

प्रादेशिक योजना- माथेरान पर्यावरणीय संवेदनशील क्षेत्र
महाराष्ट्र प्रादेशिक नियोजन व नगर रचना अधिनियम,
१९६६ चे कलम १५(१) अन्वये माथेरान पर्यावरणीय संवेदनशील
क्षेत्राच्या झोनल मास्टर प्लानला (मुंबई महानगर प्रदेशाच्या
प्रादेशिक योजनेचा भाग) मंजूरी देणेबाबत..
पुरकपत्र निर्गमित करणेबाबत..

महाराष्ट्र शासन
नगर विकास विभाग

मुख्य इमारत, ४ था मजला, मंत्रालय, मुंबई-३२.

शासन निर्णय क्रमांक- टिपीएस-१२१८/२८८८/प्र.क्र.१२०/१८/नवि-१२,
दिनांक :- ११ जानेवारी, २०१९.

शासन निर्णय :- सोबतचे पुरकपत्र (इंग्रजी) महाराष्ट्र शासनाच्या कोकण विभाग
असाधारण राजपत्रात प्रसिध्द करावे.

महाराष्ट्राचे राज्यपाल यांच्या आदेशानुसार व नांवाने,



(संजय बाणाईत)

उपसचिव, महाराष्ट्र शासन

प्रति,

- १) पर्यावरण, वन व हवामान बदल मंत्रालय, भारत सरकार, वायु ब्लॉक, ५ वा मजला, इंदिरा पर्यावरण भवन, जोरबाग रोड, अलिगंज, नवी दिल्ली-१०० ०३०.
- २) महानगर आयुक्त, मुंबई महानगर प्रदेश विकास प्राधिकरण, बांद्रा, मुंबई.
- ३) विभागीय आयुक्त, कोकण विभाग, कोकण भवन, नवी-मुंबई.
- ४) संचालक, नगर रचना, महाराष्ट्र राज्य, पुणे.
- ५) जिल्हाधिकारी, रायगड.
- ६) सहसंचालक तथा सह सचिव, नगर रचना, नगर विकास विभाग, मंत्रालय, मुंबई -३२
- ७) सहसंचालक, नगर रचना, कोकण विभाग, कोकण भवन, नवी मुंबई.
- ८) सहायक संचालक, नगर रचना, रायगड-अलिबाग शाखा, जि. रायगड.
- ९) मुख्याधिकारी, माथेरान नगरपरिषद, माथेरान, जि. रायगड.
- १०) व्यवस्थापक, शासकीय मध्यवर्ती मुद्रणालय, चर्नी रोड, मुंबई.

(त्यांना विनंती करण्यात येते की, सोबतचे पुरकपत्र महाराष्ट्र शासनाच्या असाधारण राजपत्रात प्रसिध्द करावे व त्याच्या प्रत्येकी ०५ प्रती या विभागास, महानगर आयुक्त, मुंबई महानगर प्रदेश विकास प्राधिकरण, बांद्रा, मुंबई, संचालक, नगर रचना, महाराष्ट्र राज्य, पुणे, सहसंचालक, नगर रचना, कोकण विभाग, कोकण भवन, नवी मुंबई, सहाय्यक संचालक, नगर रचना, रायगड-अलिबाग व मुख्याधिकारी, माथेरान नगरपरिषद, माथेरान यांना पाठवाव्यात.)

- ११) कक्ष अधिकारी, कार्यासन (नवि-२९), नगर विकास विभाग, मंत्रालय, मुंबई
(त्यांना विनंती करण्यात येते की, सोबतचे पुरकपत्र विभागाच्या वेबसाईटवर प्रसिध्द करावी.)

- १२) निवडनस्ती (कार्यासन नवि-१२)

GOVERNMENT OF MAHARASHTRA
URBAN DEVELOPMENT DEPARTMENT
4th Floor, Main Building, Mantralaya, Mumbai- 400 032
Dated 11th January, 2019.

ADDENDUM

Addendum to Notification dated 6th December, 2018 of Zonal Master Plan of Matheran (Part of Regional Plan of Mumbai Metropolitan Region).
No. TPS-1218/2888/C.R.120/18/UD-12,

Whereas, the part of Regional Plan of Mumbai Metropolitan Region consisting of Matheran Eco-Sensitive Zone area (Zonal Master Plan of Matheran) is sanctioned by the Government vide Notification No. TPS-1218/2888/CR-120/UD-12, dated 6th December, 2018, under the provisions of Maharashtra Regional and Town Planning Act, 1966 after obtaining the approval of Ministry of Environment, Forest and Climate Change (hereinafter referred to as MoEF&CC);

And whereas, the MoEF&CC has approved the said Zonal Master Plan subject to some conditions and the aforesaid Government notification dated 6th December, 2018 specifies that contents in compliance of these conditions shall be the part of Zonal Master Plan;

And whereas, the Government, after consulting the respective concerned Departments, has prepared the contents named as Chapter-11 Additional Information As Suggested By MoEF&CC;

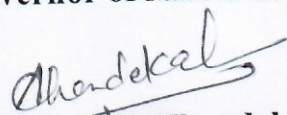
Now therefore, the Government directs that said Chapter-11 'Additional Information As Suggested By MoEF&CC' shall be the part of Zonal Master Plan of Matheran Eco-Sensitive Zone.

The copy of the said contents shall be available for inspection by the general public during office hours on all working days for a period of one month in the following offices:

- i) The Metropolitan Commissioner, Mumbai Metropolitan Regional Development Authority, Bandra, Mumbai.
- ii) Joint Director, Town Planning, Konkan Division, Konkan Bhavan, Belapur, Navi Mumbai.
- iii) Assistant Director of Town Planning, Alibaug-Raigad Branch, Alibaug.
- iv) Chief Officer, Matheran Municipal council, Matheran.

This notification shall also be published on the Government web-site at www.maharashtra.gov.in (Act/Rules).

By order and in the name of Governor of Maharashtra.


(Ashok K. Khandekar)

Section Officer to Government

Chapter 11

Additional Information as suggested by MoEFCC

11.1. Biodiversity, Value and Conservation of Matheran Eco-Sensitive Zone

11.1.1. Introduction

The Matheran Hill station and its surrounding environment are known for its scenic beauty, diverse forest types and wide number of Avian and reptilian fauna. Traditionally these areas were managed under prescriptions of Matheran Working Circle, with basic objective of maintenance and development of Matheran Hill station and to meet its requirements of firewood and forest produce. However due to its fragile ecosystem and for the purpose of its conservation an area of about 214.73 sq.kms, comprising Matheran municipal council and its surroundings were declared as Eco-sensitive Zone in the year 2003. Its geographical boundary extends in Raigad and Thane districts.

11.1.2. Floral and Faunal composition of Matheran ESZ

A. Characteristics of Vegetation

The majority of the forest in Matheran ESZ falls under “Southern Moist Mixed Deciduous Forest”. On higher elevation the vegetation tends to become evergreen and belongs to type “Western Sub-Tropical Hill Forest”. The floral species met with at higher altitude are parajambul, Jambul, Amba, Mala, Umber and Waras in top canopy and Phansad, Asana, Pisa, Anjan in the understory. The remaining area is a mixed forest with Teak, Ain, Kinjal, Sawar, Beheda, Dhavada, Siras, Nana, Sisham, Kakad, Dhaman etc. (*Matheran Hill Working Circle, Working Plan of Alibag Forest Division, Khaire and Rahurkar*). The details of the floristic species found in the area along with their scientific names is given in Table 1 (*Source: wildlife management plan of Sudhagadh WLS*)

Table 1: Floristic composition of the Forest in Matheran ESZ

S.N.	Local Name	Botanical (Latin) name
<i>Trees</i>		
1	Ain	<i>Terminalia tomentosa</i>
2	Alu	<i>Vangueria spinosa</i>
3	Al or Ashi	<i>Morinda tinctoria</i>
4	Amba	<i>Mangifera indica</i>
5	Ambeda	<i>Spondias mangifera (Syn. Spondia spinnata)</i>
6	Amati (Wavding)	<i>Embelia robusta</i>
7	Anjani	<i>Meme cyclonedule</i>
8	Apta	<i>Bauhinia racemosa</i>
9	Asana	<i>Bridelia retusa</i>
10	Arjunsadada	<i>Terminalia arjuna</i>
11	Athoon (Tambat)	<i>Flacourtia ramontchi (Syn. Flacoutia indica)</i>
12	Avli	<i>Phyllanthus emblica (Syn. Emblica officinalis)</i>
13	Babul	<i>Acacia arabica</i>
14	Bel	<i>Aegle marmelos</i>
15	Bakula	<i>Mimusop selengi</i>
16	Bava (Bhava)	<i>Cassia fistula</i>
17	Behada (Yella)	<i>Terminalia belerica</i>
18	Bhendi	<i>Thespesia populnea</i>
19	Bhoma	<i>Glochidion lanceolarium</i>
20	Bhokar (Shelute)	<i>Cordia myxa</i>

S.N.	Local Name	Botanical (Latin) name
21	Bhorjambhul	<i>Ammania baccifera</i>
22	Bhutkesh (Lawsat)	<i>Mussa endafrondosa</i>
23	Bhittia (Alan or Bhutaksha)	<i>Elaeo dendronglaucum</i>
24	Biba	<i>Semicarpus anacardium</i>
25	Bibla	<i>Pterocarpus marsupium</i>
26	Bondara	<i>Lagerstroemia parviflora</i>
27	Bor	<i>Zizyphus jujuba (Syn.Zizyphus Mauritiana)</i>
28	Chambuli	<i>Bauhinia vahlii</i>
29	Chanda, Chandava	<i>Macaranga roxburghii</i>
30	Char, Charoli	<i>Buchanania latifolia</i>
31	Chera	<i>Erinocarpus nimmoanus</i>
32	Chinch	<i>Tamarindus indica</i>
33	Dandoshi	<i>Dalbergia lanceolaria</i>
34	Daiwas (Dahivel)	<i>Cordia macleodii</i>
35	Datir	<i>Ficus heterophylla</i>
36	Dhaman	<i>Grevia tiliaefolia</i>
37	Dhavda	<i>Anogeissus latifolia</i>
38	Dikemali	<i>Gardenia lucida</i>
39	Gela &Gehla	<i>Randia dumetorum</i>
40	Gol	<i>Trema orientalis</i>
41	Ghatbor,Guti	<i>Zizyphus xylopyra</i>
42	Hed, Hedu	<i>Adina cordifolia</i>
43	Hirda	<i>Terminalia chebula</i>
44	Jamba	<i>Xylia xylocarpa</i>
45	Jambul	<i>Eugenia jambolana (Syn.Syzygium cuminii)</i>
46	Kalamb	<i>Stephegyne parvifolia (Syn.Mitragyna parvifolia)</i>
47	Kadvai	<i>Hymenodictyo nexcelsum</i>
48	Kakad	<i>Garuga pinnata</i>
49	Kandol	<i>Sterculia urens</i>
50	Karmbel	<i>Dillenia pentagyna</i>
51	Karlilimb (Kadilimb)	<i>Murraya koenigii</i>
52	Karanj	<i>Pongamia glabra (Syn.Pongamia pinnata)</i>
53	Karavati	<i>Ficus asperriama</i>
54	Kaju	<i>Anacardium occidentale</i>
55	Katekumbal	<i>Sideroxylonto mentosum</i>
56	Kavath	<i>Feronia elephantum</i>
57	Khair	<i>Acacia catechu</i>
58	Kharsingh	<i>Sterospermum xylocarpum</i>
59	Khavas	<i>Sterculia colorata</i>
60	Kinhai	<i>Albizzia procera</i>
61	Kirmira	<i>Casaria tomentosa (Syn.Glycosmis pentaphylla)</i>
62	Kokam (Ratambi)	<i>Garcinia indica</i>
63	Kuda	<i>Holarrhena antidysenterica</i>
64	Kuda (Kala)	<i>Wrightia tomentosa</i>
65	Kudi	<i>Wrightia tomentosa</i>
66	Kumbhi	<i>Careya arborea</i>
67	Kusumb (Koshinb)	<i>Schleicher atrijuga (Syn. Schleicher aoleosa)</i>
68	Karal or Ambli	<i>Bahuinia malabarica</i>

S.N.	Local Name	Botanical (Latin) name
69	Kura	<i>Ixora parviflora (Syn.Ixora arborea)</i>
70	Kukeri	<i>Sterculia guttata</i>
71	Lokhandi	<i>Ixora nigricans</i>
72	Maraudi	<i>Acanthus ilicifolius</i>
73	Medhshing	<i>Dolichandrone falcta</i>
74	Moha or Mowhra	<i>Bassia latifolia (Syn.Madhuka latifolia)</i>
75	Mokha	<i>Schrebera swietenoides</i>
76	Nana	<i>Lagerstroemia microcarpa</i>
77	Nandruk	<i>Ficus retusa</i>
78	Nimbara	<i>Melia dubia</i>
79	Niwar (Samudraphal)	<i>Barringtonia acutangula</i>
80	Padal	<i>Stereospermum heloniodies (SynStereospermum passion)</i>
81	Pair	<i>Ficus arnottiana</i>
82	Palas	<i>Butea frondosa (Syn. Butea monosperma)</i>
83	Nagkudapandarakuda	<i>Tabernae montanaheyneana</i>
84	Pandhrakhair (Kanti)	<i>Acacia ferruginea (Syn. Murraya paniculata)</i>
85	Pandhari	<i>Murraya exotica</i>
86	Pangara	<i>Erythrina indica (Syn. Erythrina variegata)</i>
87	Per Jambhul	<i>Olea dioica</i>
88	Pendharun	<i>Gardenia turgid</i>
89	Petari	<i>Trewia nudiflora</i>
90	Phasi	<i>Dalbergia paniculata</i>
91	Pharadi	<i>Albizzia chinensis</i>
92	Phungali	<i>Excoecaria agallocha</i>
93	Pimpal	<i>Ficus religiosa</i>
94	Pipar	<i>Ficus tsiela</i>
95	Ranlimbu	<i>Atlantia racemosa</i>
96	Raktarohida	<i>Maba nigrescens</i>
97	Ranjan (Rayankhirni)	<i>Mimus opshexandra</i>
98	Ritha	<i>Sapindus emarginata</i>
99	Sag (Teak)	<i>Tectona grandis</i>
100	Satvin	<i>Alstonia scholaris</i>
101	Sawar	<i>Bombax malabarica (Syn. Salmalia malaberica)</i>
102	Shemat	<i>Odina wodier (Syn. Lannea grandis)</i>
103	Shenkhair	<i>Acacia suma (Syn. Lanneacoro mandellica)</i>
104	Shendri or Kamala	<i>Mallotus philippinensis</i>
105	Shindi	<i>Phoenix sylvestris</i>
106	Shiras	<i>Albizza lebbek</i>
107	Shiras (Kala)	<i>Alibissia odoratissima</i>
108	Shivan	<i>Gmelina arborea</i>
109	Shisham	<i>Dalbergia latifolia</i>
110	Suru	<i>Casuarina equisetifolia</i>
111	Temburni	<i>Diospyros melanoxylon</i>
112	Tiwas	<i>Ougeinia dalbergioides (Syn. Ougeinia cojeinensis)</i>
113	Tetu	<i>Oroxylum indicum</i>
114	Tiwar	<i>Avicennia alba</i>

S.N.	Local Name	Botanical (Latin) name
115	Toddy palm	<i>Borassus flabellifer</i>
116	Umbar	<i>Ficus glomerata</i>
117	Undi	<i>Calophyllum inophyllum</i>
118	Vad	<i>Ficus bengalensis</i>
119	Warang	<i>Kydia calycina</i>
120	Waras	<i>Heterophragma roxburghii</i> (Syn. <i>Heterophragma quadriculata</i>)
121	Wawali or Papara	<i>Holoptelea integrifolia</i>
Shrubs		
S.N.	Name of species	Botanical name
1	Adulsa	<i>Adhatoda vasica</i>
2	Dhaiti	<i>Woodfordia floribunda</i> (Syn. <i>Woodfordia fruticosa</i>)
3	Ghaneri	<i>Lantana camara</i>
4	Ghayapat	<i>Agave americana</i>
5	Gultora	<i>Lantana alba</i>
6	Kanfuti	<i>Moghania strobilifera</i>
7	Karvi	<i>Strobilanthus callosus</i>
8	Kaladhotra	<i>Datura fastuosa</i>
9	Karawandi	<i>Carissa carandas</i>
10	Kalsunda or Pivlikoranti	<i>Balrleria prionities</i>
11	Kevani (Muradsheng)	<i>Helicteres isora</i>
12	Khulkhula	<i>Crotolaria retusa</i>
13	Mogli or Rangerand	<i>Jatropha curcas</i>
14	Nirguidi	<i>Vitex negundo</i>
15	Nivdung (Prickly pear)	<i>Opuntia dillenii</i>
16	Phangala (Phangali)	<i>Pongostemon purpuria</i>
17	Rantur	<i>Moghania species</i>
18	Rmetha	<i>Lasiosiphonerio cephalus</i>
19	Ranbhendi	<i>Thespesia lampas</i>
20	Rui	<i>Calotropis gigantea</i>
21	Shikekai	<i>Acacia concinna</i>
22	Suran	<i>Amorphophalla scampanulatus</i>
23	Thor	<i>Euphorbia ligularia</i>
24	Toran	<i>Zizyphus rugosa</i>
25	Ukshi	<i>Calycopteris floribunda</i>
Herbs		
S.N.	Name of species	Botanical name
1	AnantMul (Upalasari or Indian Sarsaparila)	<i>Hemidesmus indicus</i>
2	Bhingulia	<i>Indigo feraenneaphylla</i>
3	Burada	<i>Blumea lacera</i>
4	Chikara	<i>Desmodium pulchellum</i>
5	Dindi	<i>Leea macrophylla</i>
6	Kajra (Kuchla)	<i>Strychnosnux-vomica</i>
7	Litchi	<i>Urena lobata</i>
8	Papadi	<i>Pavetta tomentosa</i>

S.N.	Local Name	Botanical (Latin) name
9	Rankel	Musa superba
10	Ranhalad or Sholi	Curcuma aromatica
11	Rankanda	Scilla indica
12	Sarpmukha	Tephrosia purpurea
13	Sonki	Senecio grahami
14	Tarota or Takala	Cassia tora
15	VikharaTalimkhana	Astera canthalongifolia
Climbers		
S.N.	Name of species	Botanical name
1	Alsi	Dalbergia volubilis
2	Bhuikohala	Ipomea digitata
3	Chilhari	Caesalpinia sepiaria
4	Gunj	Abrus precatorius
5	Gulvel (Amarvel)	Tinospora cordifolia
6	Kanguni	Celasatrus paniculata
7	Kantharyel	Capparis sepiaria
8	Kuhili	Mucuna Pruiens (Syn. Mucunapruriata)
9	Kusari	Jasminum arborescens
10	Madvel/Modvel/Bokadvel	Combretum ovalifolium
11	Mastod	Capparia spinosa (Zizyphusoenoplia)
12	Marvel or Ranjai	Clematis triloba
13	Nandanvel	Vitis rapanda
14	Palasvel	Butea superba
15	Phulsum	Spatholobus roxburghii
16	Sakalvel	Ventilago madraspatana
17	Ukshi	Calycopteris floribunda
18	Valbiwla	Millettia racemosa
19	Watvel	Cocculus macrocarpus
20	Wagati	Wagatea spicata
21	Wag,Gowindi	Capparishorrida (Syn. CapparisZeylanica) (Syn. Capparisroxburghid)
Bamboos		
S.N.	Name of Species	Botanical name
1	Bundi or Cher	Oxytenanthera monostigma
2	Manvel	Dendrocalamus strictus
3	Padhai or Katas	Bambusa arundinacea
4	Senesibambo	Bambusa vulgaris
Grasses		
S.N.	Name of species	Botanical name of species
1	Ber	Ischaemum rugosus
2	BhaleKusal	Andropogon triticus
3	Bhaongrut (Phulera, Phul)	Anthistiriaciliata (Syn. Thermneda quadrivalvis)
4	Bhuri	Aristida paniculata
5	Boru	Andropogonhalepensis (Syn.Sorghumhelpense)
6	Chirka	Eragrosti stremula
7	Dongarigavat	Andropogon monticola

S.N.	Local Name	Botanical (Latin) name
8	Ghanya, Marvel	Andropogon pertusus
9	Gondval	Andropogon pumilis
10	Harali (Durva)	Cynodon dactylon
11	Kunda	Ischae mumpilosum
12	Kother	Woodrowia diandra
13	Kusali	Andropogon contortus (Syn.Hetropogon contotus)
14	Lavhala	Rottboollia perforate
15	Marvel	Andropogon annulatus(Syn. Dichanthium annulatum)
16	Pavnya	Ischae mumsulcatun
17	Phool	Themeda triandra
18	Rosha	Andropogon schoenanthus
19	Sheda	Ischae mumlaxum

B. Characteristics of Fauna

The Matheran ESZ falls in the Western Ghats and is bestowed with rich faunal diversity. This includes diverse groups of insects, reptiles and birds. Innumerable species, most of which are unexplored, of Grass hoppers, mosquitoes, beetles, termites, mantis, bees, hornets, wasps, cockroaches, cicads, aphids, moths and butterflies are found inside the forest.

i) Mammals:

The forest supports a number of species of herbivores, carnivores and omnivores. Panther is the only big cat found in this area. Other species which are found, though spotted rarely, are Jungle cat, Small India Civet, Common palm Civet, rusty spotted cat, fox and striped hyena. Among herbivores, wild boar and barking deer are found in abundance, besides black naped hare, crested porcupine and bonnet macaque. The checklist of mammals is given in table 2. (Source: wildlife management plan of Sudhagadh WLS)

Table 2 : Checklist of mammals

S. No	Order	Family	Scientific Name	Common English Name
1	Primates	Cercopithecidae	<i>Macaca radiata</i>	Bonnet Macaque
			<i>Macaca mulata</i>	Rhesus Macaque
			<i>Presbytis entellus</i>	Common Langur
2	Carnivora	Canidae	<i>Canis aureus</i>	Jackal
		Viverridae	<i>Viverricula indica</i>	Small Indian Civet
			<i>Paradoxurus hermaphroditus</i>	Toddy Cat or Palm Civet
			<i>Herpestes edwardsi</i>	Indian Grey Mongoose
		Hyaenidae	<i>Hyaena hyaena</i>	Striped Hyaena
		Felidae	<i>Felis chaus</i>	Jungle cat
			<i>Panthera pardus</i>	Leopard
<i>Felis rubiginosa</i>	Rusty Spotted Cat			
3	Artiodactyla	Suidae	<i>Sus scrofa</i>	Wild Boar
		Cervidae	<i>Muntiacus muntjac</i>	Barking Deer or Muntjac
4	Lagomorpha	Leoporidae	<i>Lepus nigricollis</i>	Indian Black Naped Hare
5	Rodentia	Sciuridae	<i>Funambulus palmarum</i>	Three Stripped Palm Squirrel
			<i>Funambulus pennanti</i>	Five striped Palm Squirrel
			<i>Hystrix indica</i>	Indian Crested Porcupine

ii) Avifauna

A number of local and migratory birds are found in this region, the details of which are given in table 3 (Source: wildlife management plan of Sudhagadh WLS).

Table 3: Check list of Birds

<i>S.N.</i>	<i>Order</i>	<i>Family</i>	<i>Scientific Name</i>	<i>Common English Name</i>
1	Peiecaniforms	Phalacrocoracidae	<i>Phalacrocorax niger</i>	Little or Pigmy cormorant
2	Cicomipormes	Ardeidae	<i>Ardeola - gray</i>	Pond Heron or paddy bird
			<i>Bubulcus ibis, Coromandus</i>	Cattle Egret
			<i>Egretta alub modesta</i>	Large Egret
			<i>Elgrettca intermedia intermedia</i>	Median or Smaller Egret
			<i>Egretta gazzetta gazzetta</i>	Little Egret
3	Falconiformes	Accipitridae	<i>Elanus caeruleus vociferus</i>	Black winged kite
			<i>Haliastur indus indus</i>	Brahminy Kite
			<i>Accipiter badius dussumieri</i>	Indian Shikra
			<i>Ictinactus Malayensis Perniger</i>	Black Eagle
			<i>Spilornis cheela melanotis</i>	Crested Serpent Eagle
4	Galliformes	Phasianidae	<i>Coturnix coturnix coturnix</i>	Common Grey Quail
			<i>Perdica asiatica asiatica</i>	Jungle Bush Quail
			<i>Gallus sonneratti</i>	Grey Jungle Fowl
			<i>Pavo cristatus</i>	Common Peafowl
5	Charadriiformes	Jacanidae	<i>Venellus indicus indicus</i>	Red wattled lapwing
			<i>Vanellus malbaricus</i>	Yellow wattled lapwing
			<i>Tringa hupoleucos hypoleuccos</i>	Common sand piper
6	Columbiforms	Columbidae	<i>Streptopelia decaocto</i>	Indian Ring Dove
			<i>Stveptopelia chinensis surantemsis</i>	Spotted Dove
7	Psittaciformes	Psittacidae	<i>Psittacula krameri Manillensis</i>	Roseringed Parakeet
8	Cuculiformes	Cuculidae	<i>Cuculus varius varius</i>	Common Hawk, Cuckoo or Brain Fever Bird
			<i>Cuculus Micropterus Micropterus</i>	Indian Cuckoo
			<i>Cuculus canorus</i>	Cuckoo
			<i>Eudynamys scolopacea scolopacea</i>	Koel
9	Strigiforms	Strigidae	<i>Tyto alba stertens</i>	Barn Owl
			<i>Bubo zeyionensis</i>	Brown Fish Owl
			<i>Glaucidium radiatum radiatum</i>	Barred Jungle Owlet
			<i>Athene brama brama</i>	Spotted Owlet
10	Coractiformes	Alcedinidae	<i>Alcedo atthis taprobana</i>	Small Blue or Common Kingfisher
			<i>Halcyon smyrnesis fusca</i>	White Breasted Kingfisher
		Meropidae	<i>Merops Orientails Orientails</i>	Green Bee-eater
		Coracudae	<i>Coracias benghalensis indica</i>	Indian Roller or Blue Jay
	Bucrotidae	<i>Tockus griseus</i>	Malabar Indian Grey Hornbill	
11	Pictformes	Picidae	<i>Micropternus brachyurus jerdonil</i>	Rufous Wood Pecked
			<i>Hemicircus canente</i>	Heart Spotted Wood Pecker

S.N.	Order	Family	Scientific Name	Common English Name	
			<i>Chrysocolaptes lucidus</i>	Larget Golden Backed Wood Pecker	
12	Passeroformes	Pittidae	<i>Pitta brachyura brachyura</i>	Indian Pitta	
		Oriolidae	<i>Oriolus oriolus</i>	Golden Oriole	
		Dicruridae	<i>Dicrurus adsimilies macrocercus</i>	Black Drongo or king Crow	
			<i>Dicrurus leucophaeus longicaudatus</i>	Grey or Ashy Drongo	
			<i>Dicrurus aeneus aeneus</i>	Bronzed Drongo	
			<i>Dicrurus hottentottus hottentottus</i>	Haircrested Drongo	
		<i>Dicrurus paradiseus paradiseus</i>	Large Racket tailed Drongo		
		Sturnidae	<i>Acridotheres tristis tristis</i>	Common Myna	
			<i>Acridotheres fuscus maharattensis</i>	Jungle Myna	
			<i>Gracula religiosa indica</i>	Grackle or Hill Myna	
		Corvidae	<i>Dendrocitta vagabunda vagabunda</i>	Indian Tree Pie	
			<i>Corvus splendens splendens</i>	House Crow	
			<i>Corvus macrorhynahos culminates</i>	Jungle Crow	
		Campehagidae	<i>Pericrocotus flammeus</i>	Scarlet minivet	
		Pycononotidae	<i>Pycononofus jocosus fuscicaudatus</i>	Redwhiskered Bulbul	
			<i>Pycononotus cafer cafer</i>	Redvented Bulbul	
		Muscicapidae	<i>Pellorneum ruficeps ruficeps</i>	Spotted Babbler	
		Sub-family Timalinae	-	<i>Turdoies strlatus</i>	Jungle Blabber
			-	<i>Terpsiphorie paradisi paradisi</i>	Paradise flycatcher
		Sub-family Musciapinae	-	<i>Copsychus saularis saularis</i>	Magpie Robin
		<i>Saxicoloides fulicata intermedia</i>	Indian Robin		
Family Ploceidae	-	<i>Passer domesticus indicus</i>	House Sparrow		
Sub-family Ploceinae	-	<i>Ploceus philippinus philippinus</i>	Baya or weaver Bird		

iii) Reptiles

The area hosts a diverse species of reptiles of which few are endangered. The details of the reptiles area given in table 4(*Source: wildlife management plan of Sudhagadh WLS*).

Table 4: checklist of reptiles

S.N.	Order	Family	Scientific Name	Common English Name
1	Sub-order - Sauria	Agamidae	<i>Calotes versicolor</i>	Common Garden Lizard or Blood sucker
			<i>Psmmophilus blanfordanus</i>	Rock Lizard
		Chamaeleonidae	<i>Chamaeleon zeylanicus</i>	Indian Chamaeleon.
		Varanidae	<i>Varanus monitor</i>	Common monitor
2	Sub-order -	Boidae	<i>Python moluxu</i>	Indian Python.

S.N.	Order	Family	Scientific Name	Common English Name
	Serpents		<i>Eryx conicus</i>	Russel's Sand Boa.
			<i>Ptyas mucosus</i>	Dhaman or Common Rat Snake
		Elapidae	<i>Bungarus caeruleus</i>	Common Indian Krait.
			<i>Naja naja</i>	Indian Cobra
		Viperidae	<i>Vipera russelli</i>	Russell's Viper.
			<i>Trimeresurus malabaricus</i>	Malbar Pit Viper.

11.1.3. Biodiversity Value of Matheran ESZ

A. Biodiversity and its types

Biodiversity means the variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important and desirable. It refers to the variability in living organism at various levels.

As per the World Research Institute (1992) there are three levels of biodiversity.

- i) **Genetic Diversity:** It represents the variation within and between populations of the organisms. It arises due to genetic and chromosomal mutations. Differential selection leads to changes in frequency of the gene in gene pool leading to evolution.
- ii) **Species Diversity:** It refers to species richness or number of species available in a site or habitat.
- iii) **Ecosystem Diversity:** It is defined as variability of habitat found within the area. It is determined by climatic and edaphic factors.

B. Biodiversity in Matheran Eco-sensitive Zone and its value

The use and non use values of the area forms the framework of the total biodiversity value of the landscape.

Use Value:

- a. Direct Value
All food, timber, medicines derived from this area. It includes sustainable harvesting of NTFPs, fuel wood, gene harvesting, recreation activities like ecotourism and education and research activities like preparation of the local Peoples Biodiversity Register with the help of Maharashtra Biodiversity Board.
- b. Indirect Value
All ecosystem services like climate stabilization, watershed protection activities like water conservation and ground water recharge, carbon sequestration, habitat enrichment, nutrient retention and environmental protection methods and processes in existence in the area leading to natural disaster prevention and safeguards in the area.
- c. Option Use Value
All potential future knowledge and use of the known and yet unknown resources in that area

Non Use Value:

- a. Existence value

It is the passive use value of the area and includes the value of some endemic resources and rituals of cultural interest and heritage whose absence would only be felt acutely if and when they are not present in the area.

b. Bequest Value

All the benefits, arising from ensuring that biodiversity and ecosystem services from that area, will be preserved in perpetuity for future generations too.

The biodiversity value of Matheran ESZ can be summarized into following categories.

- i) **Consumptive Use value:** It refers to the value placed on the forest on account of it being a source of food, medicine, fuel etc. The forest in Matheran ESZ has been a regular source of fuelwood for a number of tribal villages which are located in and around the vicinity of the ESZ. The exhaustive list of all medicinal plants are in the process of being documented as a part of Peoples Biodiversity Register of that area, however, a number of plants are currently used by local people and tribals to cure various ailments and occupy important position in socio cultural and religious life. The list of these medicinal plants found in the forest tract has been compiled in table 5 (source: “Biodiversity in Western ghats Districts of Maharashtra and Goa”, Forestry and Environment Division, Space Application Centre (ISRO), Ahmedabad).

Table 5: Trees and their medicinal value

S.N.	Species name	Plant part utilized	Medicinal value
1	<i>Acacia catechu</i>	Bark	Used as astringent, digestive, useful in cough and diarrhoea
2	<i>Anogeissus latifolia</i>	Ghati gum	It is good substitute for acaia gum in pharmacy
3	<i>Butea monosperma</i>	Seeds, gum	Seeds are internally administered as an antihelminthic in treatment of roundworm, pounded seeds with lemon when applied to skin acts as rubefacient. Gum is used in treatment of Diarrhoea
4	<i>Glycosmis mauritiana</i>	Leaves	Infusion of dried leaves given as a tonic and appetizer
5	<i>Heterophragma quadriculata</i>	Roots	Roots are prescribed as drink in viper-bite
6	<i>Madhuca latifolia</i>	Bark, flowers	Decoction of bark is used in curing bleeding gum and ulcers. Flowers are used in cough and bronchitis
7	<i>Emblica officinalis</i>	Fruit	Used as diuretic and laxatives; in dried form in diarrhoea and dysentery. Phyllembin, obtained from fruit pulp has mild depressant action on central nervous system and spasmolytic action. Fruits also have antibiotic effect.. Rich in Vitamin C
8	<i>Pongamia glabra</i>	Seeds	Seed oil is used treatment of skin disease and rheumatism
9	<i>Schleichera oleosa</i>	Seeds	Powdered seeds are applied to ulcers of animals for removing maggots
10	<i>Syzygium cumini</i>	Bark, seed	Bark decoction and seeds are useful in diarrhoea and dysentery. Alcoholic extracts of seeds has been reported to reduce level of blood sugar in diabetic patients
11	<i>Terminalia bellerica</i>	Fruit, fruit pulp	Fruit pulp is used in dropsy, diarrhoea and leprosy, and half ripe fruits as purgative. Fruits has antibiotic activity against a wide variety of microorganisms
12	<i>Callicarpa lanata</i>	Root	Used in cutaneous infection
13	<i>Holarrhena antidysentrica</i>	Bark, leaf, seed	Used to cure dysentery and diarrhoea
14	<i>Memecylon umbellatum</i>	Leaves, root	Leaves are given in leucorrhoea and gonorrhoea. Decoction of root is useful in excessive menstrual discharge
15	<i>Oxylum indicum</i>	Root, leaf, fruit, seed	Root bark used in diarrhoea, dysentery and rheumatism, tender fruits are stomachic and seeds are purgative.

S.N.	Species name	Plant part utilized	Medicinal value
			Leaves are used externally for enlarged spleen headache and ulcers
16	<i>Pterocarpus marsupium</i>	Gum, leaf	Gum used in diarrhea and for toothache. Bruised leaves are applied on sores and boils
17	<i>Schleichera oleosa</i>	Seeds	Powdered seeds are applied to ulcers of animals for removing maggots
18	<i>Tamarindus indica</i>	Fruits	Fruit pulp is used as refrigerant, carminative and laxative, also recommended in febrile disease and bilious disorder
19	<i>Tetrameles nudiflora</i>	Bark	Bark decoction is given for rheumatism, dropsy and jaundice
20	<i>Actinodaphne angustifolia</i>	Leaf	Infusion of leaves used in urinary disorder and diabetes
21	<i>Olea dioica</i>	Bark	Used as febrifuse
22	<i>Rawolfia serpentina</i>	Root, leaves	Drug rauwolfia from leaves is used as antihypertensives and as sedatives; also employed for relief of various central nervous system disorders; extracts of roots are valued for treatment of intestinal disorders, cholera, colic and fever. Leaf juice used as remedy for opacity of cornea

A checklist of important plants of medicinal value is provided in table 6 (source: Working plan of Alibag division by Khaire and Rahurkar).

Table 6: Checklist of medicinal plants

Sr. No.	Local Name	Botanical Name	Family
1	Gunja	Abrus precatorius	Fabaceae
2	Khair	Acacia catechu	Mimosaceae
3	Chirali, Chilar	Acacia torta	Mimosaceae
4	Haldu	Adina cordifolia	Rubiaceae
5	Bel	Aegle marmelos	Rutaceae
6	Kinhai	Albizia procera	Mimosaceae
7	Kalmegh, Chirait	Andragocephala paniculata	Acanthaceae
8	Shatawari	Asparagus recimosus	Liliaceae
9	Neem	Azadirachta indica	Meliaceae
10	Danti, dati	Baliospermum montanum	Euphorbiaceae
11	Moha (flower)	Bassia latifolia	Sapotaceae
12	Aapta	Bauhinia racemosa	Caesalpinaceae
13	Sawar	Bombax insigne	Bombacaceae
14	Salai	Boswellia serrata	Burseraceae
15	Aasan	Bridelia retusa	Euphorbiaceae
16	Tabor Charoli.	Buchanania lanzan	Anacardiaceae
17	Palas	Butea monosperma	Fabaceae
18	Palaswel	Butea superba	Fabaceae
19	Ukshi	Calycopteris floribunda	Combrataceae
20	Wagoti	Capparis zeylanica	Capparidaceae
21	Kumbhi	Careya arborea	Lecythidaceae
22	Karwanda	Carissa carandas	Apocynaceae
23	Bhokada	Cassia argentea	Caesalpinaceae
24	Chaksoo	Cassia absus	Caesalpinaceae
25	Senna, Sonamukhi	Cassia angustifolia	Caesalpinaceae
26	Bahawa	Cassia fistula	Caesalpinaceae
27	Takla/ Tarota	Cassia tora	Caesalpinaceae
28	Takala	Cassine glauca	Celastraceae
29	Kombadtura	Celosia argentea	Amaranthaceae
30	Safed Musli	Chlorophytum tuberosum	Liliaceae
31	Raktarohida	Chukrasia tabularis	Meliaceae
32	Kachni	Cichorium intybus	Asteraceae
33	Wasanwel	Cocculus hirsutus	Menispermaceae
34	Joomgoli	Cocculus hirsutus	Menispermaceae

Sr. No.	Local Name	Botanical Name	Family
35	Bakulwel	Combretumovalifolium	Combrataceae
36	Gugal	Coomiphoramukul	Burseraceae
37	Bhokrun, bhokar	Cordiadichotoma	Cordiaceae
38	Peva	Costusspeciosus	Zinziberaceae
39	Jamal Gota	Croton tiglium	Eyphorbiaceae
40	Gauriche hat	Curcuma montana	Zinziberaceae
41	Bandgul	Dendrophthoefulcata	Loranthaceae
42	Karwel, Karmal	Dilleniapentagyna	Dilleniaceae
43	Kadukand	Dioscoreabulbifera	Dioscoriaceae
44	Tembhurni	Diospyrosmelanoxyton	Ebenaceae
45	Medshing	Dolichondronefalcata	Bignoniaceae
46	Aawala	Emblcaofficiaelis	Euphorbiaceae
47	Paringa	Erythrinastricta	Fabaceae
48	Mendhikut	Euphorbia nerifolia	Euphorbiaceae
49	Kajli	Excoecariaagalocha	Myrcinaceae
50	Wad	Ficusbengalensis	Moraceae
51	Umber	Ficusglomarata	Moraceae
52	Gandya umber	Ficushispida	Moraceae
53	Pimpal	Ficusreligiosa	Moraceae
54	Khawas	Firmianacorolata	Sterculiaceae
55	Kokam	Garciniaindica	Cluciaceae
56	Dikamali	Gardenia resinifera	Rubiaceae
57	Kakad	Garugapinnata	Bursaraceae
58	Shivan	Gmelinaarborea	Verbinaceae
59	Gudmar, Bedaki	Gymnemasylvestre	Asclepiadacea
60	Kewan	Helicteresisorra	Sterculiaceae
61	Murud-Sheng	Helictrosisora	Sterculceae
62	Anantmul	Hemidimusinducus	Asclepiadaceae
63	Waras	Heterophragmaquadrilocularae	Bignoniaceae
64	Ran bhendi	Hibiscus furcatus	Malvaceae
65	Gokshur, Talimkhana	Hoigrophilaspinosa	Acanthaceae
66	Kuda	Holarrhenaantidysenterica	Apocynaceae
67	Papdi, wavla	Holopteleaintegrifolia	Urticaceae
68	Brahmi	Hydrocotyleasaitica	Apiaceae
69	Terda	Impatiens balasamina	Balasaminaceae
70	Hardwickiabinnata	Ixora brachiate	Rubiaceae
71	Kusarwel	Jasminummalabaricum	Oleaceae
72	Nana	Lagestroemiamicrocarpa	Lythraceae
73	Heena	Lawsoniainerrnis	Lythraceae
74	Gadbeej	Litseasebifeza	Lauraceae
75	Moha	Madhucalongifolia	Sapotaceae
76	Shendri	Mallotusphilipinensis	Euphorbiaceae
77	Amba	Mangiferaindica	Anacardiaceae
78	Aalav, aalu	Meynaspinosa	Rubiaceae
79	Shatal	Microcospaniculata	Tiliaceae
80	Humb	Miliusatomentosa	Annonaceae
81	Kalamb	Mitragynaparviflora	Rubiaceae
82	Kartoli	Momordicadioica	Cucurbitaceae
83	Ukshi	Morindatinctoria	Rubiaceae
84	Shevga	Moringapterygosperra	Moringaceae
85	Tulas	Ocimumsanctam	Bignoniaceae
86	Tetu	Oroxytumindicum	Bignoniaceae
87	Dagadphool	Parmeliapeblata	Paemeriaceae
88	BhuiAwala	Phyllanthusfrateznus	Euphorbiaceae
89	LendiPimpali	Piper longum	Piperaceae
90	Barachi	Psoreliacarylifolia	Fabaceae
91	Bija, Bibla	Ptetocaprismarsupium	Fabaceae
92	Tajawi	Putranjivaroxburgii	Euphorbiaceae

Sr. No.	Local Name	Botanical Name	Family
93	Sarpghandha	Rauvolfiaserpentina	Apocynaceae
94	Ringani	Sapinduslaurifolius	Sapindaceae
95	Kusum	Schleicheraoleosa	Sapindaceae
96	Biba	Semicarpusanacardium	Anacardiaceae
97	Shevri	Sesbaniaegyptiaca	Fabaceae
98	Bala	Sidacardifolia	Malvaceae
99	Ghotwel	Smilax zeylanica	Smilacaceae
100	Gorakhmundi	Sphaeranthusindicus	Asteraceae
101	Narakya	Sterculiafoetida	Sterculiaceae
102	Kokeri	Sterculiaguttata	Sterculiaceae
103	Jambhool	Syzygiumcumini	Myrtaceae
104	Sag	Tectonagrandis	Verbenaceae
105	Hirda	Terinaliachebula	Combretaceae
106	Ghol	Termaorientals	Ulmaceae
107	Arjun	Terminaliaarjuna	Combrataceae
108	Behada	Terminaliabellerica	Combrataceae
109	Gulwel	Tinosporacardifolia	Menispermaceae
110	Petari	Trewianudiflora	Euphorbiaceae
111	Nirgudi	Vitexnegando	Verbinaceae
112	Ashwagandha	Withaniasomnifera	Solanacea
113	Dhawriphol	Woodfordia floribunda	Lythraceae
114	Indrajaw	Wrightiatinctoria	Apocynaceae
115	Toran	Ziziphusrugosa	Rhamnaceae

- ii) **Productive Use value:** This includes value of the products that are of commercial importance.eg. Timber, NTFP (Non timber forest produce) etc. These forests have a fair reserve of commercially viable timber species like teak and haldu, however commercial exploitation of forest for timber has long been discontinued in forests comprising Matheran ESZ and the surrounding area. Besides a number of NTFPs are available in the forest. Their list is compiled in table 7. (*Source: working plan of Alibag division by Khaire and Rahurkar*).

Table 7: List of Non Timber Forest Produce (NTFP)

Sr. No.	Name of NTFP	Sr. No.	Name of NTFP
1	Grasses	14	Moha flowers and seeds
2	Palas leaves and flowers	15	Rankle leaves
3	Apta leaves	16	Honey
4	Tembhurni leaves	17	Karaya gum
5	Bamboo	18	Gunj pala
6	Kadhipatta leaves	19	Karvi
7	Myrobalans	20	Beheda fruits
8	Chilhar bark	21	Aonla fruits
9	Ain bark	22	Palas fruits
10	Wavding	23	Rannakhi
11	Agave leaves	24	Dukkar kandh
12	Adulsa	25	Shikekai pods
13	Shatavari		

- iii) **Existence Value:** It refers to the value of the life forms that are supported by the forest. The forest in Matheran ESZ serves as a habitat to a wide variety of mammals, reptiles, birds and insects. Their details have been given in section 2.2.
- iv) **Aesthetic value:** It means the willingness of people to pay for the aesthetic beauty of the forest. Matheran is one of the tourism hotspots in the state of Maharashtra. The scenic beauty of the hills, seasonal streams and waterfalls and a pleasant climate attracts large number of tourists and

trekkers from state as well as other parts of the country. The bustling tourism industry supports livelihood and economy of the people residing in this area.

- v) **Ecosystem services value:** It means the services provided by the ecosystem. The dense forest cover in the Matheran ESZ acts as a bulwark against soil erosion and denudation. Several streams source their origin from these forests which acts as a watershed. The tree and vegetation stands in the area serves as a major carbon sink.
- vi) **Option Value:** It refers to potential of biodiversity for future use which are presently not known. It is well known that honourable Supreme court has fixed NPV(Net present value) for all the classes of forest that are meant for diversion. Such kind of valuation is nothing but option value of the forest biodiversity.

11.1.4. Conservation of Flora and Fauna

The Matheran ESZ has rich biodiversity and supports a large number of flora and fauna and needs to be preserved and protected. A holistic approach is therefore needed with objective of -

- Conservation of Biodiversity
- Protection of watershed and catchments
- Protection against encroachments
- Management of tourism activities

A. Challenges and Threats

The major challenges faced by the area under ESZ are summarized as below

- i) **Encroachments to forest land:** The entire area ESZ, particularly area under forest are subject to tremendous pressure from encroachment. Tendency of land grabbing by taking undue advantage of government policies is widely prevalent. In view of this there is urgent need for permanent demarcation of government forest areas and all such sensitive zones.
- ii) **Forest fire:** The hilly topography with underlying rocky strata supports tall grasses which die down by the advent of winter season. It serves as potential fuel for fire incidents that predominantly occurs in the months of December to April, causing severe damage to forest, particularly in its regeneration. Quite often these fires are difficult to control due to hilly topography.
- iii) **Landslides and Soil Erosion:** The Matheran hills receive very heavy rainfall. Owing to its geology and steep topography, there posed a risk of severe erosion and landslides during monsoon season if preventive measure were not in place.

11.1.5. Strategies and Measures against threats to this zone

The conservation strategies banks upon minimal disturbance to fragile ecosystem to augment habitat protection, with slew of measures for soil conservation and prevention of forest fire incidences. These measures are to be taken up primarily by forest department with participation of local people, and if necessary, other line agencies like PWD should be roped in, particularly when large structures for checking of soil erosion is needed to be undertaken. The prescriptions for the conservation are as below.

A. Forest and Wildlife protection

The Forest of Matheran ESZ should be managed under Matheran Hill Working Circle as prescribed by working plan Alibag Forest Division. The survey and demarcation should be carried out as per the recommendations of the working plan in a phased manner.

No commercial tree felling should be carried out on hill slopes. Blanks occurring in the ESZ area should be planted with locally available species.

Fire control measures should be taken up by preparing suitable fire management plan by Forest department with annual calendar of operation. Fire lines should be cleared by the end of November. During Fire season fire watchers should be deployed and fire protection huts should be erected at strategic locations to report any fire outbreak well in advance. Fire fighting teams should be stationed at base camps and should be put to use as soon as incidence of fire outbreak comes to notice. They should be equipped with fire blowers, grass cutter machines and other fire fighting tools along with safety equipment. At the advent of fire season a campaign should be undertaken to create awareness about hazards of fire, among public and local villagers.

- i) **Soil moisture conservation works:** Soil moisture conservation (SMC) works are important both for preservation of catchments in the watersheds and habitat improvement. It should be done extensively as recommendations of Watershed management plan and as far as resources permits. Area treatment like loose boulder structures and CCT, creation of perennial waterholes, regular de silting and cleaning of natural and artificial water reservoirs should be undertaken. Earthen dams and cement concrete dams should be constructed at suitable locations to ensure water availability to the animals during peak summer season.
- ii) **Wildlife management:** Matheran ESZ harbors a number of avian fauna, reptiles, insects and few carnivores. The management strategy should focus on protection of their natural habitat from destruction. Exotic weeds such as lantana, eupatorium etc. should be removed to facilitate development of grasslands. The dead fallen wood should not be removed as it harbors variety of herpetofauna. Special niche habitats like snags, den trees, termitarium, coarse wood, debris etc. should be preserved for their ecological value.
- iii) **Regulation of tourism:** The area under ESZ receives heavy footfall of tourists. Their number and activities should be monitored and regulated in order to minimize adverse impact on the forest and threat it possess for the biodiversity. Littering by plastics is a major hazard in this area. Despite ban on plastics in state of Maharashtra, Matheran witnesses littering of plastic bottles and empty cans in almost all view points and trekking sites. Proper exhibits and signboards should be displayed at these places to sensitize against grave consequence of plastic littering and persuade the visitors against their disposal inside forest. Heavy fines should be levied against the violators. Proper system of collection and disposal of such waste be put into place by the Municipal Council and Village Gram Panchayats.

11.2. Water Conservation Measures

The issue of rain water harvesting is more important in case of Matheran Hill Station Municipal Council since major population of MESZ lives in that town. Also, the development activities are concentrated in the said area. The Government in Urban Development Department has sanctioned Development Control Regulations for the Council area vide Notification dated 1.04.2013. The said regulations have provisions for 'Rain Water Harvesting' under Regulation No. 8.81. The information about streams, springs and water bodies, etc. is given elaborately in Chapter No. 2.

11.3. Management plan for horse droppings/dung waste

Previously, in the Matheran Hill Station Municipal Council (MHSMC) horse dung was being processed along with other organic wastes to produce biogas, which was supplied to various hotels. However,

main digester was damaged due to horse dung. Hence, as approved by the Urban Development Department it is proposed by the Municipal Council to use stainless steel module pre-digester in order to reduce damage caused by horse dung. The following additional measures are also expected to be taken up for Horse dung management:

1. As per the Development Plan for MHSMC area, plot no. MP93 is reserved for Bus Stand, Logistic Hub and Parking lot. Currently, horses trespass this land and the horse dung dumped here has contaminated the Simson tank. The Matheran Municipal Council jointly with the Police Dept. and Revenue Dept. proposes to evict the horses.
2. Byelaws are proposed to be introduced to penalize horse owners for failure to manage horse dung and for tying horses to trees in the forest area thus causing de-fertilization and detrimental effect on forest area.
3. E-rickshaws if approved by MoEFCC may be introduced in Matheran as an alternative to horses. They can be owned by the Municipal Council to control misuse but given to local horse owners to operate with some conditions. The number of registered horses can then be progressively reduced by studying the carrying capacity of Matheran.

11.4. Sewage and Solid Waste Disposal Plan keeping in view the growing number of Tourists

Matheran Hill Station Municipal Council has appointed an agency for sewage treatment.

Landfill site is not permitted within the Eco-sensitive zone. The Council has already been segregating wet and dry waste. Organic waste is processed to produce biogas. As approved by the State Govt. a separate stainless steel modular pre-digester will soon be installed for handling horse dung along with other improvements such as Bio-mining and Bailing Machine. The same shall be purchased and installed shortly.

The dry waste is transported on the mini-train from Matheran town to Aman Lodge; thereafter the same is transported to solid waste landfill site. The Council has taken initiatives to achieve zero landfill status by taking measures for material recovery from dry waste.

11.5. Facilities for providing primary health and medical check-up in the ESZ area

MHSMC has a population of 4,393 persons. The Council has a 12 bedded hospital, Zilla Parishad Veterinary clinic and two private clinics. The Hospital currently has a Maternity ward, minor Operation Theatre and facilities for basic health treatment.

The hill station however, has a large number of tourists visiting every day. The number of Tourists is as high as 7,000 to 8,000 tourists per day during peak season. In view of the large number of visitors, the Council has plans to upgrade the facilities at the existing Hospital.

In other areas within the ESZ, the settlements are small in size and scattered. Providing health facility at village level may not be feasible. However, the health facilities available in the surrounding settlements just outside the ESZ are accessible to the local inhabitants. The Sub-District Hospital at Karjat has ambulance facility for emergency.

11.6. Plans for proper transportation of the ageing and ailing in the ESZ

Matheran Town with a population of 4,393 persons is the single largest settlement in the ESZ. MOEFCC vide their Notification dated 04.02.2003, banned all vehicular traffic within Matheran Town. Hence the problem of proper transportation of the ageing and ailing is limited to the MHMC area.

The old and ageing people have the option of mini-train and hand pulled carts. The amended Notification dated 16.01.2004 stipulated that one Ambulance and one standby shall be permitted in Matheran Town. Hence, the aged and ailing can be transported using the Ambulance. E-rickshaws if approved by MoEFCC may be introduced; these will help solve the problem of transporting the ageing as well as sick people.

11.7. Measures to prevent pollution of air and water

The following may be noted in respect of MESZ:

1. MOEFCC's Notification dated 04.02.2003 has imposed restrictions on certain activities that may have a detrimental effect on the environment such as industries, mining, use of plastic, etc. These restrictions have been retained in the Zonal Master Plan for MESZ (Chapter 10).
2. The Notification also banned any kind of vehicular traffic within the town. Vehicular traffic and industries which are the two major causes of pollution, are not permitted within the town.
3. The MESZ primarily consists of Forest area, a 200 m. wide buffer and the Matheran town. The Forest area is protected under the 'Indian Forest Act, 1927'.
4. Non-forest lands falling within the 200 m. wide buffer as well as other non-forest pockets within the ESZ boundary are categorized as Green Zone 2. Green Zone 2 is the most restrictive zone of the Mumbai Metropolitan Regional Plan of which MESZ is a part. The permissible activities in Green Zone 2 lying within MESZ area have been further restricted as given below:
 - a) Projects such as Integrated Township (ITP) are not permitted.
 - b) There are restrictions on quarrying, extraction of ground water, discharge of effluents, use of plastic, etc.
 - c) Industries are not permitted within the ESZ.
5. Also, MTDC in their 'Tourism Master Plan' have laid down guidelines for environment protection.
6. As discussed with MPCB, certain measures suggested by them are given below:
 - a) The Eco-sensitive zone covers 34 villages partially or fully. Gaothans of most of these villages lies outside the ESZ Boundary. In view of the sensitive nature of the area, it should be made mandatory for all Local Bodies (including Gram Panchayat) to provide Sewage Treatment Plants at village level, wherever possible.
 - b) In order to facilitate the management of solid waste, it is necessary that integrated waste management facility be set up within the ESZ. Possibility of permitting 'Waste to Fuel' generation plants in the area may be explored.
 - c) The vehicular traffic caused due to tourists movement upto Dasturi Naka is a major cause of air pollution. The option of allowing only 'Clean Fuel Vehicles' upto Dasturi Naka may also be explored. The above mentioned measures will help to reduce air and water pollution.

Note: For any clarification/additional information, the provisions of Mumbai Metropolitan Regional Plan may be referred.