

# Integrated Island Management Plans (IIMPs) for Lakshadweep Islands

## KALPENI ISLAND

*Submitted to*

Lakshadweep Administration



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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 level<sup>1</sup>. 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.

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<sup>1</sup>*Bahuguna 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 minimizing 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 Kalpeni

2.1 Kalpeni is the medium sized island. The island has three islets viz. Cheriyam, Tilakkam and Pitti. It has a huge storm bank of coral debris along the eastern and southeastern shore formed during the cyclonic storm event of 1847. The island is elongated with an area of 2.28 sq km. Habitation is confined to the central part of island. The important features of the island are deep lagoon of approximately 25.6 sq km. The overall shape of the island is linear with a broader end towards the south and a long narrow base tapering towards north east. Fishing is the major occupation of the island. Apart from fishing there also used to be good growth of coconut and breadfruit on the island. The environmental issues pertaining to this island are high density of population, coastal erosion, degradation of coral reef, mining of coral sand, impact of coastal structures on the shoreline, etc.

### 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.

2.2.1. The setback line for Kalpeni is determined on a scientific basis by dividing the island into different segments as explained in Annexure-III. In the Kalpeni island the settlement spreads more or less uniformly throughout the island except a narrow strip of land towards the northern part where sparse settlement are seen. Considering this a differential setback distance is not recommended for habitation and less habitation areas. However the lagoon and seaside coast experiences differential threat from the adjoining seas. Based on the scientific approach as outlined in the Annexure-III the lagoon coast shall have a setback distance of 30 m

and seaside coast is assigned 20 m as a conservation measure. The setback zones are demarcated in the Plan.

### **3. Highlights of 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*

Nearly 60 % of island area is covered by residential use with settlement clusters distributed all over the island typically intermingled with rich growth of coconut grooves and other activities. The whole island is planted with coconut trees. The government offices and other public semi public facilities such as hospital and post offices are located at the centre of the island. There is a jetty located on the western coast of the island which leads to the harbor area. The existing road network covers nearly the entire length of the island.

#### *3.2 Existing residential area*

The census (2011) report shows that the total population of the island is 4418. It houses nearly 7.12 % of the total population of the union territory of Lakshadweep. The total numbers of households in Kalpeni are 720. In the Kalpeni island out of the total land area of 230 ha, 136 ha (59.13%) falls under built-up category while 84 ha (36.52%) is under open spaces and 10 ha (4.35%) is under roads and transportation.

### 3.3 Existing and proposed Conservation and preservation schemes

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 the main sand dune/sand dump systems of the island needs to be conserved for the recharge of ground water. Corals are the major ecosystem of the island. Kalpeni has two small individual islands connected by a reef. The reef is extensively developed encircling the lagoon in the southwestern and eastern side. *Acropora palmata* species are common on the reef. Based on the survey by the Lakshadweep Administration (2002) it is estimated that 95% of corals in the western side reef flat are dead. Live corals cover 10% of the total. Kalpeni has a large and deep lagoon of around 25.6 sq km in the west which is the second largest lagoon area among the inhabited islands. Further the dredge and fill activities related to the port development also affects the lagoonal water circulation. Therefore excavation of lagoonal 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. 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 developments

All the existing and proposed development schemes for the coming 10 years have been mapped in consultation with the Lakshadweep administration during the field visit. The major among the 14 proposed schemes are LPG godown, Fish market, Fisheries field

office, Slaughter site, Rice godown, civil station, NIOT site, 4 Passenger Halls, Backwater bridge etc.

### 3.5 Existing Infrastructural facilities

The proposed infrastructural facilities included in the plan are passenger hall, cargo jetty, Ice crushing unit, power house, desalination plant, ayurvedic dispensary, transit accommodation, coconut processing unit etc. The UT of Lakshadweep has earmarked almost one third of the total budget of the territory for port and harbour development. The major activities are to provide transport facilities from the mainland to the island and also between islands. There is a need to improve the transport facilities to the island including the extension / widening of the jetty. Construction of 500 m mini airstrip, an extension of the existing helipad, would enhance the transport facility to the island. Since the settlements are less to the north of helipad in the plot no. 2A it would be possible to extend the length of the runway.

### 3.6 Existing and proposed tourism

The Island has not been opened for any type of tourism. There is a good scope to develop it as an entry group of islands along with Androth. Small islands like Cheriyaam, Pitti and Tilakkam, which are close, can be developed as exclusive fun and entertainment islands including the northern part of the island. Once these tourism attractions are developed there would be a requirement of more cottages in the island. The northern part of the island which has sparse settlement and fairly stable beach is identified as the tourism development areas. 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

Shore protection structures with tetrapods, hollow concrete blocks and coir bags filled with pebbles/shingle are built on the lagoon coast. The coasts on either side of the proposed breakwater on the east coast are also protected. Though these structures are effective in controlling erosion it is hindrance to the various activities such as beach tourism, fishery, etc. The land elevation on the southern part is hardly 1 to 2.5 m above MSL, which needs protection against the advancement of sea. The floodwater sluice has also been suggested near the BSNL satellite station to drain the excess floodwater coming from the island. Vegetative shore protection and beach nourishment would also be a long-term solution.

### 3.8 Existing Ground water facility

Fresh water resources are limited. The static and dynamic potential of fresh ground water in the Kalpeni Island is 3.74 MCM and 0.48 MCM respectively. Kalpeni shows the second highest level of static storage potential of fresh ground water amongst the nine inhabited islands.

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

Based on the existing landuse pattern, the Kalpeni island is broadly classified into two broad land use zones viz., lagoon zone and habitation zone. The lagoon zone is further divided into Preservation zone 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 spreads more or less uniformly throughout the island except on the northern part 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. The northern part of the island which has sparse settlement is identified as potential for regulated tourism activities and related employment opportunities. Utilizing the land use characteristics 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.