

City Development Plan for Malvan

A Synopsis



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Cities and their Growth & Development

Introduction:

The City Development Plan for Malvan over the next 20 to 25 years must aim at creating an integrated land use and socio-economic model that will sustain its natural resources as well as maintain and improve the quality of life and the unique characteristics of the place. The City Development Plan must, therefore, be based on:

- Existing natural resources
- Existing land use and zoning with respect to topography, geology, hydro-geology and forest cover
- Climate and meteorology
- Demographic profile including literacy, occupation, per capita income, etc.
- Housing
- Infrastructure such as water, energy, solid waste, sewage and storm water, connectivity and mobility, and communication
- Significance of natural and historical features of the city including its scenic beauty



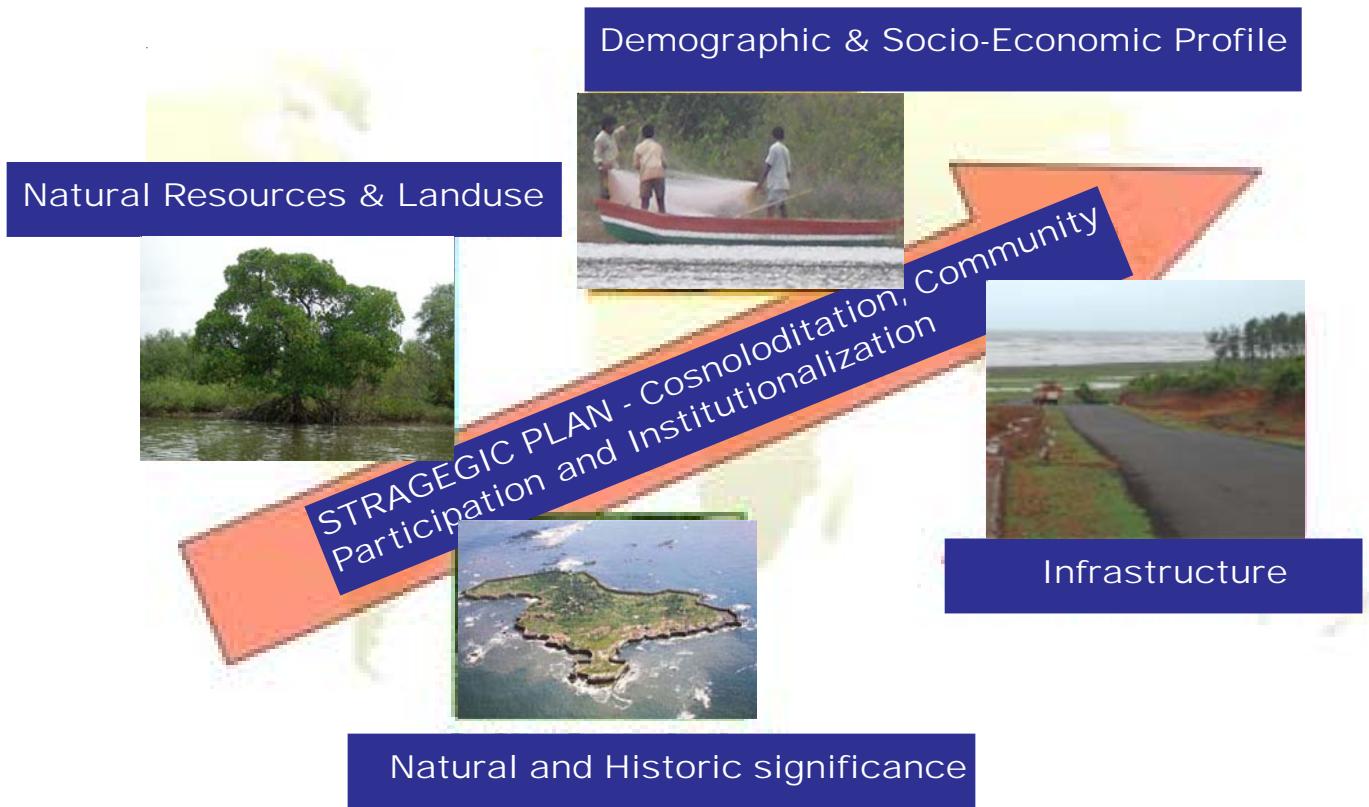
Once basic facts or statistics is gathered for all of the above factors, projections can be made for 10, 20 or 30 years into the future. The projections will then form the basis of the City Development Plan.

The Proposed plan should be made in collaboration with the citizens of Malvan - incorporating their ideas, thus allowing for maximum community participation.

Global Overview:

Worldwide, there is a movement of mass migration of people from villages to towns and cities. According to the United Nations Habitat Center:

"In 1950, one-third of the world's people lived in cities. Just 50 years later, this rose to one-half and will continue to grow to two-thirds, or 6 billion people, by 2050. **Cities are now home to half of humankind.** As the world becomes increasingly urban, it is essential that policy-makers understand the power of the city as a catalyst for national development. Cities have to be able to provide inclusive living conditions for all their residents. Rich or poor, everyone has a right to the city, to a decent living environment, to clean water, sanitation, transport, electricity and other



CONSOLIDATION OF CITY DEVELOPMENT PLAN

services. How we manage this is arguably one of the greatest challenges facing humanity.” Cities, unless they are planned, will grow into urban nightmares - megalopolises like Mumbai which are congested, and provide a poor quality of life for majority of its residents, who live in slums. This situation has come upon in the absence of long-term sustainable planning solutions. Uncontrolled development without considering the region’s natural resources and features - its rivers, mountains, coastal areas, forest cover, etc. will degrade the environment. At the same time, planning without considering the socio-economic upliftment of all people in the region will be a massive failure.

Planning must, therefore, be holistic. It must also be creative - to utilize the region’s existing wealth - both natural and human - to bring about a sustainable future.

Malvan: The Place & its People

Introduction:

Malvan formerly known as Medha has a bay almost entirely covered with Rocky Reefs. A coastal region, endowed with endearing natural features, nostalgic back waters, memorable beaches & exotic islands are its speciality. A rich diversity of mangroves surrounding the coastal belt, is part of its prosperous environment.

A town of historic tradition and abundant natural beauty, Malvan is known for the Sindhudurg Fort, its delicious Malvani cuisine (Rice & fishcurry), Malvani Hapus mango and sweets such as Malvani Khaja (Sweet made from besan flour & coated jaggery) & a variety of Malvani



Sindhudurgis declared as an eco tourism destination

Ladoos. However, there is much that the town possesses that remains unknown. The people of Malvan, their historic relation with the land - of rice and fish - and numerous other traditions, make Malvan a unique place. A development plan must consider their continuance of the place's historic tradition, the sustainability of its natural resources and the merging

Also unique of Malvan is a kind of dramatic called Malvani Dashavtar. A well known dramatists and T.V. actor, Mr. Machindra Kambli is from Malvan taluka. This is how the Malvan name happens to be. Some people say that here salt was produced in large quantity. Salt producers use the term Lavan & term Mahalavan is a place where you get more salt. Hence the name Malvan. Others believe that the name Malvan is ascribed to the large cultivation of coconut trees. Hence the name derived from MAD – BAN. Mad(coconut tree) &

Ban (Garden). Irrespective of how the name was derived, Malvan is today the Heart of Sindhudurg & a very popular tourist destination.

The historic town of Malvan today stands on what was once an inner island, and is now part of the mainland, almost hidden by palms. Formerly a trading zone, Malvan is today known for its salt pans, Chinese clay pottery and the special 'Malvani cuisine' which is quite distinct from Konkani food. The rocky terrain of Malvan holds two Ports : the Sindhudurg and Padmagad . It is said that there was an underground route joining the two Ports.

Geographically, Malvan is located on North Latitude 16° 4' and East Longitude : 73° 3'. It is bounded on the north by Deogad, on the east by Sawantwadi, Karli creek on the South & the Arabian sea on the western side. Malvan has three islands, two of which are a quarter mile away from the shore. The third island is where the Sindhudurg fort is located. This island is large in comparison to the other two islands. On one of the smaller islands is the ruined fort of Padmagad, connected with the mainland by a neck of sand. Malvan is connected by Roads through the Vengurla – Belgaum highway. It is now connected to Mumbai- Goa road, located at about 110 Kms. from Goa & 500 Kms. from Mumbai. The nearest airport is in Vasco Airport, Goa, nearly 120 KMs from Malvan, while the closest railhead is Kudal on Konkani Railway. The Area of Malvan admeasures **89.6 sq. m.** The town site admeasures around 12 kms. from north to south & 24 kms. to 27 kms. from east to west.

Coconut, Cocoa palms, Jack fruit, Cashew tree (*Anacardium Occidentale*), Mango, Undi (*Calophyllum Inophyllum*) trees are the chief plants found in the region. Transportation sources are roads, rails, airways & waterways. Rivers, Lakes & Dams are the drinking water sources in the town. Dams are also used for power generation, irrigation & transport purposes.

The temperature of this coastal town ranges from a maximum of 32°C in the month of May, and a minimum of 21°C in the month of December/January. The climate is warm and humid. The precipitation is in the form of rainfall, the annual average of which is about 2500 mm.

The houses in Malvan are mainly two-storied structures with Mangalore tile roofs.



The simple lifestyle of its people is characteristic of the Konkani culture

The chief items of import from the ancient Malvan Port were: Cotton & shahapur cloth, Molasses, Tobacco, Turmeric, chillies, oil, nuts, myrabolans, while chief export items included Salt, coconuts, beetleuts, coir, plaited palm leaves & fish.

The main economy of the town is fisheries, crops like rice & fruits like jack fruit, mango, cashews & coconuts. Malvan has its unique culture signified by its Marathi-Konkani dialect and Food. Malvan is traditionally known for its unique dialect of Marathi / Konkani called Malvani. The cuisine of this region is popularly known as Malvani cuisine. Coconut, Rice and fish assume prime significance in the Malavani cuisine.

Demographic profile

The present population of Malvan is . The population

consists of Hindus, native Christians, Muslims & Parsis. Historically, Malvan was a chief boat-building town. These ship builders are generally Hindu carpenters, Sutars & Pachkalsis, helped by Gabit Fishermen. Others are muslims & native Christians. The trade was chiefly carried out with Malbour, Mumbai, Kutch, Kathiyawad & Arabia. The Sindhudurg district in which Malvan taluka is a part, 100% literacy rate, small taluka in the shoreline of maharashtra,



Malvan is located in the Sindhudurg district flanked on the one side by the Arabian Sea

Places of Interest in and around Malvan

Sindhudurg Fort

This is one of the most daunting historical trips in the region. Sindhudurg or the ocean fort is Shivaji's cenotaph and in its chief shrine Shivaji's image is worshiped. The image is of stone and the head is covered with silver or in high days with a gold mask. In the stone of the walls, prints of Shivaji's hands and feet are held in reverence. Giving testimony to the Maratha maritime supremacy, the construction began on 25th November 1664 and completed 3 years later. The boat ride to the fort is quite playful, but it is easier if you are visiting during tourist season. It costs Rs.27/- but will costs you the fare of 11 seats if no one but you are to go. The fort conservation trust runs 22 ferries for this purpose. Once you reach the fort and when the boatman who doubles as the guide begins to unravel the thinking and the strategies behind the architecture of the fort, it leaves you in wonderment about the capabilities of the lost minds of yesteryears. The fort itself is very extensive, a little less than 2 miles round the ramparts. The walls are low, ranging from 29 to 30 feet. They are on an average 12 feet thick and have about 32 towers from 40 to



130 yards apart. The towers are generally outstanding semi circles with fine embrasures for canons. Here and there, narrow staircases lead from the inside to the top of the walls.

The area of the fort spans 48 acres. Once full of buildings it is now a mere shell with nothing but a few temples dedicated to Mahadeo, Jarimai, Mahapursh, Bhavani and Shivaji, the only one of its kind in the country. If you visit the fort in the early evening it is most likely you will hear devotional music from the radio in the huts of a few gabits. These gabits are actually 8th generation of the servants of Shivaji. They continue to live within the confines of the walls at a salary of Rs.80 per annum, the same sum their ancestors received from Shivaji raje.



Sindhudurg fort is located in one of the three islands off the coast of Malvan

In 1765 after the rule of Shivaji an expedition under the joint command of Major Gordon and Captain John Watson of Bombay marine were sent to speedily reduce the fort and they gave it the name of Fort Augustus. As the fort was very hard to dismantle and unprofitable, it was returned back to the Marathas, then Kolhapur chief, in return for peace in the area. These Kolhapur pirates known as the Malwans were the most active and desperate of all coast corsairs.

The sunlight plays visual treats on the limestone walls of the fort and the sunset from its peak is breath taking, where every year politicians fly down their choppers to hoist the Indian flag on Independence Day. On your way back from the fort, there are many things that you begin to understand about the ocean you are treading on and the brave warriors who conquered lands in these spaces of water many centuries ago. It feels like a live trip into a history textbook chapter. It brings back words forgotten long ago in elementary school.

Rameshwar Temple (23km north of Malvan)

Situated deep within the heart of the town Achara, it is a temple of lord Rameshwar worshipped and highly regarded by the locals. Everything carved in this temple is the work of locals some 600 years ago even before the time of Shivaji. Gavpalne is a tradition that is followed here every five years and during this time, the villagers have to reside outside the village. The entire village of Achara has been a gift from Shambhaji Raje, the son of Shivaji to the temple trust or Devastaan. Rameshwar temple has a great political as well as devotional backup and is one of the most influential authorities of the area.

Dhamapur lake is the largest in the district with an area of 55 Acres.

Dhamapur Lake, which is a quite place, in the future may transform into a Mecca of boating and water sport activities. Jain vestiges at Pendur, Agnewadi Temple near Masure and the Brahmanand swami memorial at Ozar are interesting cultural and devotional statements in Malvan- A place where nature and



history have definitely kept their promise. How long will the government take to fulfill theirs, is for us to see.

The talukas of Devgad in the North and Vengrula in the south have some of the most beautiful beaches to explore. Mithbhav, Kunkeshwar (temple and beach) and Tamberdeg beaches are brilliant in Devgad. Mochemad, Shiroda and Nivete beaches are the well-known ones of Vengrula. The Rameshwar temple at Vengrula is 300 years old in Konkani architectural style. The Shri Mutt Sansthan located about 3 km from Vengrula is a must see synthesis of two mountains at Dabholi. The Mutt follows Vedic traditions established by Adi Shankaracharya.

Beaches in and around Malvan

Malvan Beach

This is one of the most commercially active beaches in the Konkan. It is buzzing with life at the jetty where most of the fishermen anchor their boats of various dimensions and colors. There are a few bars and restaurants on the beach unlike most other seashores on the Sindhudurg coast. Especially to try here is a humble seafood specialty joint called Khot, run by an ex mechanical engineer. It is one of the friendliest atmospheres alive with banter among the locals.

This beach is not a place for relaxation; however, it is close to the city centre and perhaps the most accessible beach in the area. Another promising forthcoming attraction here is a one of its kind marine park in Asia. The government has proposed the marine park since 2000, but there has not been any action on it yet. The area of Malvan is a fortified island on the coastal reef. Coral patches have been recorded in the interstitial regions around the Sindhudurg fort. Most of these marine flora and fauna from the inter-tidal area is exposed during any low tide. So keep an eye out for a great opportunity for scuba diving. However, for now the best attraction on this beach remains to be the Sindhudurg fort.

Chivla Beach

This is a beautiful stretch of clean sands and clear waters bordering Malvan town from North West. It is a very small beach and there is nothing much to do here but laze around and watch the sun go down. A small restaurant called Silver Sands serves local fish and refreshments.

Asra Mahal Beach

This beach extends from the Chivla beach and there is a Navy detachment and petrol centre. It also has a modest government rest house; one can watch the sea from a distance sitting on a low wall created to confine the guesthouse. The Sindhudurg fort is visible from here as a far away horizon spot.

Tondavali Beach (19km North of Malvan)

This is perhaps the true manifestation of an untouched beach. It was one of the most difficult beaches for me to uncover. I had to hike almost a km from the road to get to the shore but it was totally worth the drain. When I first saw a glimpse of the shore from the end of the tree thickets, I could identify with a



feeling of someone who discovers new land. Not a single soul here and the sand had just patterns of sea wind. Fine grains of soft white particles urged me to feel them without my footwear. Cool waters splashing away you almost feel sorry no one watches this phenomenon abundantly.

Achara Beach (22km north of Malvan)

This one is a paradise for swimmers and dolphin watchers. Dolphin season is between October and February. It is a few km ahead of Tondavali beach. It is quite popular during season time. There are some fishing activities around here but mostly it is a good space to chill with the sea waves.

Tarkarli Beach (8km south of Malvan)

When you ask any local, what are the places to visit in Malvan, a unanimous answer is the Tarkarli Beach. True to its promise, this beach is a favorite with sand particles devoid of any red tinge and sky reflecting waters. MTDC has a luxury resort around the beach. Most of the time you are not allowed if you do not live at the resort, but exceptions are made quite easily. This is also one of the most notorious beaches to swim in and 21 tourists have died until date. So be careful whilst going deep into the waters.

Devbaug Beach (12km south of Malvan)

A confluence of the Karli River flowing into the Arabian Sea. This point marks the southern most tip of the malvan taluka. An interesting geographical site, it is far more enchanting to see it atop the bridge built to cross over the river into Vengrula.



Boat houses and Eco-friendly Resorts along Back waters and beaches would provide an ideal setting

Malvan Fort

Huge sea rocks of Malvan has easefully shouldered the responsibility of two Forts - Sindhudurg & Padmagadon his broad chest. The name of the fort is given to the Sindhudurg district. Tourist from all over the world visit through out the year to see this Maratha glory. The fort was built with the help of huge rocks on the Kurte Island which amazes people & one appreciates imaginative power of Shivaji.

In 1664 Shivaji erected this fort on 44 acres of land. It took 500 stone splitters & stone breakers, 200 blacksmiths, 3000 labourers & 100s of skilled artists who toiled very hard to complete this fort in three years. This is evidence from stone inscriptions. Initially 3 K.M. long outer wall (Tat) was built. Average height of wall 10 meter and 2 to 4 meter broad in which liquid lead was used in the foundation. These wall today also stands impenetrable. The trick used in the construction of entrance door seems to be mastermind work. The technique was so deceptive for the enemy that they could not even realize from where the entrance door begins. Outer zigzag outer wall also built in a such a way that if the enemy would come to attack it would be visible from any side so that troops inside the fort could fire their guns & cannons effectively & humble the enemy. Crores of Hones (Goldcoins) were then spent to build this wonderful fort.

Impressions of Shivaji's fingers and lake are found to be preserved here on one of the wall. Also lies inside the fort worth seeing temples of Bhavanimata, Shambhu Mahadev, Jirimiri & Mahapurush. All are in good conditions.

Other places of attraction include:

- Pandargad, 1.5 kms. away from Malvan.
- Sidhagad fort, 24 kms. away from the coast.
- Other mainland forts like Sarjekot, Rajkot fort within the boundaries of Malvan.
- Old residency established in 1812 & Factory established in 1792.
- A small Roman Catholic Chapell on the Archard road.
- Teak forest at Ovaliye.
- Temples are also of great interest in the town, like the Rameshwar temple, Narayan temple, Sateri, Dattatraya & Murlidhar temples.
- Kalavli, Kolamb & Kalsa creeks.
- Small ponds at Pendur.



Scope for City development of Malvan

The city of Malvan has great potential for Ecotourism, as projected and enumerated by the Tata Consultancy Services in its report on the tourism potential of Sindhudurg District. Considering its natural beauty, historic tradition, cultural uniqueness and pristine environment, the development plan will consider the employment and socio-economic milieu as well as the preservation of its environment while developing a plan for long term sustainability of the place and the region.

Ecotourism:

It is defined as "Responsible travel to natural areas that conserves the environment and improves the well-being of local people."

Over the past four decades, mass tourism has become synonymous with the four S's: Sun, sea, sand and sex. Although mass tourism was originally embraced by many countries as a 'smokeless' industry, that could increase employment and Gross National Product, evidence quickly grew that its economic benefit was marginal and its social and environmental costs high. Much of the money did not stay in the host country and often the only benefit to the local community was in the form of low-paying service-level employment as maids, waiters, and drivers. Mass tourism often brought over uneven development, environmental pollution and invasion by culturally insensitive and economically disruptive foreigners.

In the late 1960s, the large international conservation organizations, together with environmentalists and scientists working in Latin America and Africa began to reach two related conclusions: In Africa, they began to realize that "preservationist" conservation methods separating people and parks, were not working. Most national parks and reserves in Africa were originally established for hunters, scientists, or tourists, with little or no regard for the local people. Park management emphasized policing - "fences and



Visitors and tourists will be provided for stay in the village houses giving them a taste of Konkan rural life

fines" - which forcibly evicted and kept out local community members who were often politically and ethnically marginalized poor who received little or no benefit from either the parks or tourism, deeply resented being excluded from lands of religious and economic value and being restricted to increasingly unsustainable areas around the parks.

It was argued that the protected species, areas and ecosystems would survive only if those people living nearest them benefited financially from both parks and tourism.

" Implicit in the term is the assumption that local communities living with nature can and should benefit from tourism and will save nature in the process." - David Western, Director, Kenya Wildlife Service.

"Tourism should contribute to, rather than exploit the land...it should be active rather than passive, emphasizing cultural exchange rather than mere sightseeing." - Michael, Tico Times, Costa Rica

Ecotourism implies making fundamental changes to mass tourism practices. It must become a vehicle for significantly transforming the way tourism itself is carried out, for "greening" not merely "greenwashing" the entire industry. Following are the characteristics of Eco tourism:

- Involves travel to natural destinations
- Minimizes impact
- Builds environmental awareness
- Provides direct financial benefits for conservation
- Provides financial benefits and empowerment for local people.
- Respects local culture
- Supports human rights and democratic movements

Properly defined, Ecotourism is travel to fragile, pristine, and usually protected areas that strives to be low impact and usually small scale. It helps educate the traveler; provides funds for conservation; directly benefits the economic development and political empowerment of local communities; and fosters respect for different cultures and for human rights. Ecotourism involves ensuring to build a more discriminating and informed traveling public.

Some of the significant aspects to be included in the development plan for Malvan are:

Center for Fishery:

Fishery is the lifeline of the Malvan economy. It should be furthered through a prudent combination of traditional knowledge and modern technology such that it continues to provide sustenance to the local



Fishing is the lifeline of the Malvan Economy; its sustenance is crucial to the long-term development plan of the town

populace while at the same time serve as a means to attract tourists to understand traditional fishing techniques, tradition and even cultural and symbolic representations developed over years. This would also bring up the self-esteem of the local populace.

Provisions that can be provided for a sustainable growth of Fishery are better and non-harmful methods of fish collection, facilities for storage of fish that need to be further processed such as cold storage, solar drying for fish, which is then provided as a local delicacy, as well as conversion of non-utilized fish catch for chicken-feed or fertilizer.

Mobility:

Since there is no direct train route (most convenient access) to Malvan town, a ring rail connection must be provided either from Sindhudurg or Kudal railway station. This Ring Rail will pass along the periphery of the town with stops at most of the tourist destinations. This would not only benefit tourism but also the local populace since the present modes of transportation are highly inadequate.

Water transport can be developed not only for internal circulation between the 3 islands off Malvan, but also for direct approach.

For this purpose, there is a need to construct a Jetty.

Marine Park:

- Malvan has three islands off it, ne contains the Sindhudurg fort. The other two consist of inhabited villages. These can be Marine Park Centers. Botanical and Microbiological literature suggest that the region has a rich marine diversity of both flora and fauna. The marine park would serve to showcase these species as well as provide protection for long term survival of species which would otherwise be unnoticed and therefore, possibly destroyed through habitat destruction or other means. Following is a note on the marine diversity of Malvan coast:

"The pneumatophore bearing lignites of Kolamb in Malvan (Maharashtra, west coast of India) have yielded a rich mycoflora of higher marine fungi. Out of a dozen hypomycetes known from the submerged parts of mangrove plants, more than 8 species have been retrieved from the lignite deposits, and as such indicate the potential for a mangrove association within the fossil deposits. Of the five marine species of genus *Cirrenalia* Meyers & Moore, four are associated with the pneumatophore bearing lignites of Kolamb. *Monodictys pelagica* (Johnson) Jones and *Periconia prolifica* Anastasiou are other hypomycetes recorded in the palynological preparations. As the morphological details and size of the conidia have striking resemblance to modern taxa, the fossils have been referred to corresponding taxa described from the mangrove habitats of the tropics. Thus, the fossil record of



Conservation of the flora, fauna and coastal habitat of Malvan is key to its sustainable development

this mycoflora is of great significance and considerable importance, since it indicates fossil mangrove habitat, and as such complements the micro and megafossil data associated with the lignite deposit. Such evidence is important to infer palaeobiogeography and sea level along the west coast of India during the Late Tertiary (Neogene)."

The marine park could also encompass the salt marshes along the coast of Malvan.

Salt marshes play a critical role in the support of human life, acting as natural filtration systems by trapping pollutants that would otherwise contaminate our bays and oceans. Salt marshes have the ability to absorb fertilizers, improve water quality, and reduce erosion. They are also among the richest wildlife habitats.

The Marine Park at Malvan can be developed along the lines of the Mahatma Gandhi Marine National Park established in 1983 at Wandoor, 29 km from Port Blair; it is one of the most important areas for viewing marine diversity. The Total area of this Marine National Park is 281.50 sq.km. which includes 220 sq.km. of territorial sea water. There are 15 small and large islands in the Park with beautiful sandy beaches and creeks full of lush green Mangroves and tropical forests. Rich marine life consists of variety of coral reefs, colourful fishes, molluscs, shells, starfish, turtles, salt-water crocodile etc. One can also view a variety of birds including the White-Bellied Sea Eagle.

Marine Activities:

Ecotourism could also be developed by promoting such activities as fishing, marine observation through special equipments, scuba diving to observe the coral reefs, use of boats with transparent bottoms so as to observe fish life, etc. Researchers from around the world can benefit from such provisions and facilities as the region provides ample opportunities for Research. Guidelines to protect the local species of flora and fauna must be laid down in order that researchers do not take undue advantage while sharing their findings with the local population and experts.

Cultural Fiesta:

The typical food, the lifestyle, the housing type, should be combined in creating a cultural fiesta for the visitor. At the same time, a feeling of self-esteem and pride in one's culture will be generated for the local populace.

Part of this plan would include the setting up of restaurants in the typical Malvani style of lateritic wall and mangalore tile roof housing. These will have architectural elements such as windows, doors, trellises, cornices according to the local architecture. Local food would be served by people in their traditional costumes. Such restaurants could be created around all the interesting places in Malvan. Local people may invest and create their own restaurants but under the broad guidelines provided by the government. The government may also provide loans or other forms of financial support to assist in local entrepreneurship.

Serving Malwan delicacies in these restaurants as well as along the stations of the Ring Rail would help sustain a rich cultural setting as well as sustain the economy of the place. These restaurants would have a shop for sale of local handicrafts, art and other local industry product.

In addition to restaurants, there would be rest houses and resort facilities. Bread and breakfast facilities, where tourists would stay with locals, would provide them an unique opportunity to live the simple village



life of Malvan.

Disaster Management Center:

A Disaster Management Center should be set up equipped with the latest technologies for Earth quake and Tsunami warning. At the same time, measures should be taken to protect the shoreline from illegal construction and dumping of garbage and sewage.

Geological Museum:

A Geological museum can be created at the sites where lateritic quarrying has been carried out in the past. Such a museum would give information on the unique rock and soil formation in the Konkan belt and in the Sindhudurg district and Malvan.

GIS Mapping for critical habitats:

A GIS based Information System can be created to map and monitor the coastal habitat as well as other natural resources of the region. The GIS based system can be used for the Environmental Impact Assessment of activities such as tourism, construction, developments of ports, harbors, or jetties on the marine and natural environment of Malvan. The GIS could also be used to provide information about the place to tourists by incorporating the data in easy-to-use format at information kiosks provided along the ring rail routes as well as at all destinations. The GIS based map would also help planners and government agencies in effective planning and management of local resources.

Environmental Management:

The Environmental management will encompass the provision of waste segregation and composting as well as bio gas generation for the town through a network of bio gas plants which will provide cooking gas and fuel for emergency lighting. Similarly, solar water heating would be provided in all houses, particularly in resorts and restaurants and hospitals, where it would be made mandatory. Decentralized waste water management systems (DEWATS) utilizing bio technology would be used for sewage treatment locally. The treated water could be used for irrigation. Rain water harvesting either through storage from roof top or surface run off and percolation, would be made mandatory. In addition, all plantations in the city would be based on ecological criteria - indigenous, suitable for a particular region, its usefulness and long-term association with the flora and fauna in the region.

The environmental management would also encompass the development of scientific and modern technologies for agriculture, suitable for the flat lands. It will incorporate water conservation and soil conservation techniques and emphasize on organic cultivation. Organic food has a great demand in the market of industrialized countries. This will also thus provide additional sources of income for the population.



Eco-friendly City:

The city would also serve as an example of Eco-friendliness through the following. All public utilities such as phone booths, traffic signals, etc. would be powered by solar energy.

The city would also give priority to eco-friendly modes of transportation such as bicycles, providing separate and safe tracks all along the roads.

The methods of water shed management will be applied in parts where huge run off takes place. This will allow for water percolation and improvement in the ground water of the region. The city will also demonstrate signages and street furniture such as seating areas, provision for the physically challenged in all public buildings and areas.

The signages would also provide messages for protection and conservation of the ecology of the area, giving its unique characteristics, thus incorporating the basic rules of Eco tourism.

The city will also create a system of formal and non formal education unique in nature, that will complement the existing education system and help in capacity building of local entrepreneurs, who will even be able to obtain degrees in hotel management, ecotourism, etc.

The housing, in addition to incorporating local features, would also use local and less energy intensive materials, recycle waste, use non-toxic paints and building materials, compost solid waste and use renewable energy.

Backwaters:

The backwaters are a unique feature of the Malvan coastline. These can be developed into eco-destinations, with boathouses serving local cuisine and delicacies. In addition, packages for tours along mangroves, would also be provided by the boat house owners.



ECP-FRIENDLY CITY: Use of renewable energy such as solar and wind, biological treatment of sewage and its recycling and reuse as well as segregation and compostin of waste are some features which would make the city Eco-friendly

Conservation of Coastal habitat and mangroves:

The digitized data from GIS could also be used for eco-geomorphological zonations for selected coral reefs and mangrove patches. Using satellite imagery from IRS LISS III and panchromatic data, Coral reef features such as reef slope, reef crest, algal ridge, boulder bed, outer reef, inner reef, coral knolls, etc., can be identified. A methodology for identification of major mangrove communities such as *Avicennia*, *Rhizophora*, *Sonneratia*, *Bruguiera*, *Ceriops*, etc., was developed using IRS LISS III and PAN data in the Gulf of Katch, Goa, Bhitarkanika, Sunderbans and Andaman & Nicobar Islands.

The conservation of the coastal habitat is key to the sustainable development of Malvan since it contributes not only to its natural beauty but also is the economic life line of the populace. These mangrove forests, coral reefs and aquatic life are vital as both reservoirs of biological diversity and suppliers of oxygen necessary to maintain a balance in the earth's atmosphere. Rules must be, therefore, developed for the conservation of these habitats by all means possible.

About EnviroArch:

EnviroArch is a Mumbai-based environmental design firm led by three principal Architects & supported by a team of technical experts drawn from fields related to environment & architecture.

The objective of EnviroArch is to provide holistic design solutions based on principles of conservation, simplicity & aesthetics. EnviroArch provides integrated solutions to clients who want to minimize the impact of their building on the environment and contribute to sustainability.

The three principal architects of EnviroArch are:

**Ar. Rajeev Taishete,
Ar. Mukund Porecha
Ar. Roshni Udyavar.**

Architects Rajeev and Mukund have more than 25 years of architectural practice all over India. They hold a Postgraduate Diploma in Environmental Architecture from the Academy of Architecture, Mumbai. Roshni Udyavar has 7 years of experience in the environmental field. She has traveled widely on international assignments and is presently Head of Department at the Rachana Sansad's Postgraduate Department of Environmental Architecture, Mumbai.

The team of consultants working with the firm includes scientists and technical experts, urban planners and lawyers, who have substantial experience in their respective fields.

The environmental services provided by EnviroArch include:

- **Passive solar or climate sensitive design**
- **Total water management including water harvesting and recycling**
- **Solid waste management**
- **Ecological landscape design**
- **Environmental law consultancy**
- **Application of renewable energy**
- **Energy audit & management**
- **Ecotourism planning**
- **LEEDS certification**
- **Environment Management Plan/ Environmental Impact Assessment Report**

Research and Development:

EnviroArch hosts a dedicated research department to support the firm's design efforts with more than 10,000 files of materials on diverse topics related to environment & architecture planning, the research cell provides positive inputs through survey & analysis of the impacts of environmental design strategies.

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