meiabarica*
59.	Lark Ashycrowned Finch	*Eremopterix grisea*

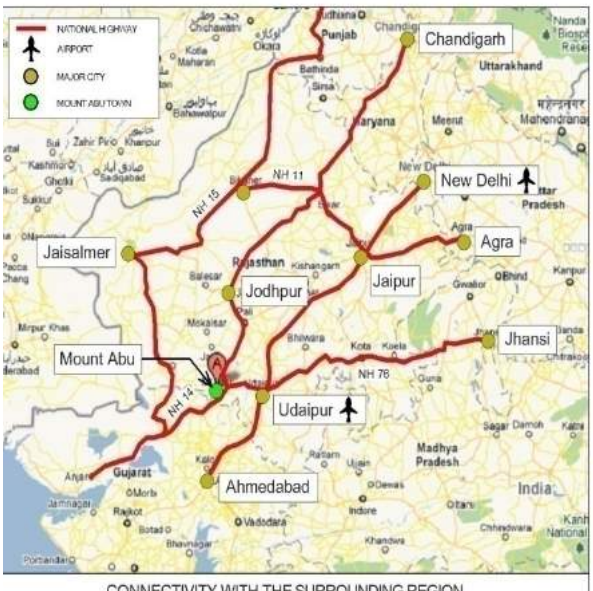
Sl.No.	English Name	Zoological Name
60.	Lark Black Crowned Finch	*Eremopterix nigriceps*
61.	Minivet Scarlet	*Percrocotus flmmeus*
62.	Minivet small	*Percrocotus cinnamomeus*
63.	Munia Black Headed	*Lonchura Malacca*
64.	Munia spotted	*Lonchura punctulata*
65.	Bharamani Starling	*Sturnus pagadarum*
66.	Myna Common	*Acridetheres tristes*
67.	Myna Bank	*Acridetheres ginginenus*
68.	Myna Hill	*Gracula religiosa*
69.	Night Jar Indian	*Caprimulgus asiaticus*
70.	Oriole Golden Eurasian	*Oriolus orolus*
71.	Owlet Spotted	*Athene Brama*
72.	Parakeet Rose ringed	*Psittacula Krameri*
73.	Parakeet Plumheaded	*Psittacula cyanocephala*
74.	Grey Francolin	*Francolinus pondicerainus*
75.	Painted Francolin	*Francolinus pictus*
76.	Indian Peafowl	*Pavo Cristatus*
77.	Pigeon rock	*Columba Livia*
78.	Pigeon Mountain Imperial	*Ducla badia*
79.	Quali Common or grey	*Cournix coturnix*
80.	Robin Indian	*Saxecoloides Fulicate*
81.	Roller Indian	*Coracias benghalensis*
82.	Robin Magpie	*Copysychus saularis*
83.	Sandgrouse Chesnut bellied	*Pterocies exustus*
84.	Sand piper common	*Tringa htpoleucos*
85.	Shikra	*Accipiter badius*
86.	Northern Shoveller	*Ahas clyoeata*
87.	Shrike Long-tailed	*Lanius schach*
88.	Shrike Wood common	*Tephrodornis pondicertianus*
89.	Chestnut tailed Minla	*Minla strigula*
90.	Sparrow House	*Passer domesticus*
91.	Sparrow Yellow Throated	*Petroniaxanthocollis*
92.	Sun bird purple	*Nectarinia asiatlca*
93.	Sun bird Crimson	*Aethopyga siparaja*
94.	Stilt Black winged	*Himantopus himantipus*
95.	Earasian Thick-knee	*Burthinus oedianemus*
96.	Stork white necked	*Cicornia epicopus*
97.	Swallow Barn	*Hirundo rustica*
98.	Swallow Wiretailed	*Hirundo smithii*
99.	Tailor bird-common	*Orthotomus sutorius*
100.	Tit Yellow cheeked	*Parus xanthogenys*
101.	Tern river	*Sterna aurantia*
102.	Tree pie Rufcus	*Dendrocitta vagabunda*

Sl.No.	English Name	Zoological Name
103.	Vulture white rumped	*Gyps benghalensis*
104.	Vulture Egyptian	*Neophron peronopterus*
105.	Wagtail White or pied	*Montacilla alba*
106.	Wagtail large pied	*Montacilla maderaspatensis*
107.	Golden-headed cristicola	*Cristicola juncidis*
108.	Water hen white breasted	*Amanrornis phoenicurus*
109.	Weaver bird common	*Ploceys phillippinus*
110.	Common Flameback	*Dionpium benghalensis*
111.	Yellow crowned /wood pecker	*Picoides maharattensis*
112.	Eurasian Wigeon	*Anas penelope*
113.	White bellied Drongo	*Dicrurus caerulescens*
114.	Spotted Eagle	*Aquila clanga*
115.	Fly Catcher Red breasted	*Musciicapa parva*
116.	Indian Grey Hornbill	*Tockus blrorostris*
117.	White eyed Buzzard	*Butastur teesa*
118.	Pled Bush Chat	*Saxicola leucura*
119.	Grey Tit	*Parus major*
120.	Oriental white eye	*Zostreops- palperbrosa*

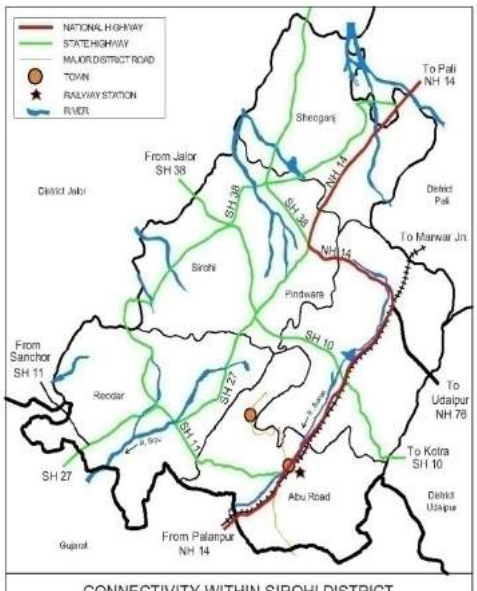
2.12 Road, infrastructure networking & Traffic movement

Road and Transport infrastructure forms a backbone of any economy and plays an important role in the development of a region. Mt. Abu is well connected by Air, Rail and Bus Transport systems. In term of air connectivity Udaipur is the nearest airport, which is served by major stations such as Delhi, Mumbai, Ahmadabad and Jaipur.

Bus transport is available on daily basis from Jaipur, Ahmadabad, Udaipur and Abu Road to Mount Abu.



CONNECTIVITY WITH THE SURROUNDING REGION



CONNECTIVITY WITHIN SIROHI DISTRICT

Nearest Railway station is in Abu road which is located at a distance of 22 km from the city centre. The said station is on the main railways line between Delhi, Palanpur and Ahmadabad and has regular trains from various parts of the country. The total length of roads in Mt. Abu is 34.5 km. The total percentage of area to total land use is 3.34%. Besides Abu road which connects the town, there are 17 km of village roads also. The existing primary town road network includes:

- Major District Road with 15 m right of way acting as major arterial road.
- Pilgrim Road with 7m right of way acting as the bye pass route to tourists going to Dilwara Temple.

The vehicle count of the Mount Abu is provided in Table 17, which indicates heavy influx of the vehicle in Mount Abu area. Likewise, parking spaces available in Mount Abu area is presented in Table 22.

Table 14
Details of vehicle in Mount Abu

Sl.No.	Vehicle Name	Vehicle (nos.)	
		2016-17	2018-19
1	35 Seater Bus	4580	5550
2	25 Seater Bus	1469	1715
3	Tempo Traveler	2715	3837
4	LMV (5 Seat Above)	32789	42196
5	LMV (S Seat)	77466	88666
6	Local Taxi	24030	29607
7	Three Wheeler	144	505
8	Two Wheeler	4952	4192
	TOTAL	**148145**	**176268**

2.13 Parking Spaces Road Length

There are eight locations, where parking facilities are available. These altogether accommodate 835 numbers of vehicles (Table 18).

Table 15

Parking spaces available and their accommodation capacity in Mount Abu area

Sl.no	Parking Location	Address	No. of Vehicles for Parking capacity
1.	Kitchen Garden Parking	Nearby M.K Circle Mount Abu	145
2.	Delwara Parking	Delwara Mount Abu	125
3.	Ashok Vatika Parking	Sunset Road Mount Abu	250
4.	Shivaji Nagar Garden	Shivaji Road Mount Abu	25

5.	Arya Samaj Garden	Nearby Daatda Sea World Mount Abu	75
6.	Skating Ring Park	Nearby B.K Museum	40
7.	Roadways Bus Stand Parking	Roadways Bus Stand Mount Abu	75
8.	Herbal Garden Parking	Nearby Paandav Bhawan Mount Abu	100
	Total		835

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Chapter 3

Recommendations of the Expert Committee

3.1 Introduction

The constituted committee was directed by Hon'ble NGT to provide its recommendations on the following issues:

1. The Committee will undertake comparison of ZMP 2030, in terms of letter of MoEF&CC dated 28.09.2015 and ESZ Notification dated 25.06.2009 and point out the aberrations in the same, besides comparing ZMP 2030 map with reference to pre-existing 2010 map in the light of ESZ notification.
2. Eleven (11) locations noted above must also be specifically looked into.
3. The Expert Committee may also look into the suggestions relating to:
   (a) Prohibiting use of plastics, burning of garbage and/ or any other waste,
   (b) Proper laying of high tension lines for protecting animals and birds life, particularly in Salim Ali Bird Sanctuary area,
   (c) Preventing forest fire,
   (d) Conservation of Nakki lake and water quality management,
   (e) Siting and operation of Solid Waste Processing Plant in accordance with Solid Waste Management Rules, 2016 (with reference to the sanctuary area),
   (f) Any other issues relating to environment management which may become a part of ZMP 2030, including observations of this Tribunal in Kasuali case.
4. The Committee will also look into the points of concern raised by the applicant in reference to:
   (a) Conversion of green areas to non-green areas,
   (b) Permissibility of construction on higher degree slopes,
   (c) Conservation of rocks, water bodies and wildlife and other heritage sites,
   (d) The issue of water scarcity,
   (e) Carrying capacity of Mount Abu with regard to number of tourists and vehicles to be permitted having regard to the availability of the infrastructure without relying upon future projection, as required in terms of ESZ notification.

3.2 Meetings, Site Visits and Stakeholder Consultations Undertaken by the Committee

The committee had three meetings, which were held on 16.12.2019, 16-17.01.2020 and 24.01.2020. The second meeting of the committee was held at Mount Abu on 16.01.2020 and 17.01.2020 during which, extensive field visits and stakeholder consultations were also undertaken. Details of the discussions held and field visits undertaken are as below:

3.2.2 First Meeting dated 16.12.2019

First meeting of committee constituted by Hon'ble National Green Tribunal vide OA no 312/2016, Dr. Arun Kumar Sharma V/s MOEF was held on 16.12.2019, at meeting hall of Rajasthan State Pollution Control Board, Jaipur in presence of Nodal Officer cum Member Secretary (RSPCB).

Attendees:

- Nodal Officer cum Member Secretary (RSPCB)
- Chief Town Planner- GoR
- Assistant Chief Town Planner- GoR
- Dr. G.C.S. Negi- G.B. Pant National Institute of Himalayan Environment, Almora (Uttarakhand)
- Dr. K. Luirei- Wadia Institute of Himalayan Geology
- Shri Ajay Agarwal –CPCB
- Dr. Bilas Singh-AFRI
- Sh. Pankaj Verma - MOEF & CC
- Prof Meenakshi Dhote, School of Planning & Architecture, New Delhi

The minutes of committee meeting are enclosed herewith as ***Annexure 3A.***

At the onset, Nodal Officer cum Member Secretary, RSPCB briefed the committee about various directions issued by Hon`ble NGT in the matter and the compliance desired from various stakeholders Department. Chief Town planner, GOR explained the sequence of events since beginning of formation of ESZ in year 2009 to final ZMP -2030 Notifications in year 2015 to make committee familiar with the issue. The committee deliberated upon various issues and the committee took following decisions:

1. In compliance of the Hon'ble NGT order, the requirement of any other expert from any other institution / field was deliberated upon and it was decided that one specialized person from the field of GIS and remote sensing shall be made part of the committee. The

committee finalized that Nodal officer should seek nomination of expert from the Regional Remote Sensing Centre (RRSC) - West, Indian Space Research Organization (ISRO), situated at Jodhpur.

2. Second meeting of the committee should be held at Mount Abu for visiting disputed sites and conducting meeting with the stakeholders.
3. A responsibility matrix based on area of expertise & discussions during the meeting shall be drawn and circulated among the members.
4. Chief Town Planner should provide a list of stakeholders.
5. Chief Town Planner should provide revenue maps and land records of 10 impugned land parcels available to the committee.

3.2.3 Second Meeting dated 16.01.2020 & 17.01.2020:

Second meeting of the Special Expert Committee was held on 16.01.2020 to 17.01.2020 at Mount Abu, Rajasthan under Nodal Officer cum Member Secretary (RSPCB). A separate meeting was also held with stakeholders on date 17.01.2020 at conference hall of Hotel Shikhar to know the views of all the stakeholders. The minutes of committee meeting are enclosed herewith as ***Annexure 3B.*** The Nodal Officer Smt. Shailja Derval, then MS, RSPCB presided over the meeting and deliberated upon item-wise mandate and scope of the Committee. At the end, the Nodal Officer requested each member to sketch out their finding and shall share with the committee during next meeting scheduled on 24.01.2020 at Rajasthan House, New Delhi for the preparation of report in view of certain data gap in the report. She further requested each participating department to supply the requisite information to the members at the earliest since the report belonged to the Hon'ble NGT.

The committee member deliberated upon various issues and following decisions were taken:

1. Hard copy of Study Report carried out by School of Planning and Architecture, New Delhi, ZMP-2030 and building by – laws shall be provided to committee. (Action by – Chief Town Planner, GOR)
2. Data regarding vehicular movement and vehicles in the town for last three years shall be provided to committee. (Action by Nagar-Palika, Mount Abu)
3. Data regarding tourist inflow in the town for last three years shall be provided to committee. (Action by Nagar-Palika, Mount Abu)
4. KML files of 10 impugned polygons with area marked on Google maps and AutoCAD files shall be provided to the committee. Constructable area of each polygon after application

of building by laws of impugned site shall also be provided. (Action by- Chief Town Planner, Jaipur)

5. Authenticated maps of nearby forest land of 10 impugned sites shall be provided to the committee. (Action By- Forest Department)
6. Data regarding position of ground water and bore wells in Mount Abu shall be provided to committee. (Action by – GWD).
7. Detailed report on factual status of sunrise housing land shall be provided to committee. (Action by- forest department) Maps, details of sites and proposed plan and the proposed colony located behind Maganji, shall be provided to committee. (Action by- Nagar Palika, Mount Abu)
8. The next meeting shall be held on 24.01.2020 in New Delhi for further discussions and report preparation. Meeting notice would be issued separately. (Action by- MS, RSPCB)

Field visits and Stakeholder Consultations

In addition to the above meeting, the Committee members visited all impugned sites on 16.01.2020 & 17.01.2020 to know the ground realities. This is to be noted that on ground, there are only 10 sites which are marked as impugned, as there is repetition of areas in Salim Ali Bird Sanctuary and Takhtawala Area, which has already been left with certain condition vide Hon'ble NGT order dated 31.01.2018. Photographs of the impugned sites taken during the visits are given at section 2.1.5.

Besides the visits, various stakeholders were invited in the meeting and they were requested to provide their views / grievances on the issues listed in the matter. Dr. Arun Sharma, petitioner in the matter, was also invited in the meeting; however, he could not attend the meeting. Later on the petitioner was contacted telephonically and was requested to forward his objections / comments / suggestions /details on the issue through email. Copy of the reply mailed by the petitioner has been enclosed herewith as ***Annexure 4.*** In this issue, within the framework of the mandate given by the committee almost all the objections / comments / suggestions have been considered by the committee.

3.2.4 Third meeting dated 24.01.2020:

The meeting was held at Rajasthan House New Delhi. The following issues were discussed:

1. To request Hon'ble NGT for the extension of time for compilation of the report as the deadline is 31.01.2020. (Action: by Nodal Officer)
2. To request Director, Wadia Institute of Himalayan Geology, Dehradun reg. continuation of Dr. Vikas as Expert Committee Member, since he was present during the site visit to

Mount Abu. (Action by: Nodal officer)

3. The remaining data, documents and maps shall be sought from relevant departments/ agencies. (Action by: Nodal officer)

The minutes of committee meeting are enclosed herewith as ***Annexure 3C.***

3.2.5 Views of Expert Committee Members after Field Visit

Suitability of 10 identified sites within Mount Abu ESZ as reviewed by the expert committee based on the site visit / ground verification as well as interactions with the local residents, Mount Abu Municipality officials, Town Planning Department officials as well as other stakeholders during 16-17 January 2020 are given below:

Table 16

Suitability of 10 identified sites within Mount Abu ESZ as reviewed by the expert committee based on the site visit/ground verification as well as interactions with the local residents/ Mount Abu Municipality officials/Town Planning Department officials/other stakeholders during 16-17 January 2020

Name of Site	Location (Lat & long with Accuracy/ Altitude); Slope (0°)	Present land use & Vegetation type/ Cover (%)	Recommendation (All these construction should comply the norm of 50 m away from forest boundary and from water body and 100 m from wetland/river)
Inside Salim Ali Bird Sanctuary	24°36'40.50"N 72°43'59.61"E (±5m) 1183 m; most of the land at this site has slope >20°	Natural Forest & Moderately Dense Forest (>40%)	• May not serve the purpose of residential location for the local residents. • This site is not suitable for construction from geological as well as ecological perspective as per ESZ norms. As the land is fragile in terms of soil cover and rock strength thus prone to erosion and site is adjoining the forest block and close to Mt. Abu Sanctuary and found to be a pristine forest. **Conclusion: Site is not suitable for construction.**
Next to Aranya Village	24°35'21.40"N 72°43'31.42"E (±3m) 1198 m;	Vacant; Open scrub/ with isolated trees (<10%)	• Soil cover is thin and intact • It also seems a lot of electrical energy will be consumed to fulfill the needs of the water supply for a longer span of lifetimes at this location due to the limited source of water supply in the ESZ zone of Mount Abu. • Mostly the site has slope <20° but the approach road to the site has to be constructed on steeper slope (>20°-30°).

Name of Site	Location (Lat & long with Accuracy/ Altitude); Slope (0°)	Present land use & Vegetation type/ Cover (%)	Recommendation (All these construction should comply the norm of 50 m away from forest boundary and from water body and 100 m from wetland/river)
			• Treacherous terrain with steep slopes poses threat of land destabilization to allow any construction. • triggering of any type of landslide due to constructional activity may pose danger to the lives and property of the residents. • Even the scope for sewage and solid waste disposal is also limited. Therefore, it will not be a wise decision to perform any constructional activity at this site. **Conclusion: Site is not suitable for construction.**
Behind Maganji Mountain	24°34'53.79:N 72°43'14.15"E (±3m) 1188 m; Most of the land at this site has slope<20°	Vacant, about 40% areas are exposed rocks; Open scrub/ isolated tress (<10%)	• No Forest patch in the vicinity • A deep Nala is available in northern margin. • Hard rock at this site will not lead to any damage to the landscape for construction. • Sewer line can easily be connected with the main line on the road. • ESZ criteria (50 m away from forest boundary and water body needs to be complied upon). • Site is suitable for residential purpose. In order to be

Name of Site	Location (Lat & long with Accuracy/ Altitude); Slope (0°)	Present land use & Vegetation type/ Cover (%)	Recommendation (All these construction should comply the norm of 50 m away from forest boundary and from water body and 100 m from wetland/river)
			consistent and coherent with the spirit and mandate of the ESZ 2009 the residential plots / houses should only be earmarked for local administration. **<u>Conclusion: Site is suitable for construction.</u>**
Hill Sahil	24°34'50.77"N 72°43'37.53"E (±3m) 1159 m; Most of the land at this site has slope>30°	Natural Forest; Moderately dense forest (>40%)	• Most of the land at this is highly vegetated and fragile in terms of soil cover even at places where the slope is gentle • This is hilly site as implied by its name and the steep slope is not suitable for construction. • Any type of construction will lead to destruction of this pristine forest patch with very old trees of endemic species *Anogeissus sericea* and wildlife habitat. • Therefore, in terms of stability, this is the site that should not be allowed for any construction from the geological and ecological point of view. Also, any kind of construction at this location may disturb the ecosystem as per ESZ norms. Therefore, this site should be kept as such.

Name of Site	Location (Lat & long with Accuracy/ Altitude); Slope (0°)	Present land use & Vegetation type/ Cover (%)	Recommendation (All these construction should comply the norm of 50 m away from forest boundary and from water body and 100 m from wetland/river)
			Conclusion: Site is not suitable for construction.
Sunset Road Scheme	24°35'11.49"N 72°42'13.79"E (±3m) 1169 m; Most of the land at this site has slope <20°	Residential (Partly built/partly Vacant); Open scrub/isolated trees (<10%)	This site is stable with the granite as basement rock. • This site is close to the forest land. Therefore, the ESZ criteria of a buffer zone with forest and water stream must comply before the start of any construction activity. • Already existing provision for farm house in state of Rajasthan may be made applicable with allowance of 10% of total area of construction as built up area or 5000 sq ft. (whichever is less) subject to NOC from Forest dept. **Conclusion: Site is suitable for construction.**
Sunrise Housing Society	24°34'55.26"N 72°43'38.12"E (±3m) 1137 m; Most of the land at this site has slope<20°	Vacant; Open scrub with isolated trees (>20%)	The basement rock is granite and is well exposed at this location with very thin soil cover. • The site is near a local natural stream (*Nala*). Therefore, the ESZ criteria of the buffer zone with water stream and forest must be complied before any constructional activity as per norms. • Site is surrounded by habitation so it may cater to the residential needs of the local people. • Thus, this site is stable and suitable for the construction of the

Name of Site	Location (Lat & long with Accuracy/ Altitude); Slope (0°)	Present land use & Vegetation type/ Cover (%)	Recommendation (All these construction should comply the norm of 50 m away from forest boundary and from water body and 100 m from wetland/river)
			residential complex. • Construction may be allowed following criteria laid down in ESZ **Conclusion: Site is suitable for construction.**
Arna Village	24°34'21.32"N 72°45'14.37"E (±3m) 994 m; Most of the land at this site has slope <20°	Vacant ; Open scrub with isolated trees/Agricultural Land (<10°)	This site is stable in terms of erosion. Soil cover is thin and intact. • At present, the land is vacant and is also well connected with the Abu Road-Mount Abu road. • Geologically, the site is suitable for proposed construction as the basement rock is massive granite, provided that the ESZ criteria of a buffer zone with forest and water stream be complied during construction. **Conclusion: Site is suitable for construction.**
Mohanpura	24°34'59.21"N 72°43'08.25"E (±3m) 1161 m; Most of the land at this site has slope<20°	Vacant rocky patch; Rocky terrain with some isolated trees in adjoining slopes	• The soil cover is thin, and the basement rock granite is well exposed at this location. The site is less prone to any natural geological hazard. • Thus, this site is suitable for construction as per ESZ norms. • ESZ criteria of 50 m away from forest boundary and water

Name of Site	Location (Lat & long with Accuracy/ Altitude); Slope (0°)	Present land use & Vegetation type/ Cover (%)	Recommendation (All these construction should comply the norm of 50 m away from forest boundary and from water body and 100 m from wetland/river)
			body needs to be complied upon. **<u>Conclusion: Site is suitable for construction.</u>**
Hetamji	24°34'35.72"N 72°43'36.81"E (±3m) 1139 m; Most of the land at this site has slope>20° & high slopes (that even reach >30 degree	Vacant/partly built-up ; Open forest with >30% tree cover in sloppy area Phoenix trees in valley area	This site is considered for residential settlement for the expansion of the local population in the ZMP 2030. • At this site two domains of the landscape have been identified (i) domain with of low slopes having slopes <20° that is geologically stable and suitable for construction and the domain with high slopes (that even reach >30°) is not geologically stable for construction • Most of the area falls over 20° slope and is more prone to erosion and should not be put under construction. • Gently sloping land towards the road side (< 20 degree) has a natural stand of *Phoenix sylvestris* (Khajoor tree) that should be protected. **<u>Conclusion: Site is not suitable for construction.</u>**
Near STP plant	24°34'38.14"N 72°43'57.77"E (±3m)	Vacant/agriculture; Open scrub/ with tree and shrubs along the hill top and the slopes.	This site is considered for the (i) tourism center (ii) residential buildings in the ZMP 2030. The proposed site for residential buildings covers the land of

Name of Site	Location (Lat & long with Accuracy/ Altitude); Slope (0°)	Present land use & Vegetation type/ Cover (%)	Recommendation (All these construction should comply the norm of 50 m away from forest boundary and from water body and 100 m from wetland/river)
	1139 m; Two domains of land at this site is available. Partially, the site has slope>20° and partially <20°.		low slopes that are geologically stable as well as the land with a high slope domain that is not geologically stable for construction. • At this site, the bedrock is hard and compact with negligible weathering. In the stable slope region, no prominent fractures/joints are developed. • At places the measured slope towards STP site was found > 20 degree even the landscape is fragile in terms of soil erodibility. Thus high slope domains must be kept as such. • The proposed tourism facility centre at the gentle slopes may be allowed. But may disturb the wildlife ecosystem. • Although the low slopes domain may be suitable for construction, geologically. But this site is the habitat of the wild animals. For example, footprints of the sloth bear were also observed during the field visit. Therefore, any construction may disturb the wildlife ecosystem. Therefore, any construction must not be allowed to preserve the ecosystem of this region.

Name of Site	Location (Lat & long with Accuracy/ Altitude); Slope (o°)	Present land use & Vegetation type/ Cover (%)	Recommendation (All these construction should comply the norm of 50 m away from forest boundary and from water body and 100 m from wetland/river)
			• The construction may be allowed in the land having gentle, i.e., stable slopes while the steep slope region closes to the cliff of the hill should be kept untouched. **Conclusion: Site is not suitable for construction.**

- In compliance to the GoI, Ministry of Environment & Forests Notification New Delhi June 25, 2009 Gazette Notification (Page 2) about regulations in the ESZ clause (iv), the following need to be fulfilled:
- "No change of land use from green uses to non-green uses shall be permitted in the ZMP, except that strictly limited conversion of agricultural lands may be permitted to meet the residential needs of the existing local residents together with natural growth of the existing local population, without the prior approval of the State Govt." For this purpose, the proponent will have to submit evidence of his/her being local residents as per the standard norms of the Rajasthan Govt.
- To accommodate the local people's residential needs for their natural growth, house construction should be allowed on priority.

Further pointed contention on behalf of the applicant is that ZMP 2030 had deficiencies as follows:-

INPUTS RELATED TO ADDRESSING DEFICIENCIES IN ZMP AS PER NGT ORDER dated 07.11.2020			
	Deficiencies	**Details in the ZMP 2030**	**Response**
i.	ZMP agrees that no construction is to be permitted in the wetland within 50 meters from the water bodies and wherever possible such buffer zone along the wetlands should be wider. Requirement of buffer zone between construction and the wetlands should have been atleast 100 meters, as per study referred to in the ZMP itself in Chapter – III.	Section 10.2.1 Buffers Zones along Wetland The buffer zone identified along the riparian corridors and wetlands.	100 meters as mentioned in Chapter -III has been arrived on the basis of runoff from watershed and is desirable however during the deliberations implementation of the same was found difficult. The wetlands rule notification of 29th November 2010, of MoEF & CC states a minimum of 50 meters buffer. Hence the same has been suggested.
ii.	Having regard to the fact that the soil of the hills is loose and the area has potential for landslides, no development should be allowed at slopes having 35 degree or more. Hetamji and Hill Sahil have slopes higher than 35 degree. The same have been described as residential. Thereby, there is possibility of construction being allowed.	20° slope is equal to 36.4 percentage slope. The ZMP has considered slopes greater than 35 percent as highly sensitive and no development has been suggested on them. As described in earlier sections, individual resources have been mapped based on their inherent sensitivity and value - Land Cover , slope , wetland-riparian buffer zone in shades of gray , soil productivity , and wildlife habitat. In order to identify potential areas for development, these maps have been overlaid to produce a composite ecological value maps (refer Map 3.11 and 3.12) illustrating areas which have high, moderate and low ecological values for all the resources combined. To do this, the classes have been rated from 1 to 3 for each of these resource categories based on their ecological value – higher the value, higher the score. However, highly sensitive slopes (slope >35%) and high value Wetland-Riparian buffer zone classes have been	The details regarding same have been incorporated in Table 16. As per notification and ZMP no construction above 20-degree slope.

INPUTS RELATED TO ADDRESSING DEFICIENCIES IN ZMP AS PER NGT ORDER dated 07.11.2020			
	Deficiencies	**Details in the ZMP 2030**	**Response**
		assigned a score of 10 instead of 3. This is so because irrespective of the values for any other natural resource, areas with slopes above 35% are unsuitable for any construction activity, and buffer zones need to be conserved and protected against any development activity for the sheer need to protect the quality and quantity of the restricted resource - water. The greys of the overlapped map corresponded to scores from 4 to 29. Areas with score ranges of 4-5, 6 -9, and 10-29 were grouped into low, moderate, and high value classes respectively.	

INPUTS RELATED TO ADDRESSING DEFICIENCIES IN ZMP AS PER NGT ORDER dated 07.11.2020

<table>
<tr><th></th><th>Deficiencies</th><th>Details in the ZMP 2030</th><th>Response</th></tr>
<tr><td>iii.</td><td>There is degradation leading to wildlife decline, as noted in ZMP. This requires invocation of Precautionary Principle while permitting any development in the area.</td><td>Table:3.3: Census (Population Figures Of Important Animals During Last Three Census)
<table><tr><th rowspan="2">S.No.</th><th rowspan="2">Name of Animals</th><th colspan="3">YEAR</th></tr><tr><th>2008</th><th>2009</th><th>2010</th></tr><tr><td>1.</td><td>Panthers</td><td>28</td><td>27</td><td>29</td></tr><tr><td>2.</td><td>Sloth Bear</td><td>132</td><td>138</td><td>182</td></tr><tr><td>3.</td><td>Sambhar</td><td>30</td><td>35</td><td>42</td></tr><tr><td>4.</td><td>Blue Bell</td><td>302</td><td>291</td><td>328</td></tr><tr><td>5.</td><td>Hyena</td><td>88</td><td>92</td><td>113</td></tr><tr><td>6.</td><td>Langur</td><td>*</td><td>*</td><td>*</td></tr><tr><td>7.</td><td>Jackal</td><td>142</td><td>*</td><td>195</td></tr><tr><td>8.</td><td>Grey Jungle Fowl</td><td>425</td><td>453</td><td>646</td></tr><tr><td>9.</td><td>Wild Boar</td><td>195</td><td>184</td><td>284</td></tr><tr><td>10.</td><td>Porcupine</td><td>84</td><td>88</td><td>158</td></tr><tr><td>11.</td><td>Hare</td><td>*</td><td>*</td><td>*</td></tr><tr><td>12.</td><td>Wolf</td><td>0</td><td>0</td><td>*</td></tr><tr><td>13.</td><td>Mongoose</td><td>*</td><td>*</td><td>*</td></tr><tr><td>14.</td><td>Jungle Cat</td><td>69</td><td>92</td><td>98</td></tr><tr><td>15.</td><td>Monitor Lizard</td><td>*</td><td>*</td><td>*</td></tr><tr><td>16.</td><td>Peacock</td><td>*</td><td>*</td><td>*</td></tr><tr><td>17.</td><td>Civet</td><td>85</td><td>75</td><td>97</td></tr><tr><td>18.</td><td>Crocodile</td><td>6</td><td>8</td><td>5</td></tr><tr><td>19.</td><td>Caracal</td><td>3</td><td>*</td><td>*</td></tr><tr><td>20.</td><td>Vulture</td><td>9</td><td>0</td><td>*</td></tr><tr><td>21.</td><td>Birds of Prey</td><td>23</td><td>21</td><td>34</td></tr><tr><td>22.</td><td>Fox</td><td>-</td><td>-</td><td>45</td></tr></table>Source: Annual Plan of Operations Wild Life Sanctuary; Mount Abu.
Urban Development Department, Government of Rajasthan</td><td>As per data collected from Annual Plan of Wild Life Sanctuary given on page III 17 the ban in construction has helped in increasing the number of species.</td></tr>
<tr><td>iv.</td><td>Nakki lake is a ‘no construction zone’ as per ESZ but ZMP permits organized commercial activities for facilities to the tourists and such activities could be cafeteria, shopping areas and accommodation.</td><td>Section 12.3 Salient Features of the Plan
6. Provision of facilities at Nakki Lake
Nakki lake being the focal point of the town attracts a large number of touri
lakefront seriously lacks adequate facilities. The lakefront needs to be plan
commercial activities, restructuring of access of shops, parking, pedestria
infrastructural facility.</td><td>The section mentions organized activity, restructuring entrance and providing infrastructure. There is no mention of accommodation.
Section 10.7 of ZMP, pages X-22 to X-25 has mentioned protection of Nakki lake and its entire catchment.</td></tr>
</table>

INPUTS RELATED TO ADDRESSING DEFICIENCIES IN ZMP AS PER NGT ORDER dated 07.11.2020			
	Deficiencies	**Details in the ZMP 2030**	**Response**
			This needs to be adhered
v.	ESZ notification provides for conservation of Toad rock but the ZMP has provision for ropeways which may result in rock not being conserved as required.	The ZMP suggest there is potential for ropeways, trekking, camping, etc.	Rocks in the area have to be protected as per ESZ notification.
vi.	The ZMP provides for 6700 tourists per day and also refers to carrying capacity having being under taken, as required under the ESZ notification, but the said carrying capacity report has not been furnished. Thus, carrying capacity has to be carried out to assess number of vehicles to be allowed and number of tourists to be allowed, having regard to the available existing infrastructure.	The carrying capacity for tourists has been calculated for 2030 by assessing existing infrastructure. The assessment has been based on existing infrastructure taking into account existing tourist accommodation and water availability. The following steps were followed 1. Tourist stay areas and their bed Capacity 2. Average stay of tourist 3. Water requirement in the hotels 4. Traffic conditions **Existing Tourism Infrastructure** The tourism infrastructure includes 1. Accommodation, 2. Facilities As per the surveys the average length of stay in Mount Abu for a foreign tourist is 1 day, whereas the average stay for a domestic tourist is 2 days. **Tourist Accommodation** The type of accommodation available in the town varies from hotels that are newly built to retrofitted residential	The number of tourist to be arrived after a detailed carrying capacity study.

<table>
<tr><th colspan="4">INPUTS RELATED TO ADDRESSING DEFICIENCIES IN ZMP AS PER NGT ORDER dated 07.11.2020</th></tr>
<tr><th></th><th>Deficiencies</th><th>Details in the ZMP 2030</th><th>Response</th></tr>
<tr><td></td><td></td><td>buildings of Rajasthan princely states and home stays. The varied accommodation available satisfies different type of tourists and their choices, preferences and affordability. In Mount Abu there are 108 hotels and 97 PG accommodations at present. Mount Abu has 3 heritage hotels with a capacity of approx. 91 rooms and 182 beds.

Tourist Accommodation
<table><tr><th>Type of Tourist Accommodation</th><th>No. of Units</th></tr><tr><td>Four Star Hotels</td><td>1</td></tr><tr><td>Three Star Hotels</td><td>1</td></tr><tr><td>Heritage Hotels</td><td>3</td></tr><tr><td>Unclassed Hotels</td><td>102</td></tr><tr><td>Paying Guest Accommodation</td><td>97</td></tr></table>Source: Tourism Department: Mount Abu 2010

Besides these, Mount Abu also has some dharamshalas and dormitories that mainly cater to the pilgrim tourist coming in the town. The total was arrived to be 6700 on the basis of primary survey.</td><td></td></tr>
<tr><td>vii.</td><td>Rocks in the ESZ area are required to be conserved but provision in the ZMP for adventure tourism permits sport climbing which may require</td><td>Scetion12.4 Development Policy Guidelines for Mount Abu Tourism</td><td>Rocks in the area have to be protected as per ESZ notification so only those forms of tourism should be propagated that does not</td></tr>
</table>

INPUTS RELATED TO ADDRESSING DEFICIENCIES IN ZMP AS PER NGT ORDER dated 07.11.2020			
	Deficiencies	**Details in the ZMP 2030**	**Response**
	drilling of the rock which will be against the spirit of the ESZ.		harm the rocks.
viii.	Forest Policy, 1988 will be violated if there is reduction in green area as a result of activities permitted under the ZMP, permitting converting green areas into non-green areas for facilities to tourists, including construction of hotels and resorts. Thus, mere denial of the State Government that no development on land with tree covers is contemplated and that there will no reduction in green area, does not fully appreciate the impact of ZMP. If green area is to be protected, provision for hotels, resorts etc. has to be deleted.	Proposed landuse Plan 2030 refer footnotes which mention adherence to ESZ notification.	No change of land use from Green uses such as orchards, horticulture areas, agriculture parks and other like places to no green area uses shall be permitted in Zonal master plan.
MoEFCC letter dated 28.09.2015			
i.	Rectification of error apparent on face of land records		
	Any error appearing in land records within Eco sensitive zone shall be corrected by the state govt. after obtaining the view of monitoring committee, once each case and correction of said error shall be intimated to the central govt. in the MOEFCC Provided that the above correction of error shall not include change of land use in any case except as provided under this sub paragraph.	Proposed land use Plan 2030 refers footnotes which mention adherence to ESZ notification.	No change of land use from Green uses such as orchards, horticulture areas, agriculture parks and other like places to no green area uses shall be permitted in Zonal master plan.
ii.	Change in land use pattern in the eco sensitive Zone No change of land use from Green uses such as	Section 10.3 Cultural Heritage (Plan, Proposals and Strategies)	No change of land use from Green uses such as orchards, horticulture areas, agriculture parks and other like places to no green area

INPUTS RELATED TO ADDRESSING DEFICIENCIES IN ZMP AS PER NGT ORDER dated 07.11.2020			
	Deficiencies	**Details in the ZMP 2030**	**Response**
	orchards, horticulture areas, agriculture parks and other like places to no green area uses shall be permitted in Zonal master plan except that Strictly limited conversion of agricultural lands may be permitted to meet the residential needs of the existing local residents together with the natural growth of the existing local population without the prior approval of the state govt. and similarly no change in use of land from tribal uses to __tribal uses shall be permitted without the prior approval of state Govt.	Proposed landuse Plan 2030 refer footnotes which mention adherence to ESZ notification.	uses shall be permitted in Zonal master plan.

1. **The Expert Committee may also look into the suggestions relating to**

(a) Prohibiting use of plastics, burning of garbage/ or any other waste

Recommendations of the Committee: The committee dwelt on the issue and looking the fragile nature of eco-system of Mount Abu and being an important tourist destination, Committee hereby recommends imposing a ban on the use of the following single use plastic items in the ESZ of Mount Abu:

- Plastic / Thermocol (polystyrene) disposable cups, glasses, plates (dishes), bowls, forks and spoons.
- Single use PET plastic water bottles.
- Single use plastic banners & flags.

It may be pointed out that the manufacturing, transport, sale and use of plastic carry bags is already banned in the entire State of Rajasthan vide notification dated 21.07.2010.

As far as the open burning of garbage is concerned, it is already prohibited under the Solid Waste Management Rules, 2016. However, the Municipal Council, Mount Abu should impose strict fines / penalties on the violators, as per the provisions of the Municipal Rules.

(b) Proper laying of high tension lines for protecting animals and birds life particularly in Salim Ali Bird Sanctuary area.

Recommendations of the Committee: Electrocution and collisions of birds poses serious threats to a number of wildlife including birds particularly for the raptors that built their nests on electricity poles or use the poles perches. As forest patches are distributed throughout the municipality area of Mount Abu and Salim Ali Bird Sanctuary area appears a pristine forest with a variety of birds and wildlife too, movement of wildlife is reportedly common in this zone. To prevent death of animals and birds in such eco-sensitive zones covering protected areas and wildlife corridors forests, due to electrocution by the distribution lines, power distribution shall preferably be through underground cable. In case of the overhead lines, the clearance above ground of the lower conductor of 11 KV and 33 KV overhead lines should be as per the CEA (Central Electricity Authority) regulation. In case, where these areas are aquatic in nature, aerial bunched cables or covered conductors would be used as laid down by National Board for Wildlife (NBWL) and accepted by MoEF & CC, Government of India.

(c) Preventing forest fire

Recommendations of the Committee: Forest fires is one of the serious threats like poaching, Illegal felling of trees, disturbance to birds by tourists, Invasive species (*Lantana camara* and *Prosospis juliflora*), introduction of some exotics like *Eucalyptus* and *Grevillea* spp., tourism

pressure and pilgrim pressure, now become a common feature in forests of Mount Abu area and it may increase in future considering the changing climatic conditions. Large human settlement, increasing urbanization due to the importance of Mount Abu as a tourist location, increased anthropogenic activities in forest edges and increasing dryness in the region are major factors responsible for forest fire. Committee recommends adoption of strict guidelines in following prevention activities like creation and maintenance of fire lines and controlled burning to reduce fuel loads as required per the forest working plans including silvicultural practices, such as selective thinning and planting of fire-adapted species. Eradication Lantana from fire prone zones would also reduce the likelihood of wildfire. Furthermore, local communities should also be mobilized to ensure responsible use of fire during camp fire, garbage burning, fetching honey, etc.

(d) Conservation of Nakki lake and water quality management

Recommendations of the Committee: Nakki Lake is a very important water body and tourist destination of Mount Abu. It is very important that the lake is protected from disposal of waste water and municipal solid waste and is conserved in its pristine form. Accordingly, as an immediate measure, there should be a complete ban on discharge of any treated / untreated sewage or industrial effluent into the lake directly or indirectly. Further, the leachates generated from the municipal solid waste dumping areas must be collected and treated separately by the Municipal Council, Mount Abu. Once the ban on use of single use plastics, as recommended above is implemented, it will also help in conservation of water quality of the lake. Further, Rajasthan State Pollution Control Board is already monitoring the lake water quality regularly, under National Water Quality Monitoring Program (NWMP).

As a long term measure, the State Wetland Authority should get an Environmental Conservation Plan for Nakki Lake and get it implemented through the concerned stakeholder departments.

(e) Siting and operation of Solid Waste processing plant in accordance with Solid Waste Management Rules, 2016 (with reference to sanctuary area)

The District Collector Sirohi has recently allotted a piece of land for disposal of Municipal solid waste of Mount Abu near village Mouja Deldar at Khasra no. 49/02. The area of this site is 29 Bigha 16 Biswa. The site is yet to be developed for scientific processing and disposal of waste. At present the Municipal solid waste of Mount Abu is disposed near mudarla Patwar area Amthala. However, a site was close to human settlement therefore this new site has been allotted by the district administration. The proposed site in outside eco sensitive zone of

Mount Abu and is on a flat terrain with little habitation. The committee is of the view that the site is suitable for development of Municipal Solid Waste Management Facility.

(f) Any other issues relating to environment management which may become a part of ZMP 2030, including observations of this Tribunal in Kasuali case.

Recommendation of the Committee:

- Mt. Abu ESZ comprises of twelve villages and a Municipal area. The solid waste management practices adopted by the Municipal body are not extended to the villages. Therefore, State Government is advised to initiate awareness generation program for Gram Panchayats as well as villagers to achieve the goal of Clean Mt. Abu.
- Also, considering the air pollution aspect, the possibility of plying of CNG vehicles or electric vehicles may be explored inside Mt. Abu area.
- To protect Mt. Abu Wildlife from broken glass pieces, lying even in forest areas, due to the tourist behaviour of throwing Beer Bottles all along the roads leading to Mount Abu, till Gurushikar, the DCF, Mt. Abu suggested replacement of alcohol bottles especially all brands of Beer by aluminum tins/cans to minimize the accidental injuries to the soft paws of Sloth Bear and Leopards and other wildlife in the sanctuary area. The offenders should be prosecuted.
- Many of the areas of Mount Abu including sanctuary area have been infested by two invasive species like *Lantana camara* and *Prosopis juliflora*, which requires to be control by complete uprooting and pricking out the newly germinated seedlings in subsequent years.

2. The Committee will also look into the points of concern raised by the applicant in reference to:

(a) Conversion of green areas to non-green areas

Recommendations of the Committee: About 52.5% (1104.2 ha) of total Municipality area of Mount Abu is forest, whereas 21.1% area is under plantation. Any type of construction and developmental activities will lead to destruction of such green patches, where some patches have very old trees and are habitats for wildlife also. Diversion of forest land for other purposes is continued under Forest (Conservation) Act (FCA), 1980. For maintaining standard of living in an urban area, experts proposes 40 sq m green space of high quality to 140 sq m suburb forest area per capita for achieving a balance between Carbon-di-oxide and Oxygen so as to meet the ecological balance for human well being. In general developing countries are adopting a general standard of green space of 20 sq m park area per capita, whereas WHO

recommends that cities should provide 9 sq m undeveloped (unpaved) open space for every inhabitant. Committee feels that in any case, if such conversation is required, it should be as per the standards followed in urban area following FCA (1980) and Urban Greening Guidelines (2014) Issued by Ministry of Urban Development, Government of India, should be strictly followed where there is chances of converting green areas to non-green areas.

No change of land use from Green uses such as orchards, horticulture areas, agriculture parks and other like places to no green area uses shall be permitted in Zonal master plan except that strictly limited conversion of agricultural lands which may be permitted to meet the residential needs of the existing local residents together with the natural growth of the existing local population with the prior approval of the state govt. and similarly no change in use of land from tribal uses to non tribal uses shall be permitted without the prior approval of state Govt.

(b) Permissibility of construction on higher degree slopes

Recommendation of the Committee: As per the provisions of ESZ Notification of Mt. Abu, no development shall be proposed on forest land, buffer areas along water channels and wetlands, or lands having slopes more than 20 degree and lands having substantial tree cover (>20% cover) and area dominated by RET species. These have been adequately reflected in the ZMP.

(c) Conservation of rocks, water bodies and wildlife and other heritage sites.

Recommendation of the Committee: The Government of Rajasthan has proposed Adventure based tourism, adventure sports, adventure trails etc., in Zonal Master Plan. However, no specific location for sports / rock climbing has been proposed. The Committee recommends that a feasibility study for undertaking such projects be carried out considering environmental and other statutory provisions and necessary clearances shall be taken as per the prevailing legislation and guidelines.

As per data collected from Annual Plan of Wild Life Sanctuary given on page III 17 the ban in construction has helped in increasing the number of species. In order to prevent further degradation of the Eco Sensitive Area, Precautionary Principle has to be followed.

Rocks in the area have to be protected as per ESZ notification so only those forms of tourism should be propagated that does not harm the rocks.

(d) The issue of water scarcity

Recommendation of the Committee: There were 5 STPs in Mt. Abu, one big and four small. However, the big STP was not functional at the time of visit of the Committee. The State

Government should re-vive the STP so that the waste water generated from Mt. Abu Municipal area can be treated and re-used.

(e) **Carrying capacity of Mount Abu with regard to number of tourists and vehicles to be permitted having regard to the availability of the infrastructure without relying upon future projection, as required in terms of ESZ notification.**

Recommendation of the Committee: As there is only one double road leading to the hill, carrying capacity calculation based on number of vehicles to be allowed inside Mt. Abu. The Nagar Palika is already maintaining a record of number of vehicles entering per day in Mt. Abu Municipal limits. As a short term measure, the Nagar Palika can hold the tourist at entry point if it is exceeding the carrying capacity on a particular day.

Detailed carrying capacity of the hill station will depend on the water availability, sewage treatment capacity, present land use, tourist accommodation available and planned, existing air quality, parking spaces, etc. Accordingly, the Local Authority may get a detailed carrying capacity study conducted through eminent institution based on the guidelines framed by CPCB and regulate the tourist traffic / number of vehicles as per the recommendations of the study.

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Annexure – V : Summary of Events

Eco-Sensitive Zone (ESZ) &. Zonal Master Plan 2030 (ZMP 2030) of Mt. Abu
[Before the National Green Tribunal Principal Bench, New Delhi Original Application No. 312/2016 (M.A. No. 212/2019 & M.A. No. 227/2019)]

- First Master Plan of Mount Abu 1981-2001 was approved by the State Government on 13.02.1990 as per the provision of Urban Improvement Act 1959. The term of this Master Plan was extended upto 2006 by State Government Notification dated 17.09.2002.
- The State Government issued notification for Urban Area for preparation of second Master Plan for horizon year 2025 on 17.09.2002.
- Draft Master Plan 2002-2025 was published for public objections/suggestions on 31.05.2003 as per the provision of U.I. Act 1959.
- The draft Master Plan 2025 was sent to the State Government on 15.03.2004 and again on 06.11.2004 for approval. But the same was not approved by the State Government.
- Ministry of Environment, Forest and Climate Change by Notification dated 25.06.2009 declared the Mount Abu as the Eco-Sensitive Zone (ESZ)
- Director, School of Planning and Architecture, New Delhi appointed as consultant for preparation the Zonal Master Plan for Mount Abu Eco-sensitive zone.
- The Zonal Master Plan (ZMP) shall demarcate all the existing village settlements, tribal areas including tribal hamlets, types and kinds of forests, agricultural areas, fertile lands, green areas, horticultural areas, orchards, lakes and other water bodies, natural heritage sites including points (such as Sunset Point) and man-made heritage sites, steep slopes, drainage channels, first order streams, ground water recharge areas and areas rich in ground water, spring recharge areas, spring lines and other environmentally and ecologically sensitive areas.
- No change of land use from green uses such as orchards, horticulture areas, agriculture parks and other like places to non green uses shall be permitted in the Zonal Master Plan, except that strictly limited conversion of agricultural lands may be permitted to meet the residential needs of the existing local residents together with natural growth of the existing local populations without the prior approval of the State Government .
- No change in use of land from tribal uses to non tribal uses shall be permitted without the prior approval of the State Government.
- Detail studies and analysis of the various environmental and ecological aspect, natural and manmade heritage etc., were carried out by the consultant and a draft of Zonal Master Plan (ZMP) was submitted by the consultant.
- Draft ZMP Published for public objections/suggestions from 16.09.2011 to 26.09.2011.
- Draft ZMP again public objections/suggestion were invited from 03.09.2012 to 12.09.2012 on the modifications due to decision taken in the monitoring committee.
- The Expert Committee of MoEF, GoI in its eighth meeting held on 03.12.2014 considered the Draft Zonal Master Plan.

- The approval of Zonal Master Plan of Mount Abu Eco sensitive zone was received from MoEF, GoI vide letter dated 28.09.2015.
- Notification under Environment (Protection) Act, 1986 (Central Act no.29 of 1986) was issued by the Environment Department, Government of Rajasthan on 29.10.2015.
- Dr. Arun Kumar Sharma (Applicant) Versus Ministry of Environment, Forest & Climate Change (Respondent) challenged the ZMP 2030 as notified on 29.10.2015 with the grievance that land use change provided therein was not consistent with the ESZ notification particularly with the reference to 10 specific locations.
- Location mentioned in the Hon'ble NGT order dated 30.01.2018 :
    I. Inside salim ali Bird Sanctuary
    II. Next to Arnya village
    III. Behind Magangis mountain
    IV. Hill Sahil
    V. Sunset road Scheme
    VI. Sunrise Housing Society
    VII. Arna Village
    VIII. Mohanpura
    IX. Hetamji
    X. Near STP plant
    - Tribunal directed constitution of an expert Committee with two representatives of MoEF&CC, representative of School of Planning and Architecture, Delhi - the Institution which was hired as consultant by the State of Rajasthan and representative of Central Pollution Control Board.
    - The Tribunal didn't agree with this committee report submitted to NGT on 04.09.2019.
    - The NGT directed further to take the work by a modified committee with expert members from G.P. Pant Institute, Almora, Uttarakhand, Indian Council of Forestry Research and Education, Dehradun, Wadia Institute of Himalayan Geology, Dehradun, Scientist from MoEF & CC, Senior official from the Central Pollution Control Board, New Delhi and Representative from School of Planning and Architecture, New Delhi. Member Secretary, Rajasthan State Pollution Control Board (RSPCB), shall be the member and Nodal Officer, who shall ensure the compliance.
    - The Committee will be free to associate any other Expert or Institution.
    - RRSC (West), NRSC/ISRO, Jodhpur has been asked to provide support especially for remote sensing and GIS related issues.
    - The Committee will be at liberty to consider the viewpoint of all the stakeholders. A meeting was held at Mt. Abu during 16-17 January 2020. The committee member also visited all 10 disputed sites for physical verification.
    - A meeting was held on 24.01.2020 in New Delhi for further discussion and report preparation which was to be furnished to NGT by 31.01.2020.
    - Nodal Officer, ESZ Committee cum Member Secretary, RSCB submitted request letter to NGT on 28.01.2020 for extension of 3 months.
    - NGT has directed to furnish the report at the earliest but not later than three months from the date of issue of order (NGT Order issued on 12 February 2020).

BEFORE THE NATIONAL GREEN TRIBUNAL,
PRINCIPAL BENCH, NEW DELHI

Original Application No. 312 of 2016
(M.A. Nos. 569/2016 & 570/2016)

IN THE MATTER OF :

Dr. Arun Kumar Sharma Vs. MoEF & CC & Anr.

CORAM : HON'BLE MR. JUSTICE U.D.SALVI, ACTING CHAIRPERSON
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER

Present:

Applicant	**Mr. Jhun Jhun Sahran, Adv. in M.A. No. 543/2017** **Ms. Nina R. Nariman and Mr. Anchit Kaushal, Advs. Applicant in Main matter**
Respondent No. 1:	**Mr. Balendu Shekhar, Mr. Sriansh Prakash, Mr. and Mr. Raj Kumar Maurya, Advs.** **Mr. Shiv Mangal Sharma, AAG, Mr. Saurabh Rajpal and Ms. Shikha Sandhu, Advs. for State of Rajasthan** **Mr. Nishit Agrawal, adv for Mr. Pragnesh Shah** **Mr. Pinaki Misra, Sr. Adv., Mr. Nishit Agrawal and Mr. Kushagra Pandey, Advs.** **Mr. Puneet Jain and Mr. Abhinav Gupta, Advs.** **Mr. Pinaki Misra, Sr. Adv., Mr. Nishit Agrawal and Mr. Kushagra Pandey, Advs.**

	Date and Remarks	Orders of the Tribunal
	Item No. 14 **January 19, 2018** **jg**	**M. A. No. 570/2016** Delay occurred in filing the present application is sought to be condoned by the applicant. The present application has been filed to seek cancellation of Zonal Master Plan 2030 for Mount Abu on account of its threat to the Eco Sensitive Zone at the Mount Abu on 27-05-2016 Parties are at consensus that cause of action for the present application first arose when the Zonal Master Plan, 2030 for Mount Abu came into effect on 29-10-2015 and six months period therefrom is the time prescribed within which any application under Section 14 of NGT Act, 2010 has to be filed and the said period expires on 29-04-2016. Thus, we have to consider whether there is any sufficient cause for condoning the delay which has

	Item No. 14 **January 19, 2018**	occurred in filing of this application. The applicant submits that his is a resident of Mount Abu and has been actively involved in the ecological preservation of Mount Abu and the fact of the said Zonal Master Plan coming into effect came to his notice only through his friend Mr. Kashyap Jani, an owner of Saraswati Hotel in Mount Abu in March, 2016 and his pre-occupation in to looking after his 87 year old mother ailing from Rheumatoid Arthiritis, Rheumatoid Iriditis, post glaucoma blindness prevented him from contacting his legal counsel and eventually resulted in delay in preferring the present application. He submits that his mother is entirely dependant on him for support and care. Learned Counsel appearing on behalf of the intervener- Mr. Pragnesh Shah r/o Anand, Gujarat invites our attention to his written submission supported by the affidavit dated 01-08-2017 (page 513-533 Vol. I-B) and submitted that the applicant is well known journalist actively involved in environmental issues pertaining to Mount Abu and is also the member of First Monitoring Committee set up under the Central Empower Committee of the Hon'ble Supreme Court of India and it is for this reason that it is inconceivable that the notification brining Zonal Master Plan, 2030 issued on 29-10-2015 widely published in local newspaper /electronic media would not have come to the knowledge of the applicant in the manner stated in the delay condonation application. Law permits filing of the application within 6 months of the first accrual of the first cause of action. Law does not say anything the individuals desire to

	Item No. 14 **January 19, 2018**	initiate about a legal action should start from accrual of the first cause of action. Many a times even inconceivable things happen and go into making of human actions. The applicant has given the reasons about he being engaged in his obligation to look after his 87 year old mother who is also blind. It is possible that individual may completely devote himself both physically or mentally to lookafter mother . We, therefore cannot rule out the possibility that the applicant could not contact his legal counsel due to his preoccupation with his old ailing mother. sufficient cause for condoning the delay has been given. Delay is condoned. M. A. No. 570/2016 stands disposed of accordingly. Learned Counsel appearing on behalf of the respondent no.2 State of Rajasthan submits that they have clarified their stand vis-à-vis the Master Zonal Plan 2010 in Affidavit dated 25-10-2017 and have annexed the description of the designated green area/forest lands land use plan for Mount Abu Eco Sensitive Zone, 2010 proposed land use plan for Mount Abu Eco Sensitive zone 2030 annexure A-1 to the affidavit. He submits that having shown the green areas in the proposed land use plan of Mount Abu Eco Sensitive Zonal Plan 2030 the grievance made by the applicant no more survives. Learned Counsel appearing for the applicant, however refutes this contention. She admits that the applicant has no quarrel about the land use plan of Mount Abu Eco Sensitive Zone 2010, however, the land use plan for Mount Abu Eco Sensitive Zone 2030 fails to show all

	Item No. 14 **January 19, 2018**	the green areas which were earlier shown in plan of 2010. She submits that she will be placing on record the written submissions in that regard. We, therefore, direct the applicant to prepare a plan showing the areas which were shown as green area in the plan of 2010 but not shown in the plan of 2030 and also the areas which according to the Eco Sensitive Zone notification ought to be shown as green zone distinctly and place such map/plan on record before us on the next date of hearing. List the matter on 30th January, 2018. .....,ACP (U.D. Salvi) .....,EM (Dr. Nagin Nanda)

Item No. 01 Court No. 1

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

Original Application No. 312 of 2016
(M.A. Nos. 569 of 2016, 418 of 2018,
748 of 2018, 807 of 2018 & 1246/2018)

Dr. Arun Kumar Sharma Applicant(s)

Versus

Ministry of Environment, Forest and Climate Change & Anr.

Respondent(s)

Date of hearing: 26.11.2018

CORAM :HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE S.P. WANGDI, JUDICIAL MEMBER
HON'BLE MR. JUSTICE K. RAMAKRISHNAN, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER

For Applicant(s): Mr. Amit Sibal, Sr. Adv. Ms. Nina R. Nariman, Ms. Geetika Kapur and Abhinav Jagannath, Mr. Ambar Bhushan, Mr. Vinay Tripathi, Mr. Sushant Singh and Mr. Ankit Kaushal, Advocates.

For Respondent (s): Mr. Prateek Yadav. and Mr. Raj Kumar Maurya, Advs.
Mr. Saurabh Rajpal and Ms. Shikha Sandhu, Advs. for State of Rajasthan
Mr. Sandeep Mishra, Advocate in MA 748/2018
Mr. C.K. Singh, Sr. Advocate and Mr. Dhaval Mehrotra, Advocates
Mr. Puneet Jain and Mr. Abhinav Gupta, Advocates.
Mr. Pinaki Misra, Sr. Adv., Mr. Nishit Agarwa, Mr. Kushangra Pandey, Advocates

ORDER

1. This application challenges the Zonal Master Plan, 2030 (ZMP 2030) for the Mount Abu Eco-sensitive Zone (MA ESZ). Further prayer is for constitution of an Expert Committee to review the said plan.

2. Averments in this Application are that vide Notification dated 25.06.2009, issued by the MoEF under the provisions of the Environmental (Protection) Act, 1986, Mount Abu was designated as Eco-Sensitive Zone (ESZ). The Notification mentions that the area has significant ecological importance. It comprises of tropical dry deciduous forests at lower altitude and evergreen forests at higher

altitude. Flora and fauna of the region comprise of several endemic and rare species. Besides, Mount Abu has natural heritage such as Nakki Lake and man-made heritage like Dilwara temple apart from other heritage buildings and structures. The Notification notes that adverse impact has been noticed due to degradation of environment with excessive soil erosion on account of water and air pollution and volcanic activities endangering natural resources and affecting health and survival of human beings. The Notification gives boundaries of the ESZ wherein the activities are to be regulated by preparation of a ZMP for the restoration of denuded areas, conservation of existing water bodies including Nakki Lake, management of catchment areas, watershed management, groundwater management, soil and moisture conservation, needs of local community, conservation of heritage sites (both natural and cultural) and their surroundings and such other aspects of the ecology and environment that may need attention.

3. The ESZ notification further provides that the ZMP shall demarcate all the existing village settlements, tribal areas including tribal hamlets, types and kinds of forests, agricultural areas, fertile land, green areas, horticultural areas, orchards, lakes and other water bodies, natural heritage sites including points (such as Sunset Point) and man-made heritage sites, steep slopes, drainage channels, first order streams, ground water, recharge areas and areas rich in ground water, spring recharge areas, spring lines and other environmentally and ecologically sensitive areas and no change of land use from green uses such as orchards, horticulture areas, agriculture parks and other like places to non-green uses shall be permitted in the ZMP, except that strictly limited conversion of agricultural lands may be permitted to meet the residential needs of the existing local residents together with natural growth of the

existing local population, without the prior approval of the State Government. Further, no change in use of land from tribal uses to non-tribal uses shall be permitted without the prior approval of the State Government. With regard to tourism, it is specifically mentioned that a detailed carrying capacity study was to be carried out by the State Government based on existing infrastructure "and not on future projections" of any project that may require environmental or forest clearance. Mount Abu has natural sites such as Nakki Lake, Toad rock, rock formations, waterfalls, pools, springs, gorges, caves, points, walks etc. and plans for their conservation in their natural setting shall be incorporated in the ZMP and Sub-Zonal Master Plan. Strict guidelines shall be drawn up by the State Government to discourage construction activities at or near these sites including in the garb of providing tourist facilities. The general pool reserve areas in the zone shall be reserved. According to the Applicant, the rare species of wildlife are under serious threat by unregulated and impressible developmental activities.

4. The ZMP 2030 has been notified on 29.10.2015, after approval by the MoEF vide letter dated 28.09.2015.

5. According to the applicant, the notified ZMP 2030 is not consistent with the ESZ Notification dated 25.06.2009 in as much as the said plan fails to discourage construction activities at or near the heritage sites, conserve the existing water bodies, permits change of land use by illegal structures. Rock climbing has also been permitted, including sport climbing by fixing permanent anchors. Construction has been allowed on green tracks to benefit some builders.

6. Though, the Ministry of Environment, Forest and Climate Change, (MoEF&CC) vide its letter dated 28.09.2015, while

approving the ZMP, placed a restriction on change of land use from green uses, the ZMP allows paying guest accommodation in residential land which will be commercialization by back door and will be indirect land use change. ZMP does not take care of the fact that the locations of the STP, Aarna Jain Dharamshala Area, Gurukul locations at Sunset Road and Takhatwala bungalow need to be preserved. The water is limited and its quality needs to be retained by not allowing construction near the water bodies, including in the garb of providing the tourist facilities. The number of tourists to be permitted is required to be restricted to protect the environment.

7. The MoEF&CC, in its counter affidavit, has opposed the application by submitting that ZMP 2030 was issued after public hearing. The responsibility for preparation and implementation of the ZMP is with the State Government. There is requirement to constitute a Monitoring Committee to monitor the implementation of the ZMP which will take care of the concerns of the appilcant. The State Government has been asked to make a provision for rectification of errors or loopholes and also to restrict the change of land use.

8. The State of Rajasthan has also opposed the application. Reference has been made to the order of the Hon'ble Supreme Court dated 19.09.2004 in W.P. (C) No. 202 of 1995, *T. N. Godavarman vs. Union of India*, constituting a committee comprising of three members in consultation with the Central Empowered Committee(CEC), pending issuance of ESZ. After the ESZ notification, order dated 19.08.2011 was passed by the Hon'ble Supreme Court in *T.N. Godavarman Thirumulpad Vs. Union of India*, (2011) 14 SCC 390 at page 392 to the effect that interested parties could place their response to the ZMP and the same will be finalized after considering such response. The ZMP was submitted to the

MoEF for approval and notified after approval was granted. The MoEF constituted a Monitoring Committee comprising of local residents and NGOs as members. Revised committees were also constituted by the MoEF&CC vide order dated 24.01.2012 and 05.05.2015. The State Government engaged the Department of Environment Planning, School of Planning and Architecture as consultant and also consulted the concerned departments, including Environment Department, Forest Department, Tourism Department, Pollution Control Board, SDO, Mount Abu, Secretary UIT, Mount Abu, Municipal Commissioner, Mount Abu, Archaeological Department and Underground Water Resource Department etc. Public objections were also considered. A detailed study of natural and man made heritage, forest, flora and fauna, wetlands, wildlife and other environmental and ecological aspects was carried out. Issue of tourist promotion has been duly addressed. No development has been proposed in the forest land or on slopes of more than 20 degrees. Conservation of forest, wetland, hill slopes and green areas has been given prime importance. There is a proposal for installation of air and noise monitoring stations. There is provision for reuse of waste water, on site waste water treatment and planning and management of waste water resources.

9. This application was filed before this Tribunal on 27.05.2016. On 31.05.2016, this Tribunal directed that no fresh plan should be sanctioned for construction without specific leave of the Tribunal. In view of the said order, certain intervention applications have been filed either seeking permission for repairs, or seeking permission for constructions, claiming to be within the purview of the ESZ and ZMP. Vide order dated 30.01.2018, permission for construction for residential purposes was granted for 'Takhtawala Building' subject to consideration of slope and geological studies and there being no felling of trees and also plan being in conformity with the Hill architecture.

Similar permission was also given for some other areas of Mount Abu mentioned in the order subject to the area being residential and subject to the same conditions as applicable to the 'Takhtawala building'.

10. We have heard the learned counsel for the applicant, learned counsel for the MOEF&CC, State of Rajasthan and for the interveners.

11. Main contention raised on behalf of the applicant is that comparison of land use plan annexed to Mount Abu ZMP for the year 2010 and the proposed land use plan annexed to the ZMP 2030 shows land use change which is inconsistent with the ESZ notification. In particular, reference has been made to the following points in the said plan:-

1. Inside Salim Ali Bird Sanctuary;
2. Aranya Village
3. Behind Maganji
4. Inside Salim Ali Bird Sanctuary
5. Hill Sahil
6. Sunset Road Scheme
7. Sunrise Housing
8. Takhtawala
9. Takhtawala
10. Arna Village
11. Mohanpura
12. Hitanji
13. Near STP Plant

12. Apart from the above, following points have been raised to point out inconsistencies in the ZMP 2030 as compared to ESZ notification or otherwise:-

(i). ZMP provides that no construction is to be permitted in the wetland within 50 meters from the water bodies and wherever possible such buffer zone along the wetlands should be wider. Requirement of buffer zone between construction and the wetlands should have been atleast 100 meters, as per study referred to in the ZMP itself in Chapter – III.

(ii). Having regard to the fact that the soil of the hills is loose and the area has potential for landslides, no development should be allowed at slopes having 35 degree or more. Hitanji and Hill Sahil have slopes higher than 35 degree. The same have been described as residential. Thereby, there is possibility of construction being allowed.

(iii) There is degradation leading to wildlife decline, as noted in ZMP. This requires invocation of Precautionary Principle while permitting any development in the area.

(iv) Nakki lake is a 'no construction zone' as per ESZ but ZMP permits organized commercial activities for facilities to the tourists and such activities could be cafeteria, shopping areas and accommodation.

(v) ESZ notification provides for conservation of Toad rock but the ZMP has provision for ropeways which may result in rock not being conserved as required.

(vi). The ZMP provides for 6700 tourists per day and also refers to carrying capacity having being under taken, as required under the ESZ notification, but the said carrying capacity report has not been furnished. Thus, carrying capacity has to be carried out to assess number of vehicles to be allowed and number of tourists to be allowed, having regard to the available existing infrastructure.

(vii). Rocks in the ESZ area are required to be conserved but provision in the ZMP for adventure tourism permits sport climbing which may require drilling of the rock which will be against the spirit of the ESZ.

(viii). Forest Policy, 1988 will be violated if there is reduction in green area as a result of activities permitted under

the ZMP, permitting converting green areas into non-green areas for facilities to tourists, including construction of hotels and resorts. Thus, mere denial of the State Government that no development on land with tree cover is contemplated and that there will no reduction in green area, does not fully appreciate the impact of ZMP. If green area is to be protected, provision for hotels, resorts etc. has to be deleted.

13. Learned counsel for the applicant referred to enunciation of 'Precautionary Principle, in the judgements of Hon'ble Supreme Court in 2004 (12) SCC 118 para 48, *M.C. Mehta Vs. Union of India & Ors.* and 2006 (1) SCC 1, *para* 86, 87 and 89, *T.N. Godavarnman Thirumulpad Vs. Union of India & Ors.*

14. We asked the learned counsel for MoEF&CC whether any expert study was carried out prior to grant of approval to the ZMP 2030 or whether points raised on behalf of the applicant have been addressed. In absence of any stand in the counter affidavit of MoEF&CC or instructions, no positive statement could be made.

15. Learned counsel for the State of Rajasthan supported the stand in the counter affidavit dated 06.09.2016 and two further affidavits dated 27.10.2017 and 19.03.2018.

16. Learned counsel for the interveners opposed the above contentions and submitted that ZMP 2030 is consistent with the ESZ, the interveners are original residents and their activities are not in any manner prohibited by the ESZ. It was also submitted that there is no absolute bar to change of land use. The bar can be lifted with the permission of the State Government. Approval for construction has been granted prior to 2010.

17. Learned counsel for the applicant however submitted that his objection is to an amusement park and a hotel. Even if any

permission was granted prior to 2010, the same could be of no avail after ESZ notification was issued and till ZMP 2030 was finalized.

18. At this stage, we do not consider it necessary to go into the merits of individual claims of intervenors for construction. We have to first consider the issue whether ZMP 2030 conforms to the ESZ.

19. There is no merit in the plea that there is absolute power for change of land use, with approval of the State. There are inherent limitations in exercise of such powers. Environment law has to be read into the Development Laws on the accepted concepts of 'Precautionary Principle' and the 'Sustainable Development principle. ESZ Notification itself is part of the Precautionary Principle and Sustainable Development principle. These principles have been treated as part of Article 21 of the Constitution of India and also are statutory principles to be followed by this Tribunal under Section 20 of the National Green Tribunal Act, 2010. The Precautionary Principle operates wherever there is a potential threat of serious damage to the environment. As already noted, the issuance of ESZ notification itself is application of Precautionary Principle. Procedure of MoEF&CC clearance to ZMP is also part of application of the Precautionary Principle. This Tribunal has considered the concerns for protection of ecologically fragile hills recently vide order dated 05.10.2018 in Original Application No. 218 of 2017 SPOKE Vs. Kasauli Galaxie Resorts (Kasauli case). Directions were issued for restriction on contruction activity, for slope stability, for waste management based on carrying capacity study.

20. Even though, we refrain from making any final comment on merits on the contention that ZMP 2030 provisions are in conflict with ESZ notification, we are satisfied that there is certainly need for consideration of the issue by an Expert Committee which is constituted as follows:-

1. Two representatives of MoEF&CC – an officer not below the rank of Joint Secretary/Advisor and an Expert of Eco-Sensitive Zone (ESZ) to be nominated by MoEF&CC;
2. Representative of School of Planning and Architecture, Delhi - the institution which was hired as consultant by the State of Rajasthan. Representative should be senior level land scape expert.
3. Representative of Central Pollution Control Board of the level of Director/Additional Director.

21. The Committee will undertake comparison of ZMP 2030, in terms of letter of MoEF&CC dated 28.09.2015 and ESZ Notification dated 25.06.2009 and point out the aberrations in some besides comparing ZMP 2030 map with reference to pre-existing 2010 map in the light of ESZ notification. Thirteen (13) locations noted above must also be specifically looked into. The Expert Committee may also look into the suggestions relating to prohibiting use of plastics, burning of garbage/ or any other waste, proper laying of high tension lines for protecting animals and birds life particulary in Salim Ali Bird Sanctuary area, preventing forest fire, conservation of Nakki lake and water quality management, siting and operation of Solid Waste processing plant in accordance with Solid Waste Management Rules, 2016 (with reference to sanctuary area), any other issues relating to environment management which may become a part of ZMP 2030, including observations of this Tribunal in Kasuali case.

22. The Committee will also look into the points of concern raised by the applicant in reference to conversion of green areas to non-green areas, permissibility of construction on higher degree slopes, conservation of rocks, water bodies and wildlife and other heritage sites, the issue of water scarcity, carrying capacity of Mount Abu with regard to number of tourists and vehicles to be permitted having regard

to the availability of the infrastructure without relying upon future projection, as required in terms of ESZ notification.

23. The Committee may assume its charge within one month from the receipt of copy of this order by the MoEF&CC. The Nodal Agency will be MoEF&CC. The report of the Committee may be furnished within three months after assumption of charge by the Committee which may be forwarded by MoEF&CC to this Tribunal by e-mail at ngt.filing@gmail.

24. The *status quo* as on today in terms of the orders dated 31.05.2016 and 30.01.2018 with regard to any construction in the area will be operative till the finalization and acceptance of report of the Committee by this Tribunal.

25. The application is disposed of except for consideration of the report.

26. The MoEF&CC may revise its approaval in the light of the above report, if necessary and consequential action may also be taken by the State of Rajasthan, subject to any challenge to the report as per law.

27. The report may be placed for consideration before this Tribunal on 30.04.2019.

Adarsh Kumar Goel, CP

S.P. Wangdi, JM

K. Ramakrishnan, JM

Dr. Nagin Nanda, EM

November 26, 2018
A

Item No. 01 Court No. 1

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

Original Application No. 312/2016
(M.A. No. 212/2019 & M.A. No. 227/2019)

Dr. Arun Kumar Sharma Applicant(s)

Versus

Ministry of Environment, Forest &
Climate Change & Anr. Respondent(s)

Date of hearing: 07.11.2019

CORAM: **HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON**
HON'BLE MR. JUSTICE S.P WANGDI, JUDICIAL MEMBER
HON'BLE MR. JUSTICE K. RAMAKRISHNAN, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER

For Respondent(s): Mr. P.S. Narsimha, Senior Advocate, Mr. Nishit Agrawal, Advocate to intervenor Pryajnesh Shah
Mr. Sriansh Prakash, Advocate for Impleaded party
Mr. Puneet Jain, MR. Abhinav Deshwal, Advocates
Mr. Dhaval Mehrotra, Advocate for MA 227 of 2019

ORDER

1. The issue for consideration is whether Zonal Master Plan, 2030 (ZMP 2030) for the Mount Abu Eco-sensitive Zone (MA ESZ) to the extent of change of land use compared to the land use stipulated in ZMP 2010 is inconsistent with the ESZ notification dated 25.06.2009.

2. The applicant challenged the ZMP 2030 as notified on 29.10.2015 with the grievance that land use change provided

therein was not consistent with the ESZ notification particularly with the reference to following locations:-

1. Inside Salim Ali Bird Sanctuary;
2. Aranya Village
3. Behind Maganji
4. Inside Salim Ali Bird Sanctuary
5. Hill Sahil
6. Sunset Road Scheme
7. Sunrise Housing
8. Takhtawala
9. Takhtawala
10. Arna Village
11. Mohanpura
12. Hitanji
13. Near STP Plant

3. Further pointed contention on behalf of the applicant is that ZMP 2030 had deficiencies as follows:-

(i). ZMP provides that no construction is to be permitted in the wetland within 50 meters from the water bodies and wherever possible such buffer zone along the wetlands should be wider. Requirement of buffer zone between construction and the wetlands should have been atleast 100 meters, as per study referred to in the ZMP itself in Chapter – III.

(ii). Having regard to the fact that the soil of the hills is loose and the area has potential for landslides, no development should be allowed at slopes having 35 degree or more. Hitanji and Hill Sahil have slopes higher than 35 degree. The same have been described as residential. Thereby, there is possibility of construction being allowed.

(iii) There is degradation leading to wildlife decline, as noted in ZMP. This requires invocation of Precautionary Principle while permitting any development in the area.

(iv) Nakki lake is a 'no construction zone' as per ESZ but ZMP permits organized commercial activities for facilities to the tourists and such activities could be

cafeteria, shopping areas and accommodation.

(v) ESZ notification provides for conservation of Toad rock but the ZMP has provision for ropeways which may result in rock not being conserved as required.

(vi). The ZMP provides for 6700 tourists per day and also refers to carrying capacity having being under taken, as required under the ESZ notification, but the said carrying capacity report has not been furnished. Thus, carrying capacity has to be carried out to assess number of vehicles to be allowed and number of tourists to be allowed, having regard to the available existing infrastructure.

(vii). Rocks in the ESZ area are required to be conserved but provision in the ZMP for adventure tourism permits sport climbing which may require drilling of the rock which will be against the spirit of the ESZ.

(viii). Forest Policy, 1988 will be violated if there is reduction in green area as a result of activities permitted under the ZMP, permitting converting green areas into non-green areas for facilities to tourists, including construction of hotels and resorts. Thus, mere denial of the State Government that no development on land with tree cover is contemplated and that there will no reduction in green area, does not fully appreciate the impact of ZMP. If green area is to be protected, provision for hotels, resorts etc. has to be deleted.

4. This Tribunal considered the matter on 26.11.2018 and it was observed that no expert studies had been carried out for grant of approval to the ZMP 2030 and the issues raised by the applicant had not been gone into. Since environment law had to be read into the development laws, any Master Plan has to be consistent with the Precautionary and Sustainable Development Principles, particularly in and near ESZ areas.

5. The Tribunal referred to earlier order dated 05.10.2018 in Original Application No. 218 of 2017, *SPOKE Vs. Kasauli Galaxie Resorts (Kasauli case),* wherein a study was directed to be carried out for finalizing the master plan in an eco fragile area.

6. Accordingly, the Tribunal directed constitution of an expert Committee as follows:

1. Two representatives of MoEF&CC – an officer not below the rank of Joint Secretary/Advisor and an Expert of Eco-Sensitive Zone (ESZ) to be nominated by MoEF&CC;

2. Representative of School of Planning and Architecture, Delhi - the institution which was hired as consultant by the State of Rajasthan. Representative should be senior level land scape expert;

3. Representative of Central Pollution Control Board of the level of Director/Additional Director.

7. The mandate of the Committee was to be as follows:-

> "*The Committee will undertake comparison of ZMP 2030, in terms of letter of MoEF&CC dated 28.09.2015 and ESZ Notification dated 25.06.2009 and point out the aberrations in some besides comparing ZMP 2030 map with reference to pre-existing 2010 map in the light of ESZ notification. Thirteen (13) locations noted above must also be specifically looked into. The Expert Committee may also look into the suggestions relating to prohibiting use of plastics, burning of garbage/ or any other waste, proper laying of high tension lines for protecting animals and birds life particulary in Salim Ali Bird Sanctuary area, preventing forest fire, conservation of Nakki lake and water quality management, siting and operation of Solid Waste processing plant in accordance with*

Solid Waste Management Rules, 2016 (with reference to sanctuary area), any other issues relating to environment management which may become a part of ZMP 2030, including observations of this Tribunal in Kasuali case.

The Committee will also look into the points of concern raised by the applicant in reference to conversion of green areas to non-green areas, permissibility of construction on higher degree slopes, conservation of rocks, water bodies and wildlife and other heritage sites, the issue of water scarcity, carrying capacity of Mount Abu with regard to number of tourists and vehicles to be permitted having regard to the availability of the infrastructure without relying upon future projection, as required in terms of ESZ notification."

8. Though the Committee was to furnish its report within three months from the order dated 6.11.2018 report has been filed almost after more than 9 months on 04.09.2019. We find from the report that the Committee has assumed the ZMP to be conclusive on the ground that suitability analysis test had already been carried out by the State Government. This approach is inconsistent with the directions of this Tribunal. If the analysis of the State Government was to be treated as final, there was no need for the Committee.

9. Accordingly, without expressing any opinion on merit, we direct further exercise to be undertaken by modified Committee as follows:

1. An Expert of Ecology from G.P. Pant Institute, Almora, Uttarakhand to be nominated by the Director of Institute.

2. A senior Scientist from MOEF & CC, to be nominated by the Secretary, MOEF & CC.

3. A senior Scientist from the Indian Council of Forestry Research and Education, Dehradun.

4. Senior Scientist from Wadia Institute of Himalayan Geology, Dehradun, to be nominated by the Director.

5. Scientist/ Senior official from the Central Pollution Control Board, New Delhi.

6. Representative of School of Planning and Architecture, New Delhi.

7. Member Secretary, Rajasthan Pollution Control Board, shall be a member and Nodal Officer, who shall ensure the compliance.

10. The Committee may take into account the material already on record but undertake further study in terms of the directions of this Tribunal and also take into account the pattern of studies in the context of Manali (referred to order of this Tribunal dated 19.09.2018 in O.A. No. 635/2017, *Ramesh Chand v. State of Himachal Pradesh*), Shimla (referred to order of this Tribunal dated 16.11.2017 in O.A. No. 121/2014, *Yogendra Mohan Sengupta v. UOI & Ors.* and Kasauli (referred to order of this Tribunal dated 05.10.2018 in O.A. No. 218/2017, *SPOKE Vs. Kasauli Galaxie Resorts (Kasauli case)*. The Committee may also take into account the order dated 19.01.2019 passed by this Tribunal. The Committee will be free to associate any other Expert or Institution.

11. The Committee will be at liberty to consider the viewpoint of all the stake holders.

12. The Committee may commence its proceedings at the earliest complete the exercise preferably within two months and furnish its report by 31.01.2020 by e-mail at judicial-ngt@gov.in.

List for further consideration on 12.02.2020.

Adarsh Kumar Goel, CP

S.P Wangdi, JM

K. Ramakrishnan, JM

Dr. Nagin Nanda, EM

November 07, 2019
Original Application No. 312/2016
A

Annexure 3A

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Mount Abu ESZ-ZMP 2030 Committee

Constituted by Hon'ble NGT order dated 07/11/2019 in OA No. 312/2016

Minutes of the first meeting of Committee formed vide order dated 07/11/2019 of Hon'ble National Green Tribunal in the matter of OA no 312/2016, Dr. Arun Kumar Sharma V/s MoEF held on 16/12/2019 at meeting hall of Rajasthan State Pollution Control Board, Jaipur

The first meeting of committee constituted by Hon'ble National Green Tribunal in OA no 312/2016, Dr. Arun Kumar Sharma V/s MoEF was held on 16/12/2019 at meeting hall of Rajasthan State Pollution Control Board, Jaipur in presence of Nodal Officer cum Member Secretary (RSPCB).

The committee met to discuss the issues regarding the inconsistency of Zonal Master Plan 2030 with ESZ notification 2009 and land use pattern of Mount Abu in year 2010.

The Nodal Officer cum Member Secretary (RSPCB), Chief Town Planner-GoR, Assistant Chief Town Planner-GOR, Dr. G.S. Negi- G.B. Panth Institute, Dr K. Luirei- Wadia Institute, Shri Ajay Aggarwal –CPCB, Dr. Bilas Singh-AFRI, Shri Pankaj Verma- MOEF and Dr. Meenakshi Dhote, School of Planning & Architecture, New Delhi, attended the meeting. The list of the participants is enclosed.

At the onset, Nodal Officer cum Member Secretary, RSPCB briefed the committee about various directions issued by Hon`ble NGT in the matter and the compliance desired from various stakeholders Department. The Chief Town Planner, GoR explained the sequence of events since the beginning of ESZ notification in year 2009 to final ZMP -2030 notification in year 2015, to make the committee familiar with the issue.

The committee deliberated upon various issues and the following decisions were taken:

1. In compliance of the Hon'ble NGT order, the requirement of any other expert from any other institution/ field was deliberated and it was decided that one specialised person from the field of GIS and remote sensing shall be made part of the committee. The committee finalized that Nodal officer should seek nomination of expert from the Regional Remote Sensing Centre (RRSC) –West, Indian Space Research Organisation, Jodhpur.
2. Second meeting of the committee should be held at Mount Abu for visiting disputed sites and meeting the stakeholders.
3. A responsibility matrix based on area of expertise & discussions during the meeting shall be drawn and circulated among the members.
4. Chief Town Planner should provide a list of stakeholders.
5. Chief Town Planner should provide revenue maps and land records of 10 impugned land parcels available to the committee.

The meeting ended with thanks to the Nodal Officer and all expert participants and the CTP, GoR,Jaipur

(Shailaja Deval)
Nodal Officer & Member Secretary, RSPCB
Mt. Abu ESZ- ZMP 2030 Committee

O/c

Mount Abu ESZ-ZMP 2030 Committee

Constituted by Hon'ble NGT order dated 07/11/2019 in OA No. 312/2016

Minutes of the meeting cum site visit of 10 disputed sites by committee and meeting with all the stakeholders on 16.01.2020 to 17.01.2020 at Mount Abu under the Chairmanship of Nodal Officer cum Member Secretary(RSPCB), of Committee formed Vide order dated 07.11.2019 of Hon'ble NGT in the matter of OA no 312/2016, Dr. Arun Kumar Sharma V/s MOEF

A meeting cum site visit of 10 disputed sites by committee and meeting with the stakeholders of the committee constituted by Hon'ble National Green Tribunal Order in OA no 312/2016, Dr. Arun Kumar Sharma V/s MoEF was held on 16.01.2020 to 17.01.2020 at Mount Abu, Rajasthan under Nodal Officer cum Member Secretary (RSPCB).

The committee met to discuss the issues regarding the inconsistency of Zonal Master Plan 2030 with ESZ notification 2009 and land use pattern of Mount Abu in year 2010.

The meeting was attended by the Nodal Officer cum Member Secretary (RSPCB), Dr. G.E.S. Negi (G.B. Panth National Institute Himalaya Environment and Sustainable Development), Dr Vikas (Wadia Institue of Himalayan Geology), Shri Ajay Agarwal (CPCB), Dr. G. Singh (AFRI), Shri Pankaj Verma (MoEF & CC), Dr. A.K. Bera (RRSC (West) NRSC/ISRO), Local officers of various departments i.e Forest, LSG, RSPCB, PHED etc. also assisted the committee during site visit. The list of the participants is enclosed. A separate meeting was also held with stakeholders on date 17.10.2020 at conference hall of Hotel Sikhar to know the views (list of participants enclosed)

At the onset, Smt Shailaja Deval, Nodal Officer cum Member Secretary, RSPCB briefed about the various directions issued by Hon`ble NGT in the matter.

The committee member deliberated upon various issues and following decisions were taken:

1. Hard copy of study carried out by School of Planning and Architecture, New Delhi,ZMP-2030 and building by-laws shall be provided to committee (Action by – Chief Town Planner, GOR)
2. Data regarding vehicular movement and vehicles in the town for last three years shall be provided to committee (Action by Nagar-Palika, Mount abu)
3. Data regarding tourist inflow in the town for last three years shall be provided to committee (Action by Nagar-Palika, Mount abu)
4. KML files of 10 impugned polygons with area imposed on Google maps and auto cad files shall be provided to the committee. Constructible area of each polygon after application of building by laws of impugned site shall also be provided (Action by- Chief Town Planner,Jaipur)
5. Authenticated maps of nearby forest land of 10 impugned site shall be provided to committee (Action By- Forest Department)
6. Data regarding position of ground water and bore wells in mount abu shall be provided to committee (Action by –GWD)

Mount Abu ESZ-ZMP 2030 Committee

Constituted by Hon'ble NGT order dated 07/11/2019 in OA No. 312/2016

7. Detailed report on factual status of surnrise housing land shall be provided to committee(Action by- forest department)
8. Maps, details of site and proposed plan and the proposed colony located behind Maganji shall be provided to committee (Action by- Nagar palika,Mount abu)
9. The next meeting shall be held on 24.01.2020 in New Delhi for further discussions and report preparation. Meeting notice would be issued separately. (Action by- MS, RSPCB)

The meeting cum visit ended with vote of thanks to the Nodal Officer.

(Shailaja Deval)
Member Secretary
and Nodal Officer
Mt. Abu ESZ-ZMP 2030 Committee

No.F1(.....M.J.....)/RSPCB/Jaipur/328-339 Date: 22/01/2020

Copy to following for information and necessary action:

1. P.S. to Addition Chief Secretary, RSPCB,Jaipur
2. Sr. P.S. to Member Secretary,RSPCB
3. Dr. G.E.S. Negi, Scientist-G, G.B. Panth National Institute Himalaya Environment and Sustainable Development, Almora Uttarakhand,
4. Dr. G. Singh, Scientist-G, AFRI, Jodhpur
5. Dr. Meenkshi Dhote, School of Planning and Architecture, New Delhi
6. Sh.Ajay Aggarwal, A.D., Central Pollution Control Board, New Delhi
7. Sh. Pankaj Verma, Scientist-E, MOEF&CC, New Delhi
8. Dr. A.K. Bera, RRSC (West) NRSC/ISRO, Jodhpur
9. Dr. Vikas, Scientist-C, Wadia Institute of Himalyan Geology, Dehradun
10. Chief Town Planner, Govt of Rajasthan ,Jaipur
11. Chief Engineer, GWD, Jodhpur
12. DFO, Forest Department, Sirohi
13. Regional Officer, RSPCB, Pali

Member Secretary
and Nodal Officer
Mt. Abu ESZ-ZMP 2030 Committee

Annexure 3C

Mount Abu ESZ-ZMP 2030 Committee

Constituted by Hon'ble NGT order dated 07/11/2019 in OA No. 312/2016

Minutes of third meeting of committee constituted Vide order dated 07.11.2019 of Hon'ble NGT in the matter of OA no 312/2016, Dr. Arun Kumar Sharma V/s MoEF & CC on 24.01.2020 at Rajasthan House, New Dehli.

The third meeting of the committee constituted by Hon'ble National Green Tribunal Order in OA no 312/2016, Dr. Arun Kumar Sharma V/s MoEF & CC was held on 24.01.2020 at Rajasthan House, New Delhi in presence of the expert members and the Nodal Officer.

The committee discussed the issues regarding the inconsistency of Zonal Master Plan 2030 with ESZ notification 2009 and land use pattern of Mount Abu in year 2010 and reviewed the documents and data available.

The meeting was attended by the Smt. Shailja Deval, Nodal Officer cum Member Secretary (RSPCB), Dr Vikas (Wadia Institute of Himalayan Geology), Shri Ajay Agarwal (CPCB), Shri Pankaj Verma (MoEF & CC), Dr. A.K. Bera (RRSC (West) NRSC/ISRO) and Dr. Meenakshi Dhote, School of Planning and Architecture. The list of the participants is enclosed.

The committee member deliberated upon various issues and following decisions were taken:

1. To request Hon'ble National Green Tribunal for extension of time for compilation of report as deadline of the report submission is 31.01.2020. (Action by: Nodal Officer)
2. To request Director, Wadia Institute of Himalayan Geology, Dehradun regarding continuation of Dr. Vikas as expert committee member since he was present during the site visit to Mount Abu. (Action by: Nodal Officer)
3. The remaining data, documents and maps shall be sought from relevant departments/agencies. (Action by: Nodal Officer)

(Shailaja Deval)
Member Secretary
and Nodal Officer
Mt. Abu ESZ-ZMP 2030 Committee

No.F1(.....)/RSPCB/Jaipur/ 347 to 353 Date: 29/1/2020

Copy to following for information and necessary action:

1. Dr. G.E.S. Negi, Scientist-G, G.B. Panth National Institute Himalaya Environment and Sustainable Development, Almora Uttarakhand.
2. Dr. G. Singh, Scientist-G, AFRI, Jodhpur
3. Dr. Meenkshi Dhote, School of Planning and Architecture, New Delhi
4. Sh.Ajay Aggarwal, A.D., Central Pollution Control Board, New Delhi
5. Sh. Pankaj Verma, Scientist-E, MOEF&CC, New Delhi
6. Dr. A.K. Bera, RRSC (West) NRSC/ISRO, Jodhpur
7. Dr. Vikas, Scientist-C, Wadia Institute of Himalyan Geology, Dehradun

-//-
Member Secretary
and Nodal Officer

Gmail

Vini Sharma <amitrpcb@gmail.com>

Fwd: FOR YOUR KIND ATTENTION

Dr. Vijai Singhal <singhalvijai@gmail.com> Thu, 16 Jul, 5:24 PM
To: Amit Sharma RPCB <amitrpcb@gmail.com>, HO RSPCB Scmg <scmg.rpcb@gmail.com>

---------- Forwarded message ---------
From: **Arun Sharma** <sharmansameep@gmail.com>
Date: Sun, Jul 12, 2020, 7:09 PM
Subject: FOR YOUR KIND ATTENTION
To: Dr. Vijay Singhal NGT Member Secretary <singhalvijai@gmail.com>

PRAYER TO HONORABLE NGT COMMITTEE

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Most Honorable, Sir!
Greetings from Mount Abu!
With great angst, anguish and trepidation, I humbly submit my supplication to your Honorable Self, to save this ruthlessly beleaguered Abode of Gods, Mount Abu. The first AGG, Colonel James Todd, 1823, who was the first English man, to set his foot on this oldest heritage, 3.3 billion years old, of this planet earth, had warned the future generations, *pari passu* entreating the almighty, "Oh, Lord, save this heaven from **HOBOS**!" As it is, it has all ready suffered irreparable, merciless destruction.

Alas, from time to time, all concerned souls have been horrified with the relentless molestation, rape and what not, of this most ancient heritage of the world, Mount Abu, in the lap of the most ancient mountain ranges in the world, the Aravelies! Allow me, Sir, to draw an analogy that Mount Abu is like beautiful, innocent, primordial damsel, with whom, all want to sleep, but no one wants to marry it, and look after its welfare – all just want to ravish it, gash it, mash it, rip it, rend it, stab it, slash it, lance it, maim it, mutilate it, and leave it

pitilessly wounded, and weeping!

My most humble supplication is to save this most spoilt, pillaged, plundered Shangri-La on earth, as well defined, by great travelers like Xuanzang, Ibn Battuta, as heaven, great saints like Vashishtha, Guru Nanak, Kabir's Guru, Ramanand Dasji, Rev. Swami Vivekananda, Gokhle Baba, again as heaven, so much so, has even been mentioned in Van Parva of Mahabharata, where Sage Ved Vyas motivated Dharmraja, Udhishther, "*Oh, go yee to Arbudnachal (Mount Abu), where even a night's stay at Sage Vashishtha Ashram would bless you with blessings, equal to donating 1, 000 cows in charity*!"

In the name of spirituality, in the name of development, in the name of progress, in the name of education, in the name of tourism, in the name of beautification, this heaven on earth, Mount Abu, has been ruthlessly molested, sans any consideration, of its wild life, its feral health, it's extremely fragile eco-system, and indeed, its carrying capacity. Never ever any such attention with any scientific studies, were ever undertaken, by the state government, government of India, or the forest department in any way. And, Mount Abu kept bleeding, under the onslaught of dynamites, blowing away the most ancient granite rocks into splinters, with shameless glee, cutter decimating brutally, the fragile ecosystem of Mount Abu!

In 2009, the most Honorable Supreme Court of India, most munificently, finally notified Mount Abu as an **Eco Sensitive Zone** (**ESZ**). Concerned Abuphils thought that after that, Mount Abu would be finally saved, with the shield of ESZ. Alas, this did not happen. The much morphed, truncated, tempered with, devastating ZMP brought the knell of the much fought of ESZ! The ZMP most cruelly violated all the important protective defense of ESZ, as humbly submitted below:-

(i). ZMP provides that no construction is to be permitted in the wetland within 50 meters from the water bodies and wherever possible such buffer zone along the wetlands should be wider. Requirement of buffer zone between construction and the wetlands should have been atleast 100 meters, as per study referred to in the ZMP itself in Chapter – III. ZMP ought to have conserved the existing water bodies and not allow them to be trammeled by construction activities. Water bodies of upper and lower Kodra dams are allowed to be developed with impunity

(ii). Having regard to the fact that the soil of the hills is loose and the area has ***potential for landslides****, no development should be allowed at slopes having 35 degree or more.* ***Hetanji and Hill Sahil have slopes higher than 35 degree****. The same have been described as residential. Thereby, there is possibility of construction being allowed.*

(iii) There is degradation leading to wildlife decline, as noted in ZMP. This requires invocation of ***Precautionary Principle*** *while permitting any development in the area.*

(iv) ***Nakki lake is a 'NO CONSTRUCTION ZONE' as per ESZ*** *but ZMP permits organized commercial activities for facilities to the tourists and such activities could be cafeteria, shopping areas and accommodation.*

(v) ESZ notification provides for ***CONSERVATION OF TOAD ROCK*** *but the ZMP has provision for ropeways which may result in rock not being conserved as required, and this pristine glory may go into oblivion in time to come More so. In a span of few meters, the rope way would not only be destructive, toy, but a ludicrous joke, on Mother Nature, and on the idea of tourism, more*

so; Toad rock is recognized as natural heritage in ESZ notification, where construction has to be discouraged. Ropeway will destroy the grandeur of natural heritage site.

(vi). The ZMP provides for 6700 tourists per day and also refers to carrying capacity having being under taken, as required under the ESZ notification, but ***THE SAID CARRYING CAPACITY REPORT HAS NOT BEEN FURNISHE, WHICH WAS NEVER EVER DONE. THUS, CARRYING CAPACITY HAS TO BE CARRIED OUT TO ASSESS NUMBER OF VEHICLES TO BE ALLOWED AND NUMBER OF TOURISTS TO BE ALLOWED****, having regard to the available existing infrastructure.*

(vii). ***Rocks in the ESZ area are required to be conserved*** *but provision in the ZMP for adventure tourism permits sport climbing which may require drilling, and defacing of the rocks, which will be against the spirit of the ESZ.* Rock climbing relies on permanent anchors i.e. bolts fixed to the rocks for protection, which would mar the grandeur of the immense rock faces intrinsic to Mount Abu.

(viii). ***Forest Policy, 1988 will be violated*** *if there is reduction in green area as a result of activities permitted under the ZMP,* ***permitting converting green areas*** *into non-green areas for facilities to tourists, including construction of hotels and resorts. Thus, mere denial of the State Government that no development on land with tree cover is contemplated and that there will be no reduction in green area, does not fully appreciate the impact of ZMP. If the green area is to be protected, provision for hotels, resorts etc. has to be deleted.*

(ix) ESZ notification provided for conservation of **man made heritage** sites like Dilwara Temples. Map attached to ESZ

notification provides for temporary shops to be relocated and inappropriate constructions to be restricted. But none of this is reflected in ZMP. In fact the map is modified in ZMP to make way for sunken garden for a Haat and Bazaar - which will destroy the peaceful and serene atmosphere of Dilwara temples.

In the light of the facts mentioned *ut supra,* your honorable self would see that how each violation is being done with glaring temerity:

1. Inside **Salim Ali Point** and around it is dense virgin forest, and indeed more than 35 degree slope, with water body within 100 meters.
2. **Aranya Village** again confirms the similar, humble submission.
3. **Behind Maganji,** albeit the water body is a little further away, but, the slope is against the directive of the Honorable Supreme Court, and it is not only close to the forest but has dense feral growth.
4. **Hill Sahill** has been bone of vehement contention for all the above mentioned violations, for ages.
5. **Sunset Road Scheme** violates all the above mentioned abjections, including a water body within 100 meters.
6. **Hetamji and near STP Plant** here every concern, with temerity, is thrown to wind, with crass disregard to all the directives of the Honorable Supreme Court of India. It is just at the forest, with a huge water body flowing within a stone throw, with dense, virgin forest, on slope more than 35 degree.
7. **Aarna Village** too is a virgin forest, with more than 35 degree slope, and a water body nearly 100 meters, as the crow flies.
8. **The Love Lake Nakki,** is the most besieged lake in the country. Limnologists have, time again warned that the lake is under threat with too much of construction and pollution around

it. The zone, right from independence has been a **NO CONSTRUCTION ZONE**, further fortified by the notification of ESZ by the Honorable Supreme Court of India. Alas, right form the most mentioned 70 years of our country, this extremely fragile, and much maligned and threatened Lake has been molested in the name of beautification, like a frail, beautiful woman loaded with tons of ornaments, making a truly ugly jewelry shop! I folded hands prayer to your honorable self would be, "**SIR PLEASE LEAVE THIS PETITE, FRAGILE, MYTHOLOGICAL LAKE ALONE AND SEE THAT NEVER EVER ANY CONSTRUCTION IS EVER ALLOWED HERE FOR ANY REASON!**"

Honorable, Sir, you would appreciate that a busy physician like me, would not have any access to resources to take drone or aerial pictures of all these sites to physically show the close relation of the dense forest, the slope around, the water bodies around, and indeed, the entire extremely fragile ecosystem, of the oldest flora and fauna, which are often named after Mount Abu, as Abuensis. Your honorable self would appreciate that all the documents with pictures and other documents were submitted when my humble petition was filed by my learned lawyers.

With kind regards and gratitude

Cordially yours

Dr. Arun Kumar Sharma

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