

POLICY FRAMEWORK AND PREPAREDNESS

for Implementing Measures to Effectively Deal with Climate Change



An Analysis For The Union Territory Of Lakshadweep

A study titled "Policy Framework and Preparedness for Implementing Measures to Effectively Deal with Climate Change: An Analysis of four states in India" was conducted through the support of the Heinrich Böll Foundation.

The assessment for the Union Territory of Lakshadweep and state of Kerala is an extension of this mentioned study. The aim of the study was also to understand the implications of the predicted Climate Vulnerability and Mitigation potential under various scenarios generated under the Intergovernmental Panel on Climate Change (IPCC) from the states' perspective.

Further, a detailed gap analysis was done to understand which actions, interventions and solutions mentioned under the State Action Plan on Climate Change (SAPCC) (mandated under Ministry of Environment, Forest and Climate Change (MoEFCC)) were aligned with the IPCC AR5 report.

This pull out comprises of findings for the Union territory (U.T.) of Lakshadweep. It also lists out recommendations that have emerged from the study. It has been prepared to initiate the discussions at the Union territory level, on the status of the implementation of their climate change action plans.

LAKSHADWEEP Union Territory Profile

Energy Profile

Lakshadweep is a group of 36 archipelago islands and India's smallest Union Territory with an area of 32 sq km. Lakshadweep lies off the south western coast of India at 73°38' and 73° 42' E longitude and 80 degree and 10° 48' and 10° 50' N latitude. It is a uni-district Union Territory and is comprised of 12 atolls, three reefs, five submerged banks and ten inhabited islands. The islands comprise of 32 sq km. All Islands are 220 to 440 km away from the coastal city of Kochi in Kerala, in the Arabian Sea.

As per the Census 2011, Lakshadweep's population is 64473 and contributes 0.01% to the total Indian population. The population density of the UT is 2013 persons per sq.km, one of the highest in the country. Due to the factors such as economic backwardness, geographical isolation, etc., the whole of the ethnic population is classified as Scheduled Tribes.

Agriculture along with fisheries is the most widely prevalent economic activity in the territory. Almost all the households own small or marginal pieces of agricultural land. Over 87% of the operational holdings are of less than 0.5 hectare size. Of the total geographical area of 3,228 hectares, the net sown area in Lakshadweep is 2,598 hectares, which works out to a little over 80% of the total geographical area of the island¹. Thus the share of net sown area is very high at more than 80%, as against the national average of about 43%. Hence, land available for any new development works / projects, is very limited².

The total installed capacity of the power houses in Lakshadweep during 2009-10 was 16510 KW with the power generation to the tune of 35,336,000 kWh. The power is supplied in Lakshadweep through diesel generating sets. Nearly 1.07 Cr. litres of diesel is used every year to create power (16MW power is produced using 9 lakh litres of diesel every month)³.

To supplement diesel power generation, there are 11 Solar Power Voltaic (SPV) plants established with capacity of one megawatt. At present the SPV power plants are producing 1065 KWP energy in islands. The energy produced from these power plants of 1 MW capacity is expected to save diesel fuel equivalent to approximately 5.6 lakh litres per annum.

The per capita energy consumption of the UT is estimated to be around 657 kWh in FY 15. The UT served 17,761 domestic consumers in 2015-16 and the peak energy demand in Lakshadweep is 8 MW in 2015-16 (CEA, 2016-17)⁴.

Energy Statistics – Lakshadweep

Per Capita Energy Consumption	657 kWh
Peak Energy Demand	8 MW
Number of Consumers	17,761
Energy Deficit	0 (2015-16)

As per the 24X7 Power for all Initiative⁵ of Lakshadweep, all households are electrified in the UT and the supply is available 24X7. As indicated in the LAPCC, the Lakshadweep Administration was to set up 100 KWP diesel grid interactive SPV power plants in nine inhabited islands except Bitra with the financial assistance from the Ministry of New and Renewable Energy (Government of India). In addition, the MNRE had sanctioned INR 40 crore project for enhancing solar power capacity by 1 MW in 4 islands together with renovation and maintenance of all the 12 existing solar plants in the islands during the year 2010-11⁶. Under the National Solar Mission, the UT had provided solar lanterns to 100% households below the poverty line free of cost and at a reduced cost of INR 489 per lantern to other stakeholders, in order to reduce dependence on diesel generation.

The UT is also a beneficiary of the central Unnat Jyothi by Affordable LED's for All (UJALA) scheme. The scheme is aimed at promoting energy efficiency saving the electricity in the Indian states and Union Territories.



UJALA Scheme Benefits-Lakshadweep

Energy Saved Per Year	12,987 MWh
Avoided Peak Demand	3 MW
CO2 Reduction Per Year	10, 519 t of CO2

Total LEDs distributed in Lakshadweep - 100000

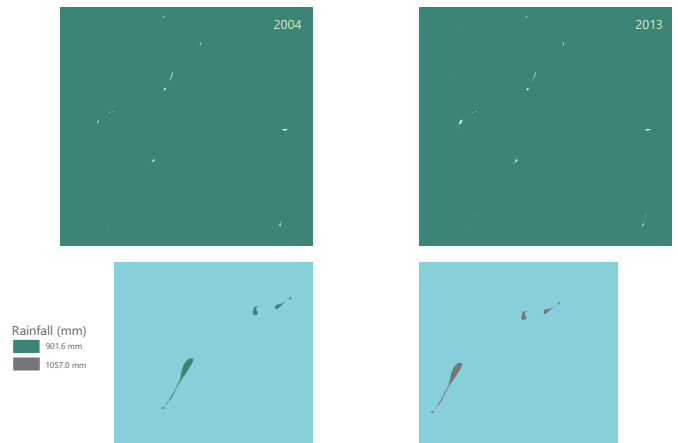
UJALA Dashboard as on 20 September 2017

The vulnerability profile of the states and Union Territories looks more closely at the possible impacts of Climate change, focusing on the rainfall patterns as well as fluctuations. In addition, other vital parameters, such as occurrence of natural disasters like drought, cyclones etc. are also highlighted. Ground water availability is also a key area of concern related to potential vulnerability that has negatively impacted groundwater replenishment and high extraction.



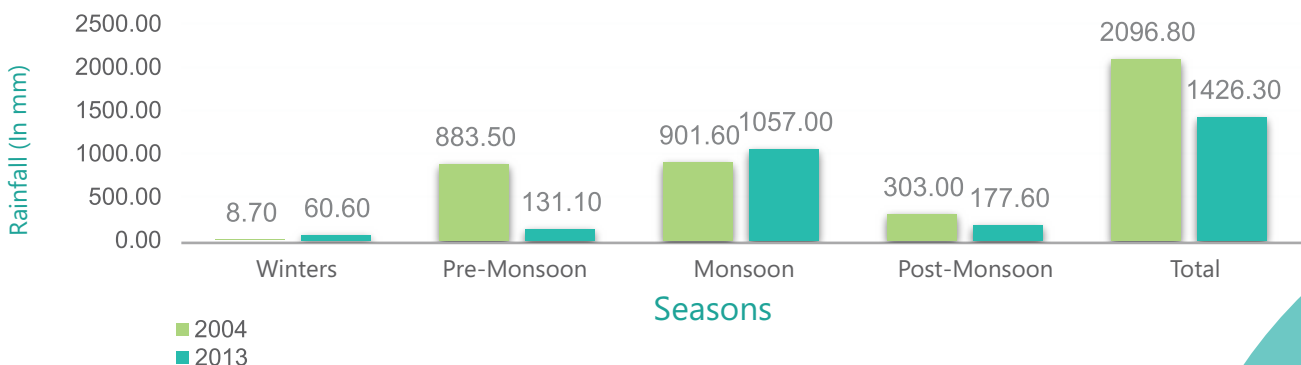
The annual rainfall in Lakshadweep varies from 60 mm in winters to 1057 mm. The pattern over 2004–2013 is observed in the maps and the figure below. It is observed that there have been fluctuating levels of rainfall in the

UT with the overall impact of reduction of the level of rainfall between 2004–2013. There has been a considerable reduction in the pre-monsoon rainfall as against 885 mm in 2004 to 131 mm in 2013. The amount of monsoon rainfall has increased from 2004–2013, thereby showing the need for taking measures for soil protection against shoreline erosion and better preparation for disaster management.



Rainfall Pattern in Lakshadweep

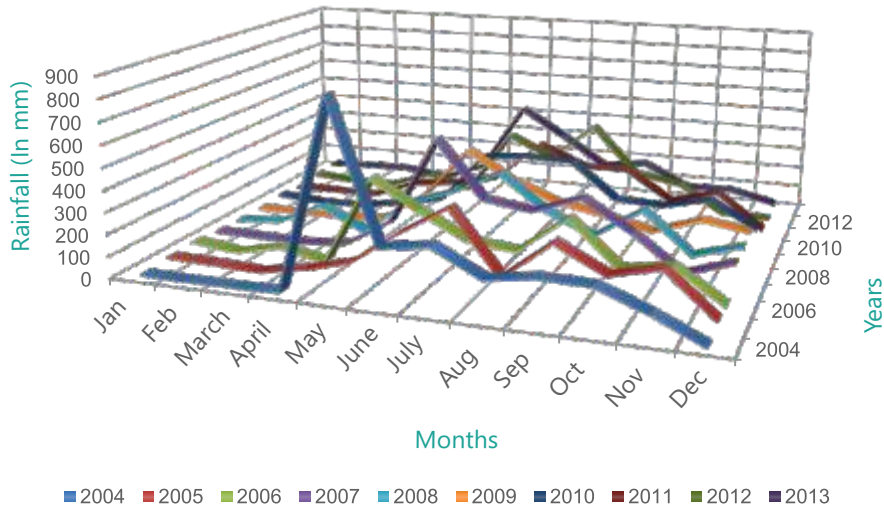
Seasonal Rainfall Pattern in Lakshadweep



Rainfall Variation

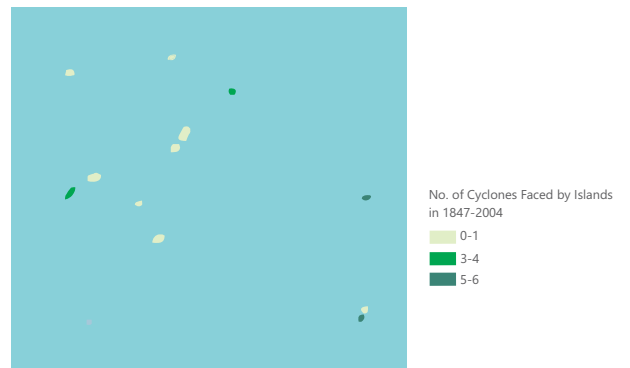
Even though there has been an overall decrease in the amount of rainfall from 2004 to 2013 in Lakshadweep (2096 mm in 2004 to 1426 mm in 2013), the monsoon season has seen an increasing trend with 900 mm in 2004 to 1057 mm in 2013. The highest variation is seen in the month of May (pre-monsoon), with the amount of rainfall dramatically decreasing from 874 mm in 2004 to 88 mm in 2013.

Rainfall Variation in Lakshadweep from 2004 – 2013

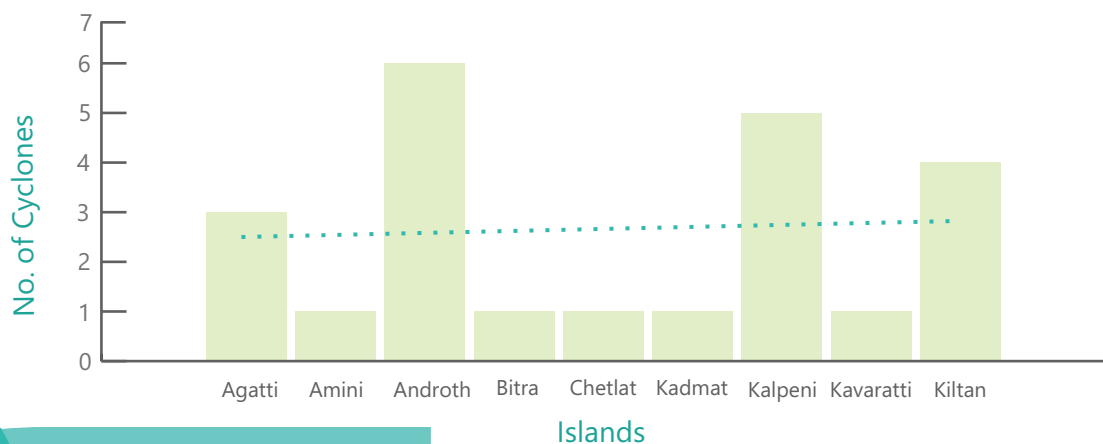


Cyclone

Due to the geographical location of the UT, it is highly prone to storms and cyclones. The island gets directly impacted by these calamities, as they effect the coconut farming and fishery activities disrupting livelihoods of the native population. Kavaratti, Minicoy, Kadmat, Agatti and Bitra have been identified less vulnerable to storms and cyclones as compared to Androth, Kalpeni and Kiltan. Androth, Kalpeni and Kiltan are nearer to the mainland of Kerala with Androth being the closest and therefore face synergistic cyclone conditions as that of Kerala.



Island-Wise Status of Cyclones in Lakshadweep from 1898-2004



Gaps & Status of Preparedness

Based on the IPCC, NCE and SAPCC recommendation, this section highlights the state of preparedness of five major sectors Climate Resilient Agriculture, Climate resilient Ecosystem, Social adaptation and Climate Resilient Infrastructure, energy that were identified as vulnerable sectors in the Lakshadweep Action Plan on Climate Change (LAPCC).

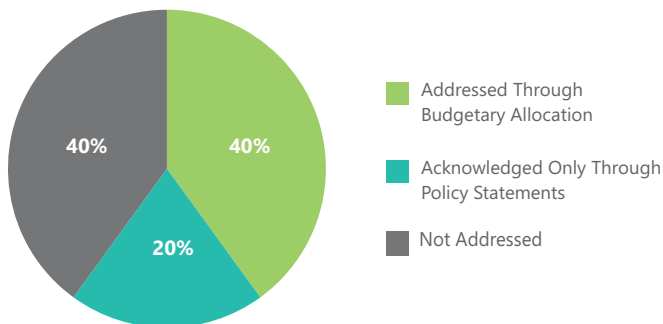
Sustainable smart cities has not been considered in the case of Lakshadweep, as the island is under the coastal protection zone and infrastructure building is highly regulated, as against to other cities in the country.

The LAPCC clearly states that due to the "limited availability of specific climate change related information on Lakshadweep, climate change response strategy for the islands have a 'precautionary adaptation approach'; which will be embedded largely as a sub-set of overall "sustainable" development".

Data sources for the Report -

Vulnerability maps have been prepared using Arc GIS and Quantum GIS software from the data gathered from:

Indicator	Data Source	Time Series
Rainfall Data	IMD	2004-2013
Cyclones	Erstwhile Planning Commission of India ⁷	1847-2004



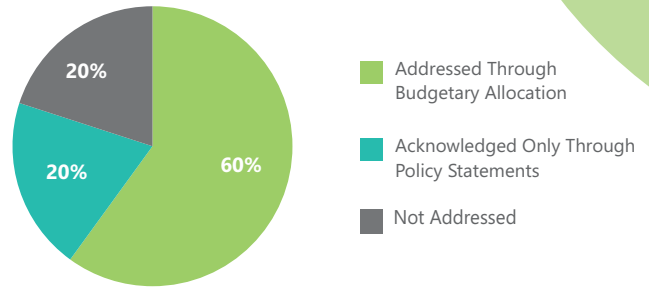
Recommendations Addressed Through Climate Resilient Agriculture In Lakshadweep

40% of the recommendations from the IPCC and NCE reports have been addressed through budgetary allocations by various national and Lakshadweep specific programmes. The National programmes include National Mission on Sustainable Agriculture, National Initiative on Climate Resilient Agriculture, National Horticulture Mission, etc. The specific programmes are more focussed towards enhancing the growth of coconut based agriculture, since most farmers practice coconut production in the UT. These programmes include Coconut Development Programme, Horticulture Development Programme, etc. 20% of the recommendations have been addressed through various National level programmes that are a part of the NAPCC. 40% of the recommendations have not been addressed due to the geographical isolation of the islands and regulated nature of the UT.

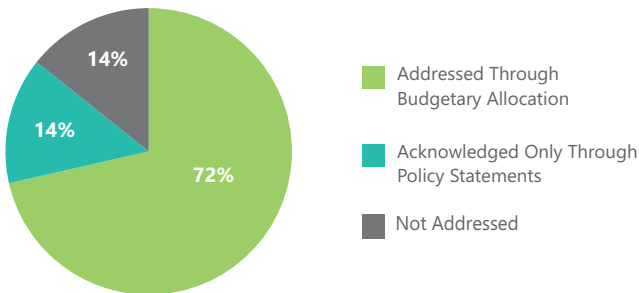
Climate Resilient Agriculture

Climate Resilient Ecosystem

60% of the recommendations from both the reports have been addressed by budgetary allocations and 5% through schemes. The Programmes like Coral Reef management and Integrated Coastal Management Plan, are meant for maintaining the delicate ecosystem of Lakshadweep while making the island climate resilient. 20% of the recommendations have not been addressed that can be attributed to reasons like lack of capacity of the administration and high dependency on budgetary support from the centre.



Recommendations Addressed Through Climate Resilient Ecosystem In Lakshadweep



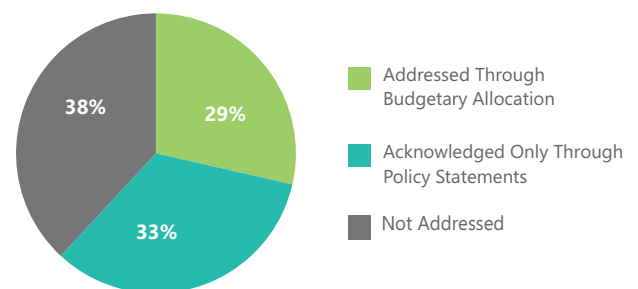
Recommendation Addressed Through Social Adaptation In Lakshadweep

72% of the recommendations have been addressed through budgetary allocations through various schemes and national programmes. 14% of the recommendations have been addressed through policy measures. 14% of the recommendations remain unaddressed. It is to be noted that in the case of Lakshadweep the entire ethnic population, which constitutes 95% of total population, is classified as Scheduled Tribes because of socio-economic backwardness, geographical isolation, etc. The tribes have, however not been named⁸. Hence most of the budgetary allocations through programmes are for social upliftment, therefore social adaptation can be seen as a cross sectoral approach. These programmes include Sarva Shiksha Abhiyan, Swarnajayanti Gram Swarajgar Yojana, Pradhan Mantri Awas Yojana – Grameen, Mahatma Gandhi National Rural Employment Guarantee, DIET Education, etc.

Social Adaptation

Climate Resilient Infrastructure

Lakshadweep being a protected zone⁹, land tenure and procurement of land is highly regulated. This leaves very limited areas on islands like Kavaratti, Minicoy, Androth, etc. for settlements. With this background, a good 38% of the IPCC and NCE recommendations remain unaddressed in Lakshadweep. 29% of recommendations are addressed through budgetary allocations and 33% through schemes and subsequent declarations.

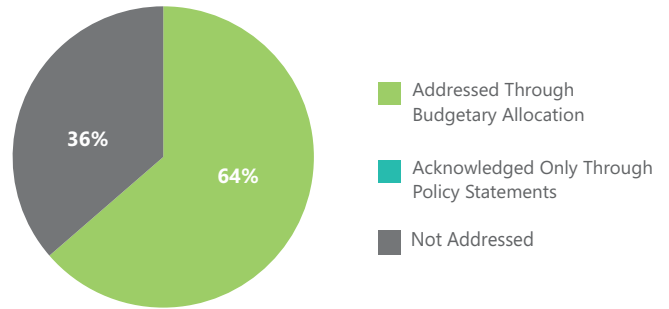


Recommendation Addressed Through Climate Resilient Infrastructure In Lakshadweep

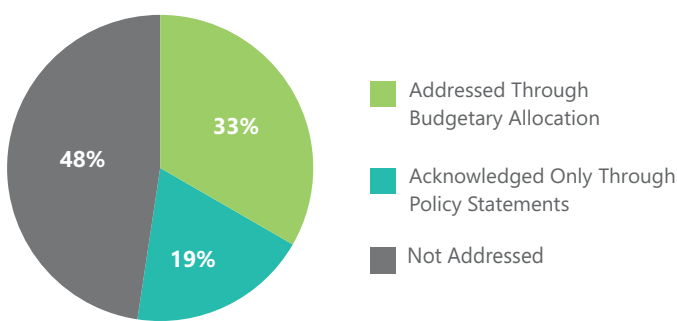
The schemes acknowledge the need for undertaking measures like “study and set up of a system for regulatory and Energy Bench marking Government other buildings”, “need to create capacity on regulatory measures, particularly for ensuring energy efficiency in new buildings as well as through a programme of retrofits”, etc.

Sustainable Water Management

Lakshadweep is an island UT and water, though being an abundant resource is scarce for drinking. Therefore, extensive national and Lakshadweep specific programmes and schemes are active for managing water salinization and proper sanitation. Most of the schemes like National Water Mission, National Sustainable Habitat Mission, Water Supply scheme of Lakshadweep are aimed at providing clean drinking water to the population and ensuring sustainable sewage management, as it is imperative to maintain the delicate ecosystem balance on the island. 64% of the recommendations have been addressed through policy and budgetary allocations in Lakshadweep.



Recommendation Addressed Through Sustainable Water Management In Lakshadweep



Recommendation Addressed Through Energy In Lakshadweep

Lakshadweep has been able to achieve 100% electrification for its industries and households¹⁰. Electricity is majorly generated through diesel gensets and the diesel is procured through the mainland from Kerala, Cochin, etc. There is a big policy shift towards tapping the high potential of solar power and biogas power (for the short run) for powering the households as well as industries present on the island. A total of 52% of recommendations have been addressed through budgetary and policy/scheme measures. A big chunk of 48% of the recommendations have not been addressed. The island relies on national schemes like National Solar Mission, National Mission on Enhanced Energy Efficiency and 24X7 Power for All, to name a few, and there is a scope for the development of Lakshadweep specific policies.



RECOMMENDATIONS

The LAPCC seems to contain stepping stones for addressing climate change challenges. There are however many areas that are of concern and its current state just seem policy declarations rather than concrete actions.

Need for governance structures and policy frameworks for the UT is strongly felt. Currently the UT is following central policies and there is need for developing UT specific policies like disaster management act, energy policy for the UT, etc. The UT administration had developed a framework of Disaster Management Plan for Lakshadweep in 2004¹¹. The framework serves as the basic guidelines document towards cyclone preparedness and response mechanism. However, with the ever increasing impact of climate change, there is a need for structured approach towards disaster management. Similarly, there is a need for energy policy as the LAPCC currently still focuses on Diesel for a large portion of its electricity generation, though in a fuel efficient manner, while there is a need for switching to climate friendly sources like solar energy completely, both for households and industry.

Sources -

1 Lakshadweep Action Plan on Climate Change (LAPCC)

2 ibid LAPCC

3 ibid LAPCC

4 Load Generation Balance Report 2016-17, CEA (<http://www.cea.nic.in/reports/annual/lgbr/lgbr-2016.pdf>)

5 24X7 Power For All Lakshadweep Islands, Feb 2016 (http://powermin.nic.in/sites/default/files/uploads/joint_initiative_of_govt_of_india_and_lakshadweep.pdf)

6 ibid LAPCC

7 Lakshadweep Development Report, 2007, erstwhile Planning Commission of India (<https://goo.gl/DA9QKb>)

8 LAPCC

9 Coastal Regulated Zone category IV

10 24X7 Power for All Lakshadweep Islands, A Joint Initiative of Government of India and Administration of UT of Lakshadweep

11 LAPCC