

Integrated Island Management Plans (IIMPs) for Lakshadweep Islands

KAVARATTI ISLAND

Submitted to

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1. Background

1.1. As the island communities strive to raise their standards of living with increased connectivity and changing life style with threatened fragile natural ecosystem '*Integrated Island Management Plans (IIMP's) for Lakshadweep islands*' was prepared for the UT Lakshadweep Administration by Centre for Earth Science Studies. The preparation of IIMPs was in accordance with the guidelines provided in the Island Protection Zone (IPZ) Notification, 2011 of Ministry of Environment and Forests, Government of India (Enclosure-1).

1.2. The IIMP encompasses the existing and proposed developments, conservation and preservation zones, dwelling units including the infrastructure projects such as schools, markets, hospitals, public facilities, etc., The IIMP consists of a detailed spatial plan for all the development activities covering

- (i) the entire island area landward from High Tide Line (hereinafter referred to as the HTL);
- (ii) land area between HTL and Low Tide Line (hereinafter referred to as the LTL) which will be termed as the Intertidal zone;
- (iii) the lagoon area within the territorial water limit (12 Nautical miles or 20 km).

The activities permissible (see Annexure-I) and the no-development setback determination criteria (see Annexure-II) are as prescribed by the MoEF.

1.3. Majority of the listed information in the guidelines were collected from the islands during the different field visits. The digital data base on cadastral scale 1:4000 scale maps were utilized for mapping the different physical characteristics of the island. Locational information of the islands such as dwelling units including the infrastructural facilities was collected using Global Positioning System (GPS). Areas indicating the dwelling units including the infrastructure projects were mapped. The conservation and preservation zones were mapped separately. The entire island including the Lagoon aquatic area has been considered for the plan preparation. The data on coral reef classification of the lagoon waters mapped at eco-

geomorphologic level during 2007 utilizing the high resolution satellite imageries viz., IRS P6 LISS III/LISS IV Mx were used with limited field check-up and has an accuracy at 90% confidence level¹. The entire field data were incorporated in ARC-GIS platform and IIMP is prepared in 1:4000 scale. Though the MoEF guidelines direct to prepare the IIMP in 1:10,000 scale, the final map is prepared in 1:4000 scale for better clarity of the plan, considering the smallness of the island. These maps once approved can also be enlarged at 1:2000 scales for each panchayat ward of the island for offering better clarity.

1.4. The major thrusts of IIMP in the islands are the conservation and preservation zones which are basically the major coastal habitats of the island ecosystems. The management of these habitats is based on well understood linkages among human activities and changes within a natural system. The known uses of the coastal habitats are classified as non-extractive, extractive and transformative. Non-extractive uses refer to activities such as recreation, research and education which do not involve removal of material from the habitats or do not have serious impacts. Extractive uses involve removal of renewable resources such as fish, ground water, mangrove wood, etc. Transformative uses (such as coral extraction, waste disposal without treatment, etc) result in negative changes in habitat characteristics and function. Sometimes there is a degree of overlap among the uses. The major coastal habitats of the island are coral reefs, sea grass beds, sand dunes, lagoons, sandy beaches, and the like.

In the islands the extensive coral reef formation is seen both inside and outside the lagoon waters. Normally coral reefs are present in the depths exceeding 1-2 m depth in the lagoons and are beyond the wave breaker zone. In the outer reef areas it is present up to 30 to 40 m depth. The biophysical survey of coral reefs conducted during 1999-2002 period by the Lakshadweep Administration has indicated presence of live corals in the ranges of 14% to 24%. The areas bordering the above zones are declared as buffer zones. The remaining areas can be called as Non-coral reef areas. Similar classification applies to sea grass areas also.

¹Bahuguna and Nayak, 1998. *Coral reefs of the Indian coast. – Scientific Note, Space Application Centre, Ahmedabad.*

1.5. In the IIMP weightage is also given for upgrading the physical and social infrastructure in the island. For social infrastructure there should be adequate primary health care facilities with a minimum of beds / high schools / primary schools / nursery schools / madrassas, safety in fire control and telecommunication of required standards. A general college / ITI with hostel facilities is possible in only one of the larger Islands. If on stilts and of 2 stories these could also double up as emergency / cyclone shelters. Primarily, existing provisions have to be upgraded in terms of land built space and facilities. Organized open spaces for settlement and neighborhood (ward) level parks / play grounds exist and are being upgraded often with built facilities / equipment for different resident age groups. The same applies to the island level sports ground.

1.6 In terms of physical infrastructure, potable water is generally in short supply in most Islands. Desalination plants fill up the gap in Kavaratti, Agatti and Minicoy. This facility is to be installed in all islands. For sewage disposal two pit flush septic tanks are in place. Oxidation ponds offer alternatives according to soil conditions. Solid waste disposal / management pose problems and alternatives to sea dumping / Incineration needs being explored. Electricity is generated through diesel. These needs being supplemented by alternate sources, of which solar panels and windmills are favored alternatives.

1.7 Demand for new private housing / households is not in the UT as the decadal growth rate has been and continues being well below the national average. In fact the bulk of the demand for new housing is in the government sector through standardized houses and at two storeys'. Private houses are being constantly upgraded and incrementally extended through permanent material and often at two storey's. In this scenario, households seek direct access from roads or common pathways. They seek better social / physical infrastructure, other amenities and better livelihood avenues. Also, as land is primarily with the community, home stay facilities are possible only through expansion of houses and not through new houses within the habitation zone. Even these should have the majority concurrence of the grama sabha before being processes.

1.8. The IIMP is thus prepared keeping in view the directions in the Notification dated 6.01.2011 issued by MoEF (Enclosure-2) and the order dated 11.05.2012 (Enclosure-3) of the Hon'ble Supreme Court. The preparation of IIMP should be in the context of the Environment (Protection) Act, 1986 and the development of tourism shall be after considering its impact on the livelihood of the island population and other related vulnerability issues as per the directions of Supreme Court contained in Enclosure-3. The following are the main components considered while preparing the IIMP:

- i. Land use zones strong on conservation / protection related issues so as to promote the sustainable development of the UT;
- ii. A supporting list of non-compatible / prohibited uses within each land use zone;
- iii. A simple set of building bye-laws and related development control regulations with provisions for building, fire safety, health, sanitation, etc.

1.9 The High Power Committee constituted as per the direction of Hon'ble Supreme Court (See Enclosure-3) have examined in detail the criteria for fixing the coastal setback area, i.e. '*No Development Zone*' (between High Tide Line and Setback line) where developmental activities are either restricted or prohibited. The objects of providing such a No Development Zone (NDZ) as provided in the CRZ Notification are the following: (Details in Annexure)

- i. Protection of life and property against erosion, storm surge and sea level rise due to global warming.
- ii. Protection of ecologically vulnerable coastal habitats, special, natural or scenic sites.
- iii. Ensuring public access to the beaches
- iv. Avoidance or minimising the cost of investment on coastal protection work and adoption of eco-friendly methods.
- v. Prohibition or regulating the different types of activities taking place in the coastal zone to maintain the balance between developmental goals and environmental objectives.

2. IIMP for Kavaratti Island

2.1 Kavaratti is the capital island of Union Territory of Lakshadweep. It is the most developed and centrally located in the Lakshadweep Archipelago. The island is long and narrow, with an area of 3.6 sq km. It is the third largest inhabited island. There is a shallow lagoon in the west which is rich in coral growth. The southern part of the island has a narrow area popularly called chicken neck area. The people of Kavaratti had considerable skills as stone masons and woodcarvers. The Ujra Mosque and Jamath Mosque are examples of this fine craftsmanship.

2.2 Extent of Setback Area

2.2.1. The coastal setback area is a '*No Development part of a Zone*', which refers to the strip of coastal area (between HTL and Setback line) where developmental activities are prohibited or otherwise restricted. The criterion by which the setback line is demarcated is outlined in Annexure-III. The no-development setback or buffer zone in the island is determined on the basis of its differential exposure to natural hazards, availability of free space and whether the island is habitation or non-habitation area.

2.2.2. The setback line for Kavaratti is determined on a scientific basis by dividing the island into different segments as explained in Annexure-III. In the Kavaratti island a clear cut distinction between habitation and non-habitation is not possible since the settlement is spread more or less uniformly throughout the island. However there are sparse settlements to the south of chicken neck where many government establishments like Helipad, Solar station, Naval establishments are present. The elevation wrt MSL is lower at this region compared to the northern part. Thus it is not possible to have a different setback distance for the habitation and non-habitation areas. Based on the scientific approach as outlined in the Annexure-III a uniform setback distance of 30 m is

assigned around the island as a conservation measure. The setback zones are demarcated in the Plan.

3. Highlights of Kavaratti IIMP

The IIMP in the island (see Map-1) is discussed on the matrix of uses of permitted / prohibited activities within the major landuse category such as lagoon, habitation and non-habitation areas. The present IIMP is proposed for the ten year period 2011-21. The plan can be revisited as and when required and accordingly updated. Even its perspective can be changed to beyond 2021. Some of the major aspects relevant to each of these categories are also highlighted below.

3.1 Existing Land Use

Kavaratti Island has the second highest population density (next to Amini), which creates a great pressure on the island. The numbers of households are increasing considerably. As on date 1464 residential houses are present in the inhabited part of the island. Physiographically the northern parts of the island are wider and it gradually tapers towards south. The elevation of the island varies from 0.5m– 6.0m above MSL. Approximately 81.38% of total land area falls under builtup category. The settlement clusters are concentrated mostly on the northern part of island where groundwater reserve is located. The narrow southern portion is puramboke land, which belongs to the government. The island has a well developed road network. There are 34 mosques designed as per the local architecture, a telephone exchange, museum, tourist hut and a jetty in the island. The entire area in the island is under coconut plantation. Besides coconut plantation, the natural vegetation of the island includes banana, drumstick, breadfruit, wild almond and some shrubs like Kanni, Punna, Screw pine, Cheerani etc.

3.2 Existing Residential Area

The settlements are concentrated mostly on the northern part of island which is mainly distributed in the block numbers of 2c, 1c, 1d, 2e, 4a, 4c, 4b, 3a, 3b, 2f and 4d. As per the census data 2011, Kavaratti island has a population of 11,210

persons; the sex ratio being 947 females per 1000 males. For the decade 1981-1991, Kavaratti recorded the fourth highest decennial population growth (31.39) while for 1991- 2001, it recorded the sixth highest population growth. The main occupation of the islanders is fishing. In the Kavaratti island out of the total area of 360 ha, 293 ha area (81.38%) falls under built category while 47 ha (13.05%) is under open spaces and 20 ha (5.55%) is under roads and transportation category.

3.3 Existing & Proposed Conservation and Preservation Areas

The areas under conservation and preservation are the major ecosystems such as coral reefs, sea grass beds, sand dunes, lagoon waters including the religious/cultural establishments/monuments, major institutions and natural resources of the island. The major settlement in the island is also a zone where the ground water zones are located. This area with sand dune/sand dump systems of the island needs to be conserved for the recharge of ground water. Corals are the other major ecosystem of the islands. Based on the survey it has been concluded that the island coral biodiversity is satisfactory. The survey during 2001 showed a live coral cover of 13% which increased to about 23% during 2002. Lagoon waters encompass colony of live corals and this has to be preserved against the threat of land-based pollutants. Further the dredge and fill activities related to the port development also affects the lagoonal water circulation. Therefore excavation of lagoons bottom shall be restricted to maintain the navigational channel only. In the management option a buffer zone above the HTL has been suggested to control sewage and storm drainage effluents from the island, safeguards against runoff soils from the island, etc. The beaches are the nursing ground for some of the endangered species such as birds, crabs, turtles, etc. If developments on the lagoon shore are not planned properly it can lead to a variety of short and long-term ecological and economic losses. The institutions under the conservation category are mosques, madrasas, lighthouse, airport and jetties. Schools, tourism destinations and fish landing centers in and around the jetties are also demarcated as conservation zones.

3.4 Existing and Proposed Development Schemes

All the existing and the proposed development schemes for the coming 10 years have been mapped in consultation with the Lakshadweep Administration (2011-21). The existing schemes has 370 government establishments such as SDO, Secretariat Administrative Office, Rural Development Office, Guest House, Sub Jail, Satellite Earth Station, Planetarium, LPG Godown, Library, Naval Office, Fisheries Department, Fire and Rescue, EB, Doordharsan Station, Harbour works, Sports, PWD store, etc., while the proposed development schemes are 46 in number which includes IRB Complex, Helipad Hanger Building, Incinerator, Bio mass plant, Radar Station, Khadi board office, Tourism Directorate, Central Library, Museum, Employment Directorate, Construction of new jetty, Extension and widening of existing jetty, Diving Academy, Renovation of Administrative Bungalow, Expansion of existing hospitals etc., All these are shown in IIMP. Majority of the proposed development schemes are coming outside the setback line or NDZ and are permissible activities.

3.5 Existing & Proposed Infrastructure Facilities

The island has a well developed all weather concrete road network providing good connectivity within the island. There are five passenger cum cargo ships that serve Kavaratti and facilitate inter-island connectivity. There is a small runway for small aircraft in the island. All the houses are electrified. The island has made great progress in the field of education. Besides four educational institutions, there is an ITI offering skill development courses. The medical infrastructure is constantly expanding and strengthening with a main hospital (Indira Gandhi Hospital), a primary health centre, a dispensary and an ayurvedic hospital. Strengthening of telecommunication, Jetty area improvement, sanitation network etc are considered for improving the infrastructure facilities.

3.6 Existing & Proposed Tourism (Resorts and Recreational facilities)

Kavaratti is one of the six islands in the Lakshadweep where tourist accommodation facilities are being considered. Island has a good potential for beach tourism on the north-western part between sports ground and port control tower on the lagoon coast. A 50m wide area along this stretch behind the NDZ has

been proposed for tourist facilities. Here improvement of existing tourist infrastructure and new facilities can be created. Improving the connectivity with the main land is also being considered under tourism development projects.

- All tourism related project shall be based on carrying capacity of islands, which refers to the capacity of an ecosystem to sustain specified resource uses.
- The activity should not permit the destruction of corals.
- No construction of hard structures on the seaward side of the corals.
- No disposal of untreated sewage or effluent including the non biodegradable waste in to the lagoon water by the tourist related activity.

3.7 Shore Protection

Kavaratti island has a total shore length of 14.72 km. The long-term shoreline changes in the Kavaratti island indicates that about 36% of Kavaratti is affected by erosion, 61% of the shoreline is accreting and the rest is stable. Many coastal areas which are severely affected by erosion have been protected by shore protection structures using hollow concrete blocks and tetrapods. In some of the areas low cost shore protection structures have been built on the low water line by placing the coir bag filled concrete mixtures of shingle/pebbles. For the severely eroding northern end, strengthening of the reef artificially is proposed¹.

3.8 Existing & Proposed Sewage Treatment

In the island a number of drinking water wells contain excessive nitrate concentration originating from the septic tanks and other human wastes. Sewage treatment and disposal is inadequate or non-existent. It is a major threat to the land and water resources in and around human settlements, and can irreversibly contaminate the ground water resources. Appropriate sewage treatment and disposal is essential to conserve the fragile and sensitive ecosystem of the island. Detailed studies need to be undertaken to identify the gap between sewage and solid waste collection and disposal.

3.9 Existing & Proposed Drinking water facility

Fresh water resources are limited and the hydrological system is extremely fragile. The depth to water table generally varies between 0.5 to 3.5m below ground level. The people of the island depend on bore wells and dug wells. All the wells are influenced by tides. The ground water is periodically recharged by rain. Indiscriminate exploitation of resources results in the shrinkage of fresh water lens and ultimately leads to saline intrusion. Conserving and protecting it from pollutants is very important. Rain water harvesting is being widely practiced in the island. In addition a desalination plant of 1 lakh litre/day has already been established in the island.

3.10 Non-conventional energy system

At present power is mainly generated through diesel sets. Installed capacity has been increased from 5270 KW to 8120 KW and through this uninterrupted power supply is being provided in the islands. Diesel generator sets are however highly polluting. Diesel has to be brought from the mainland through barrels. During the transport of diesel from the main land there is every chance of spillage and leakage leading to pollution of land and groundwater. Noise and air pollution are also caused during the operation. The plant is located in the densely populated area compounding the pollution effects on the people. There is a growing demand of power for fishery and tourism related industry. To meet the growing requirement of power in the island the administration is planning to bridge the gap through non-renewable energy systems. A 100 KW grid interactive Solar power plant and 80 KW wind generator is proposed to be installed at Kavaratti. A 200 KW capacity Biomass gasifier plant for generating electricity and Solar copra driers are proposed to be installed at Kavaratti.

4. Permission for Development Activities in the Different Land use Zones

Based on the existing land use pattern the Kavaratti island is broadly classified into two broad land use zones viz., lagoon zone and habitation zone. The lagoon zone is further divided into Preservation and Conservation Zone. This is basically a '*Prohibited Use Zone*' wherein the development activities are to be permitted and regulated only through the Administrator, bearing in mind the fragile eco-system to be protected and as highlighted in the IIMP. The habitation zone comprising predominantly the northern and central portion of the island is Regulated Development Zone (RDZ-I). This is a '*Regulated Zone*' with a setback area, which is a no-development zone (NDZ) incorporated in the IIMP. Most of the islanders reside in this zone. Therefore the incremental and sustainable growth of the zone is to be undertaken in their interest with a control by the Panchayat / Grama Sabha for developments in Habitation plots / areas. Less habitation area is towards south of chicken neck on the southern part of the island which has mixed land use characteristics. The north-western part of the island is identified as a '*Tourism Potential Regulated Zone*' with a no-development zone (NDZ) incorporated in the IIMP. Here the beaches are traditionally accreting and therefore new land uses are infused for regulated tourism and related employment opportunities. Utilizing the different land use zones in the island a simplified Development Control Regulations (DCR's) and Building Bye-laws are provided in the Annexure-III. Permission of LCZMA, Lakshadweep Environment clearance and approval from the Island District Panchayat are to be obtained wherever is applicable as provided in the Annexure-II.