Financial Reforms, during and Post COVID-19

Lakshadweep

Research Study

2020-21

Regional Centre for Urban and Environmental Studies
All India Institute of Local Self-Government, Mumbai

Preface

Lakshadweep UT administration has largely been dependent on central government grants and subsidies for efficient operation and ongoing work towards the development of their islands. However, negligible own source of revenue has put a strain on its financial system, especially in the context of the ongoing COVID-19 pandemic situation.

The UT has recently witnessed large scale private investment in sectors like tourism and health. 40% of development budget of UT administration has been used primarily in sectors like Power, IT, education, health, tourism, water and sanitation. Even with large influx of funds in these specific sectors, efficient on-field execution is still a challenge given the limited technical capacities of the UT administration.

As a long-term measure, the UT administration needs to work towards achieving financial sustainability. This study highlights the potential sectors of development in the domain of IT, power, education, health, sanitation, water and tourism where innovative financing and impactful ground execution can be explored. It has also identified potential interventions within the selected sectors which will help towards financial empowerment in identified sectors.

This study on 'Financial Reforms during and post COVID-19 - Lakshadweep' is undertaken in three stages: 1. Data collection, identification of and consultation with stakeholders, assessment of existing scenario; 2. Assessment of regulatory framework and policy assessment and 3. Identifying anchor investment areas and structuring. The current report includes the first two stages and also lists down the anchor potential opportunity areas for reforms. The report comprises of detailed sectorial assessment and identification of relevant schemes and programmes by central and UT governments. It also establishes the need for reforms and identifies key anchor opportunity areas to act as enablers for such reforms. Further details on potential opportunity areas of investment are also identified for critical factors based on multiple stakeholders' consultations and field visits.

Acknowledgement

I take this opportunity to put on record our deep appreciation for the Ministry of Housing and Urban Affairs for providing us an opportunity for working on this study. I would like to convey our gratitude to the Advisory Committee, RCUES Mumbai for providing us an opportunity to contribute to the task of rethinking public spaces and infrastructure.

I also take this opportunity to express my gratitude towards Shri Ranjit Chavan, President, All India Institute of Local Self Government, for showing confidence in us and valuable support to complete the Report. My sincere thanks are to Shri Rajiv Agarwal, IAS (retd.), Director-General, All India Institute of Local Self Government, Mumbai, who was instrumental in initiating the report and providing encouragement and valuable direction to the report.

This study has been undertaken by Dr. Haneefa Koya, Expert Member (Marine), Lakshadweep Biodiversity Council, Mr. Mithun S. Anand and their team with RCUES Mumbai. Their contribution and tireless efforts towards this study are highly appreciated. Their relentless work to make this study useful and worthwhile, despite the challenging circumstances of COVID is highly valued. I would also take this opportunity to thank all the other stakeholders who have contributed to and enriched this study through interviews, discussions, data and knowledge sharing etc.

I would also like to thank team RCUES who worked towards the completion of the report.

I hope this work will be encouraging and helpful for the Union Territory of Lakshadweep to take positive steps in financial reforms during and post COVID era.

Director,
RCUES of AIILSG

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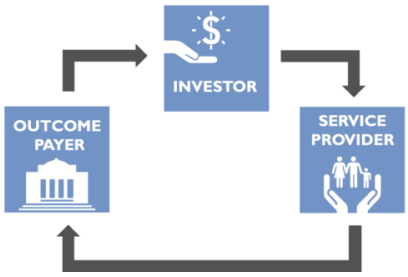
1. Introduction

1.1. Concept

There have been recent instances in Lakshadweep island with large scale private investment coming up in sectors like tourism and health. Soon Lakshadweep would be having India's 1st set of water villas in three Islands and will pump more than 1000 cr of investment with multiplied benefits to overall development. Agatti has been successfully operating multi-specialty hospital on PPP model and such model has huge potential to scale up and get replicated in other bigger islands.

40% of development budget of UT administration has been used primarily in sectors like Power, IT, education, health, tourism, water and sanitation. Considering the large influx of fund in these specific sectors, ground execution with full efficiency is still a big challenge because of limited technical capacity of UT administration. There have been many case precedents of introducing innovative financing under above mentioned sectors and substantially reducing the risk on government behalf.



The prime objective of this study will largely focus on the five given trust area: -

1. Increase in scope of initial investment through private sectors in all identified development sectors
2. Identify the investment opportunity area in each sector to function as anchor project for enabling similar future interventions in other themes of development work
3. Develop the structure of clear performance milestone and payment and linked with payment from existing heads of UT administration post meeting the results
4. De-risk the financial investment and improve towards financial empowerment in system of UT administration
5. Developing the financial sustainability road map in identified sectors of Lakshadweep to be implanted during horizon of 15 years and high-level policy inputs

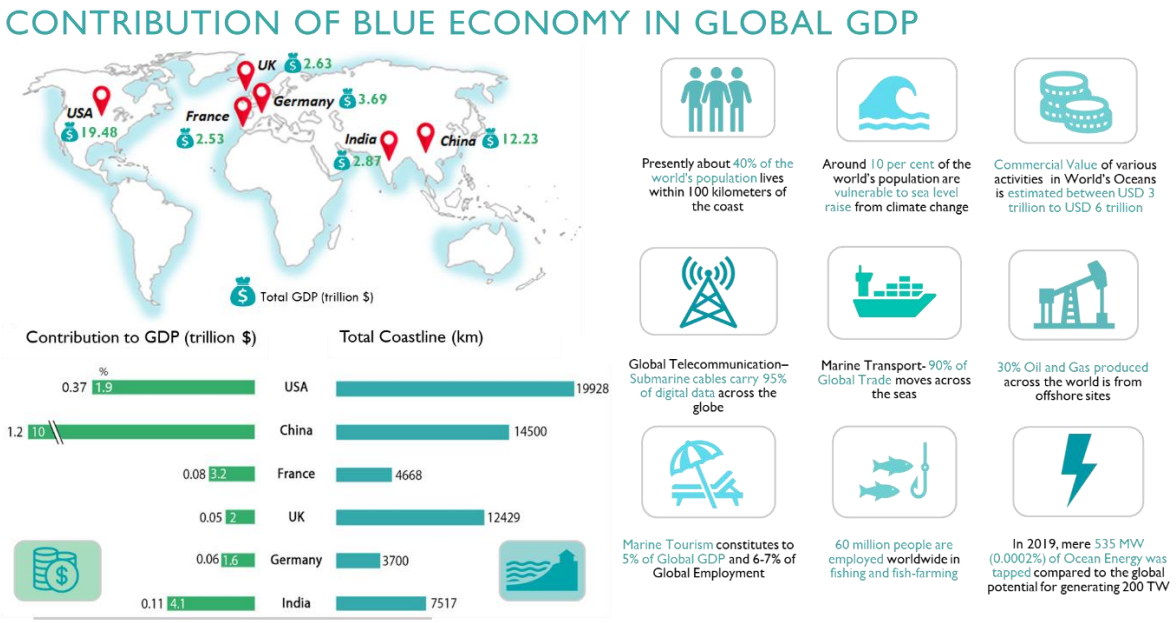
The highly vulnerable and fragile ecosystem of Lakshadweep should place greater emphasis on self-sustainability as to better prepare any such future similar pandemic out-breaks including from more frequent occurrence of natural calamity. The financial empowerment and more efficient ground execution would help to develop a strong foundation of **Atmanirbhar Lakshadweep** and limit the adverse impact from any such unwanted future events.

1.2. Blue Economy

Global campaign for sustainable harnessing of the oceans, initially spearheaded by the Small Island Developing States (SIDS), has surfaced 'Blue Economy' as a means to address the climate crisis, mitigate concerns related to over exploitation of marine resources in the high sea, and ensure alternative ways to governance and sustainable development in the region. ***The concept of the blue/marine economy emphasizes conservation and sustainable management based on the idea***

that healthy ocean ecosystems are more productive and are fundamental to sustainable, ocean-based economies.[1] Sustainability is central to the UN's Sustainable Development Goal (SDG) No 14 – Life under water: conserve and sustainably use the oceans, seas and marine resources for sustainable development. Maritime economy constitutes the seventh-largest economy in the world. ***Coastal tourism alone is one of the fastest-growing marine based economic activity worldwide, estimated at USD 7.4 billion to coral reef nations alone.***[2]

All the coastal nations in the world are dependent on oceans for earning a livelihood, achieving holistic growth, empowering native coastal communities and attaining greater social and economic inclusion. Indian Ocean region covers diverse areas of rich ocean cover spreading over three continents and serves as a major link for trade, investment and technology cooperation between the littoral states. Indian Ocean Rim Association (IORA), an international organization of countries bordering the Indian Ocean, has taken a diplomatic lead on promoting six priority pillars of blue economy - Fisheries and Aquaculture, Renewable Ocean Energy, Seaports and Shipping, Offshore Hydrocarbons and Seabed Minerals, Marine Biotechnology, Research and Development, and Tourism. By undertaking suitable policy measures the IORA countries may exploit the potential of blue economy for growth and development of their respective economies.



[1] United Nations (https://www.un.org/sustainabledevelopment/wp-content/uploads/2017/05/Ocean-fact-sheet-package.pdf), (pib.gov.in/PressReleseDetailm.aspx?PRID=1582638; https://mnre.gov.in/wind/offshore-wind)

Government of India's vision for the sea is 'Security and Growth for All in the Region' (SAGAR) endorsing the 'blue economy' as a new economic pillar. India is naturally endowed with most constituents of maritime power, yet lags in realizing its full potential due to the lack of adequate infrastructure and institutional reforms. The state of Gujarat witnessed a double digit growth of GDP against pre-development, which was nearly 5 percent in the 1980s, after bringing in investments to develop its ports and related infrastructure.[3] With a coastline of 7500 km, India has a high potential for market penetration in the cruise and coastal tourism sectors. With a committed vision to achieve

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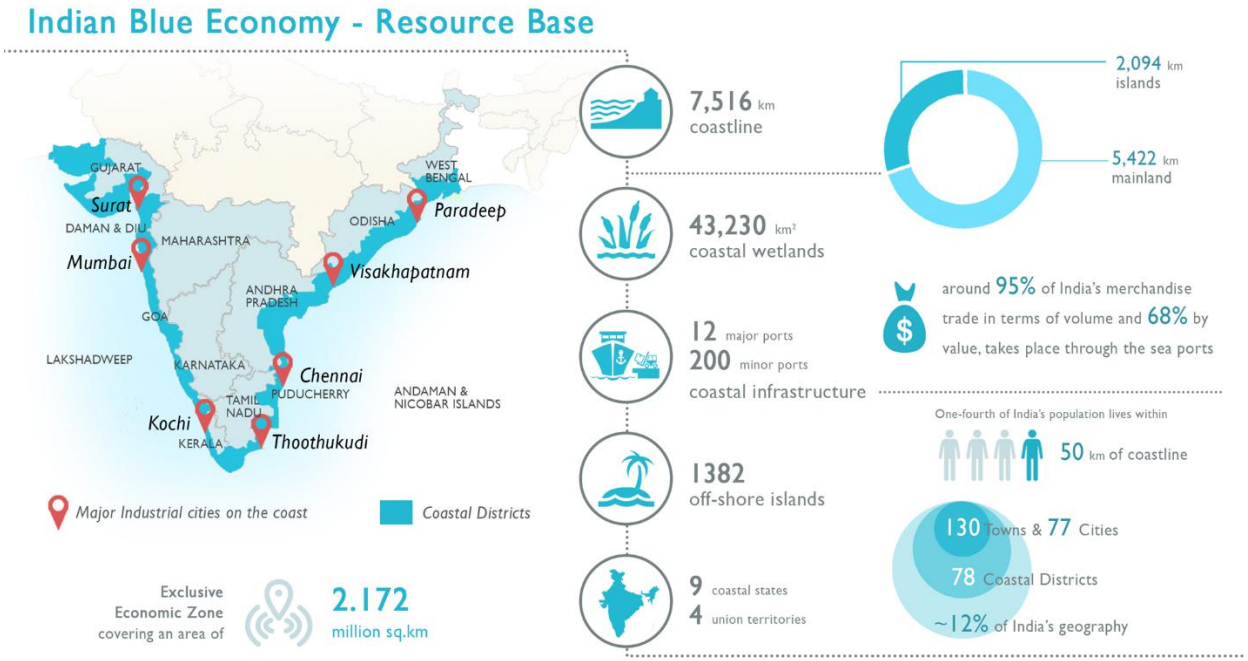
[1] *"The 2018 Annual Economic Report on EU Blue Economy" (PDF). European Union: 5. 2018.*

[2] *https://www.africanews.com/2018/11/26/importance-of-a-sustainable-blue-economy-statistics-and-facts*

[3] *Umare, M., Varghese, V. P., Badar , A. M., Singh , D. P., & Dhange , N. R. (2018). A Review of Blue Economy for Potential Growth of Infrastructure in India. A Review of Blue Economy for Potential Growth of Infrastructure in India (1st ed., Vol. 3). All Rights Reserved © 2018 IJERMCE 314 ISSN (Online) 2456-1290 International Journal of Engineering Research in Mechanical and Civil Engineering (IJERMCE)*

energy security by exploring marine renewable energy sources, India has immense potential to mobilize and utilize its maritime resources to achieve its national objectives.

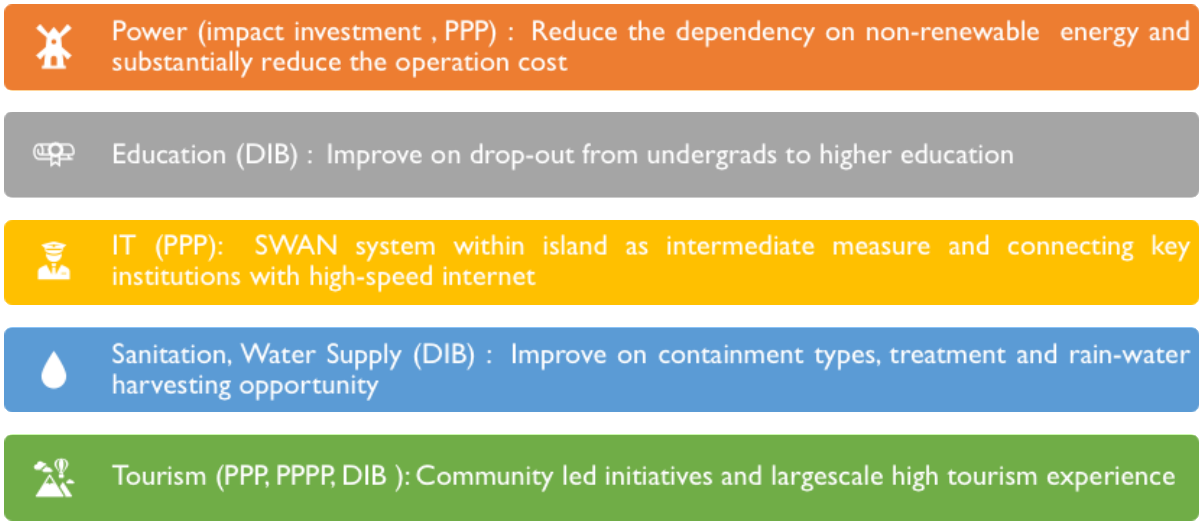


1.3. Coverage and scope of study

Lakshadweep UT administration has largely been dependent on central government grant and subsidy to smoothly run the overall operation and ongoing work towards the development of these islands. However, source of own set of revenue are negligible and situation like COVID-19 has put more strain on financial system. As sustainable and long-term measure, UT administration needs to work towards achieving financial sustainability in the process and this study highlight the opportunity sectors of

development in the domain of IT, power, education, health, sanitation, water and tourism where innovative financing and impactful ground execution can be explored with means like impact investment bond, public-private partnership (PPP), people public private partnership (PPPP) etc. The study will help to identify opportunity intervention within selected sectors and work towards developing project structuring through means of innovative financing clubbed with envisioned sustainability road map. This will help towards sustainably increase in financial empowerment in identified sectors and will be a step towards **'Atmanirbhar Lakshadweep'.**

1.4. Focus areas



1.4.1. Power

Heavily dependent on Diesel: Currently, 24x7 power supply is available to almost all households in Lakshadweep. The islands are largely dependent (more than 90%) on the diesel generators (DG sets) for power generation.

High Cost of Electricity Generation: At present, the cost of electricity generation in Minicoy Island is INR 13 per unit, while the average cost of electricity generation in mainland India is INR ~3 to 4 per unit.

Transportation & Storage of Diesel: The cost of transportation and storage of diesel is approximately INR 17 per unit. This cost increases the total cost of electricity consumption to INR ~30 per unit for the end user, which is almost 5 to 10 times the price across different states in mainland India.

Adverse Environmental Impact: Due to the lack of air connectivity across Lakshadweep Islands, diesel is transported in barrels via sea. Leakage of barrels during transportation, loading and unloading can cause immense damage to the ecologically sensitive islands and marine life. Furthermore, the combustion of diesel produces greenhouse gases which leads to large-scale air pollution, global warming, and climate change.

1.4.2. Education

No institution for higher educations: Institutions of higher education are not available in the UT level and the islanders depend on Kerala and Karnataka for Higher Education.

Lack of continuation from under grads to higher educations: Today, Lakshadweep has a total of 70 educational institutions, which includes one Jawahar Navodaya Vidyalaya and one ITI. Although there

is good involvement at undergrads level, there are substantial reduction in continuation towards higher study.

1.4.3. Tourism

No Private Investments: Although the islands lie in the lonesome tranquility of nature, the actual potential for tourism development is not yet explored by UT. Currently the island lacks any private resorts or investments in tourism sector.

Community led initiatives and large-scale tourism experience: It becomes essential to identify and promote community led tourism initiatives in the islands of Lakshadweep. Recently NITI Aayog and MHA has approved India's first water villa projects in the islands of Lakshadweep which is getting implemented through private partnership and values approx. 1000 crores.

1.4.4. IT

Optical Connectivity: One of the major limitations of the islands is its lack of optical connectivity with mainland. Prime Minister of India has recently announced that "Lakshadweep will be connected to submarine optical fiber cable in the next 1,000 days". He also highlighted that technology would play a crucial role in the development of the Lakshadweep.

As immediate solution, the administration is also planning to upgrade the satellite bandwidth and SWAN network for connecting key institutions with high-speed network.

2. Approach and methodology

Lakshadweep characterizes a unique socio-ecological landscape which must be acknowledged in decision-making and high-level policy inputs. As part of the study a list of stakeholders and experts has been consulted, which includes sectoral experts, department officials and islanders. The consultation and stakeholder meetings helped in mapping the past initiatives, failures and possible roadblocks which also need to be taken in account for better preparedness. The potential investors mapping for all focus sectors would be also undertaken for future liasoning by UT administration. Some of successful investment and impact initiative of similar profile in India and other parts of the world had been documented as part of development of best practices and the related applicability will help to develop a strong foundation to start the consultation and explore upon the potential opportunity area.

The study methodology can be defined under three stages as mentioned below. The current baseline assessment report includes the first two stages and also list down the anchor potential opportunity areas for reforms.

Stage 1: Data Collection, Identification of and consultation with stakeholders, assessment of existing scenario

Activities and Tasks	Major Outputs
• Data assimilation & synthesis • Stakeholder mapping and interactions • Past 10 years expenditure, utilization and ground impact report of projects under identified sectors • Development of best practices doc	• Investment impact mapping in focus sectors of last years • Stakeholder – influence and interest mapping • Applicability of investment driven development best practices and limiting risk of Government. • Data inferences from collected data

Stage 2: Regulatory framework and Policy assessment

Activities and Tasks	Major Outputs
• Appreciation of related and applicable Acts, Policies, Programs, Institutions & Regulations • Assessment of Investment types, challenges and opportunity	• Critical assessment of all the existing policies and programs enabling external investment and funding schemes supports as convergence opportunity • Investment opportunity outline in consultation with stakeholders

Stage 3: Identifying Anchor Investment Area and Structuring

Activities and Tasks	Major Outputs
• Potential opportunity area of investment in identified sectors. • Structuring of investment opportunity in line with proposed interventions • Risk assessment and mitigation strategy • Mapping of critical success factors, key enablers and roadblocks • Final inputs/suggestion to strengthen the existing investment framework to enable more positive outlook	• Investor deck for range of identified anchored project • Performance milestone for each identified intervention • Expected financial and implementation benefits • Key learning and applicability in other parts of country from research study • Development of sustainability investment road map for Lakshadweep island development

3. Assessment of Existing Scenario

3.1. Past 10 years Union Budget allocation

The following table shows the union Budget Estimates (BE) and expenditure for the past 10 years. As illustrated in the table, the total estimated budget to the UT has increased over the years, paying more attention to the sectors such as **power, health, transportation, and information technology.** The data shows an increase of 65% in the UT expenditure over last 10 years.

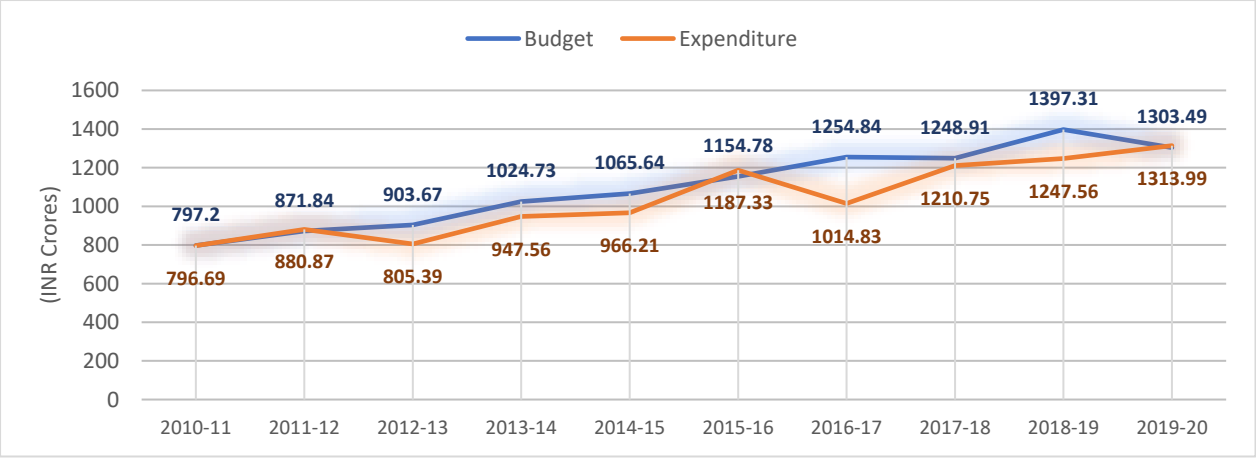
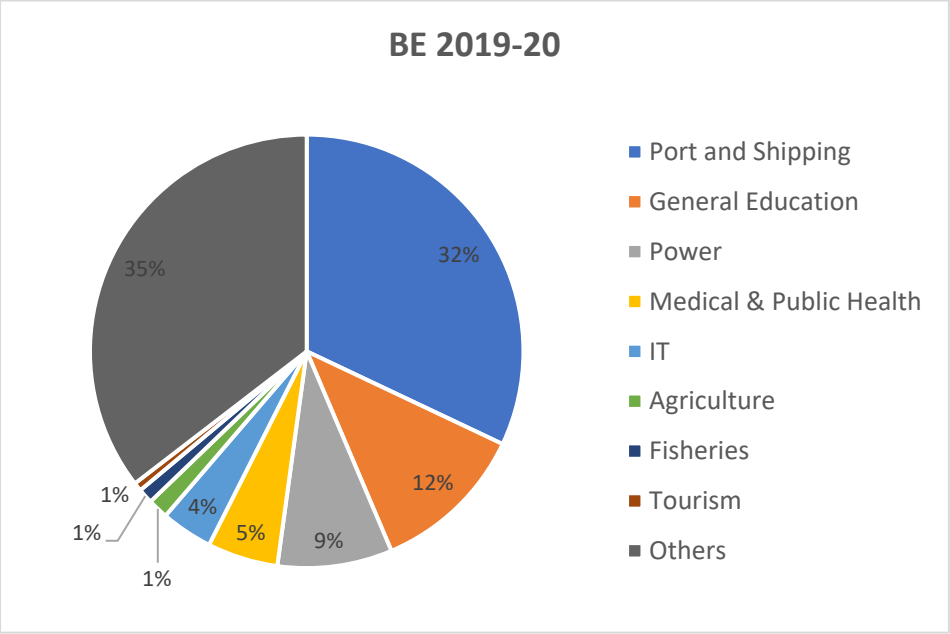


Figure 1 Union Budget Allocation to Lakshadweep for past 10 years (in INR Crores)

The following table illustrates the percentage distribution of funds across major sectors for the budget from 2014 to 2020. It can be seen that a large percent of share is always under the transportation sector which includes operation and maintenance of ships, lighthouses, and ports. This is followed by the sectors such as general education, power, medicine & public health, and IT. All these sectors contribute to approx. 60 to 65 percent of union share. It can also be seen that the critical livelihood sectors such as agriculture, fisheries and tourism contribute only 3 to 4% share. It was observed during the stakeholder consultations that these three sectors have large potential to be developed into major economic sectors.

	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Port, Light house and Shipping	32.20	36.57	44.39	37.76	32.36	32.03
General Education	10.98	11.40	11.42	12.29	10.05	11.58
Power	11.58	10.17	8.45	9.60	7.78	8.56
Medical & Public Health	4.63	4.91	5.13	5.90	4.77	5.27
IT	1.89	2.14	2.45	3.61	3.64	3.86
Agriculture	1.91	1.32	1.42	1.78	1.44	1.51
Fisheries	1.38	0.96	1.15	1.26	0.96	1.12
Tourism	1.19	1.24	0.82	0.87	0.66	0.64
Others	34.24	31.28	24.76	26.94	38.36	35.43



3.2. Review of Major/Potential Sectors and their budget allocation

This section provides a review of the major sectors of UT such as Transportation, Energy, Education etc. which consumes large shares of Union Budget funds. Other than the major sectors, this section also discusses about the sectors which have huge potential to be developed into major economic sectors of Lakshadweep islands. Overall, the section provides an overview of the existing scenario in the islands and proposed projects or interventions that are being taken up by the concerned UT departments and further examines the component wise distribution of funds to each sector.

3.2.1. Energy

Existing Scenario

Lakshadweep is largely dependent on the diesel power generation (DG sets) system for generation of power. As per the Electricity Department, more than 90% of the electricity is generated from diesel generators and the remainder is from solar. Due to the high cost of import of diesel to the island, power generation in the island is a costly affair, with production cost of a unit of electricity coming around INR 12-13 while the revenue collection through user tariff is only INR 3.5/unit. Moreover, diesel generators are major source of air pollution and carbon emission in the island. Hence, in-order to reduce the dependency on fossil fuels, the UT administration installed the solar power plants in few of the islands. The existing solar power plants installed in the islands and their operational statuses are illustrated in table below.

Figure 2 Existing solar power plants installed in the islands

Island	Capacity	Status
Kavaratti	760 kWp Grid Interactive SPV plant	Three power conditioning units are defective at this plant, 2 Nos 110 kVA and 1 No. 50 kVA, i.e. 270 kVA capacity is kept idle.
Minicoy	220 kWp plant	Plant is currently generating at 60% of its capacity
Agatti	100 kWp	The plant is generating power at full capacity, but one of the 50 kVA PCUs has developed a snag, tripping in between, which needs to be attended for smooth functioning of the plant.
Kalpeni	100 kWp plant	Both the 50 kVA PCUs are defective and hence the plant is idle. Renovation by changing old modules is to be carried out.
Bangaram	50 kWp SPV-Diesel Hybrid plant	Plant is idle due to defective PCUs. The battery bank shifted from Kadmath is to be commissioned.

Source: 24x7 Power For All – Lakshadweep Islands, 2016, A Joint Initiative of the Govt. of India and U.T. Administration of Lakshadweep + Discussions with Electricity department, U.T. of Lakshadweep

Budget Allocation

The funds for energy sector have increased significantly over the past 10 years from around INR 35 crores in Budget 2010-11 to total INR 115.97 crores in the budget of 2019-20. However, around 96% of this budget is consumed for the services for conventional sources of energy (Diesel/Gas Power Generation). Only 4% of this amount is allocated for Non-Conventional Sources of Energy. The component- wise distribution of funds are mentioned in the following table for the last two years-

Energy	BE 2018-19 (INR Crores)	BE 2019-20 (INR Crores)
Power	**108.7**	**111.63**
Power Plant and Ancillary works	88.87	108.7
Miscellaneous	19.83	2.85
Non-Conventional Sources of Energy	**4.36**	**4.34**
Grid interactive and Distributed Renewable (SPV project)	2.36	2.34
Other Sources of Energy	2	2
Total	**113.06**	**115.97**

Proposed projects

Lakshadweep Administration with support from Solar Energy Corporation of India (SECI) is in the process of developing renewable sources-based power generation in UT with a cumulative capacity of 25.14 MW Solar PV (along with 75.71 MWh of Battery Energy Storage) spread over 11 islands. As first phase, tender for deployment of solar power plants in 3 islands – Kavaratti, Bangaram and Thinnakara are finalized. For Minicoy, Solar PVs of cumulative capacity of 3.70 MW is proposed to be developed by SECI in the second phase which will include 0.40 repowered PV, 1.50 rooftop PV and 1.80 floating PV with a battery storage capacity of 11.0 MWh.

3.2.2. Transport

Existing Scenario

Lakshadweep Islands has an isolated location in the South-west of Indian Mainland in the Laccadive Sea, about 200 to 400 km away from the nearest port of Kochi. Moreover, nearest seaports to Lakshadweep islands are Mangaluru and Kochi. From Kochi, passenger ship services to Lakshadweep group of islands are available throughout the year, whereas passenger ship services from Mangaluru and Beypore are only available during the fair season since the fair-weather ships operate from these ports around that time. There are a total of 7 passenger ships connecting Lakshadweep to Mainland of which two of them are fair-weather. In terms of air connectivity, there is one daily flight service between Cochin International Airport and Agatti Airport.

Lakshadweep Administration owns 8 High Speed Vessels (HSV) which operate during the fair-weather season i.e. from October to May. These HSVs provide inter-island connectivity during the fair season. However, during rainy season, all-weather passenger ships serve as inter island connectivity mode as per their schedule to cover more than two or three islands during their voyage. There is one regular schedule for the high-speed vessel from Kavaratti to Agatti and back to provide inter-island connectivity for flight (air) passengers. Presently, HSVs fail to establish daily connectivity between each island due to longer travel time. Helicopter services is also available for intra-island connectivity, however the first preference is given for any medical evacuation. Huge subsidies are provided to the locals as well as government officials for availing helicopter services. The helicopter services can be availed by domestic/international tourists but without any subsidies.

The shipping services are the primary means of transportation of men and material between the islands and the mainland. Port Light Houses and Shipping sector augment the necessary infrastructure for Shipping Services such as procurement of passenger and cargo ships, inter-island ferries and crafts for ship to shore transport of men and material and other port and harbor facilities in the islands as well as mainland.

Due to peculiar nature of the islands there exists some natural physical barriers which are hindering the creation of berthing facilities for ships. Hence all passenger and cargo discharging takes place in the open sea except Andrott, Kavaratti and Minicoy where some of the small ships come along side the breakwater at Andrott, Deep water jetty and western side jetty at Minicoy and Kavaratti. Apart from that ships are also berthing in eastern side jetties at Agatti and Amini depending on fair weather conditions. Suitable crafts capable of navigating inside the shallow lagoon are being placed at all islands for ship to shore transport which needs to be continued. Port infrastructure development is done through Andaman Lakshadweep Harbour Works (ALHW) under deposit works. It is proposed to improve the usability deep water jetties and proposes to construct deep water jetties in the northern group of islands also. Construction of additional berths at existing breakwater and 3rd stage extension of the breakwater are also taken up by ALHW.

Budget Allocation

Almost 32% of total union budget fund for Lakshadweep is allocated for transportation sector which includes development of ports, lighthouses & shipping and for development of other transport modes. In the year 2019-20, around INR 300 crores was demarcated for shipping services and around INR 80 crores for civil aviation.

The component- wise distribution of funds are mentioned in the following table for the last two years-

Name of the Sector	BE 2018-19 (INR Crores)	BE 2019-20 (INR Crores)
Ports & Light Houses	43.23	39.64
Major Ports Management	3.5	3.2
Minor Ports Management - Ports Establishment - Ports Infrastructure Facilities - Harbour Facilities - Others	39.7 - 5.52 - 9.5 - 16 - 8.71	36.44 - 5.55 - 7 - 15 - 8.89
Shipping	**330**	**300**
Civil Aviation	**78.91**	**77.91**
Payment to Helicopter Services	65	65
VGF for Aircraft Operations	13	12
Other Miscellaneous	0.91	0.91
Road & Bridges	**1.1**	**0.85**
Assistance to Panchayats for Maintenance of Roads	0.4	0.25
Street Lights	0.7	0.6
Road Transport (Regional Transport Office)	**0.67**	**0.7**
Total	**453.91**	**419.1**

Proposed Projects

Seaplanes have been proposed by UT Administration in Lakshadweep to improve inter-island connectivity. As per recent information, the seaplane operation covering Agatti-Minicoy-Agatti-Kavaratti-Agatti has been awarded to M/s Spice jet under UDAN 4.0 Phase-1. Administration has also initiated to procure a dedicated cruise ship for tourist. They also have a proposal to hire more helicopters for strengthening inter island connectivity and medical evacuations.

3.2.3. Agriculture, Fisheries and Allied Activities

Existing Scenario

Agriculture along with fisheries, are the most widely prevalent economic activity in the union territory. However, there has not been any significant growth under this sector over the past years.

Agriculture: Coconut plantation dominates the agricultural production. Jowar, ragi, sweet potatoes, sorgum and banana are other products being cultivated in Lakshadweep islands. However, the islanders are fully dependent on mainland supply chain for all the necessities. Considering the fragile nature of the island ecosystems, the use of chemical fertilizers and other inorganic inputs are not recommended in the islands. During Monsoon, the timely arrivals of supplies from mainland through ships are also affected.

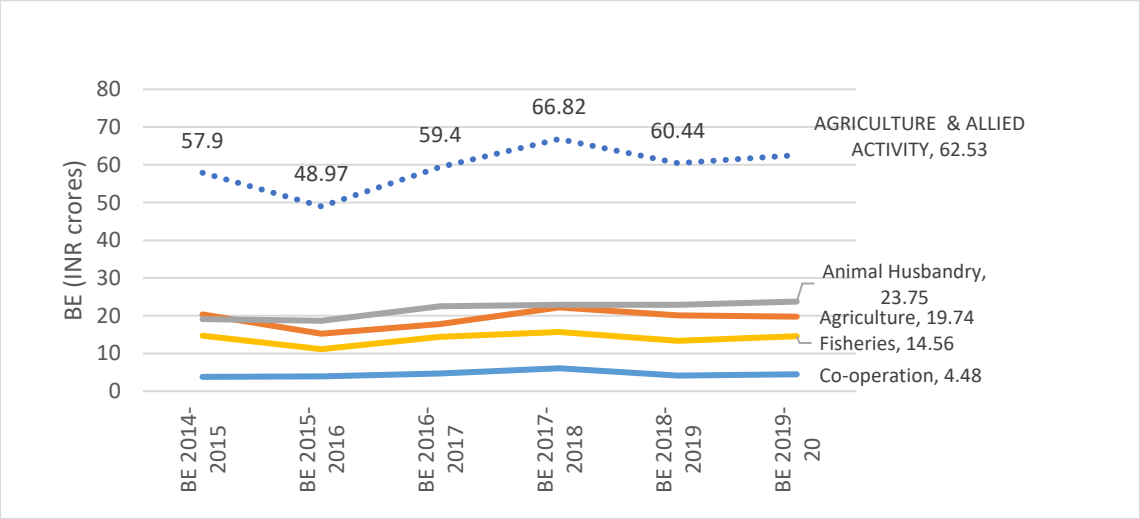
Animal Husbandry: Animal husbandry has been one amongst the few growth driving sectors in the islands. It provides fresh, nutritional value-added animal protein to the population of the UT, generates employment and enriches the soil with organic manure. The livestock present in Lakshadweep are cattle, sheep, goats, poultry, rabbit, ducks and turkey. Despite the large number of households rearing these livestock, the demand of products such as milk is less, and available meat is inadequate. Yet, the islanders are not prepared to give up livestock rearing because of social and economic reasons. Due to scarcity of grazing land, organized dairy farming is also not encouraged.

Fisheries: Sea and lagoon around Lakshadweep is rich in fishery resources. About 80% of the total fish landing of Lakshadweep comprises of Skip Jack tuna. There has been a steady growth of fish production, which once stood at 500 tonnes during 1950s crossed 12,000 tonnes in the recent years which is about 5% of the estimated fishable potential. Therefore, there is ample scope for developing the fishing industry in Lakshadweep. Considering the vast economic zone available, the potential of fish landings could be much higher provided supporting facilities and technological improvements are introduced. With regard to impediments to the production, other than the Skipjack tuna, commercial fishing is not done for any other fish. The Yellow fin tuna resource is almost unexploited since the technology for deep sea fishing is not prevalent in the territory.

Budget Allocation

As evident from the table below, there has not been any improvement in the agriculture and fisheries sectors for the past six years. The fisheries sector has been allocated only INR 14.56 crores which is quite less considering the huge potential of fisheries sector in Lakshadweep.

The following graph depicts the distribution of funds to Agriculture and allied activities for past 6 years.



The component- wise distribution of funds for the animal Husbandry sector are mentioned in the following table for the last two years-

Name of the Sector	BE 2018-2019 (INR Crores)	BE 2019-20 (INR Crores)
Animal Husbandry	22.89	23.75
Veterinary Services and Animal Health	1.62	1.87
Cattle and Buffalo Development	1.99	2.04
Poultry Development	2.42	2.93
Assistance to Gram Panchayats	15	15
Others	1.86	1.91

The component- wise distribution of funds for fisheries sector are mentioned in the following table for the last two years-

Name of the Sector	BE 2018-2019 (INR Crores)	BE 2019-20 (INR Crores)
Fisheries	13.35	14.56
Marine Fisheries	2.83	3.23
Processing, Preservation and Marketing	0.79	1.04
Training to Fishermen	0.48	0.63
Boat Building Yard	2.04	2.64
Assistance to Gram Panchayats	5.75	5.5
Others	1.46	1.52

3.2.4. Tourism

Existing Scenario

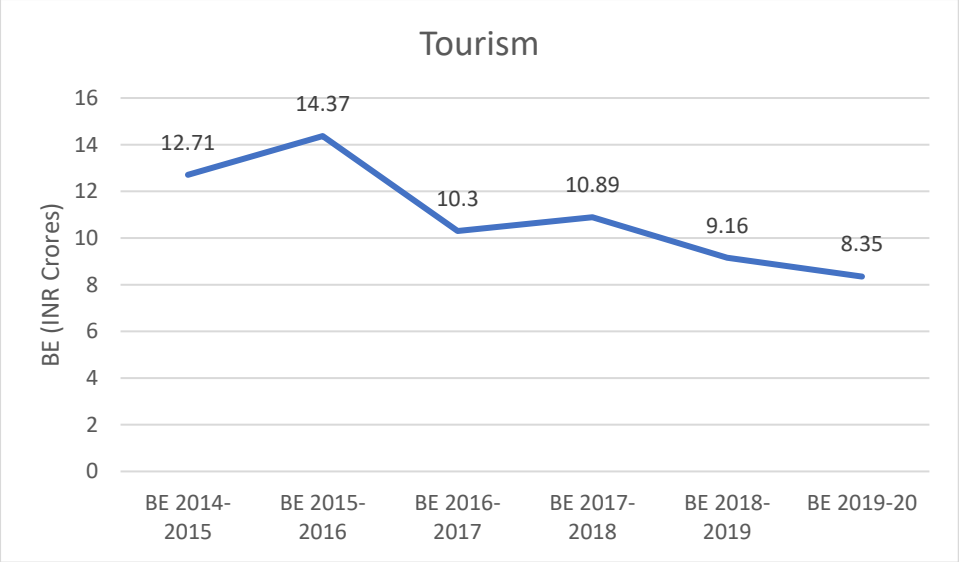
Although there are 10 inhabited islands in the Lakshadweep group, only five islands are open to tourists. These are Minicoy, Kalpeni, Kavaratti, Agatti and Kadmat. Bangaram, an uninhabited island is also developed for tourism promotion by constructing a resort. Of the above six, except for Agatti and Bangaram, all other islands are promoted as tourist centers by SPORTS. Agatti and Bangaram islands were developed by UTL and later were leased out to private agencies through SPORTS. Both these islands are open for international tourists.

Lakshadweep accounts for a meagre 0.01% share of the total tourist arrivals in India. In terms of tourist arrivals ranking (2015) in the country Lakshadweep stood quite low at 36th position in Domestic Tourist Visits (DTVs) and 35th position in Foreign Tourist Visits (FTAs) beating only Mizoram. During the year 2015, total tourist arrivals in Lakshadweep were 18,414 of which 93.63% were domestic and the remaining were foreign tourists. Total GDP of the Lakshadweep was Rs. 101,769 lakh in 2015-16. Tourism Direct GVA (TDGVA) or contribution of tourism industry to the UT's GDP is estimated at Rs. 4,372 lakh or 4.3% of total GDP. In terms of employment, out of estimated at 0.16 lakh jobs in the UT, the number of direct jobs in tourism characteristic industries, referred to as tourism employment, is only 3,502 (21.95%). While the share of GDP contribution and tourism employment are higher than that of national average (2.78% and 5.4% respectively), they are considerably lower than that of competing island destinations like Maldives and Seychelles.

Tourism has the potential to become a major economic driver for Lakshadweep owing to its growing popularity as a tourist destination but is limited by strict entry regulations and inadequate infrastructure.

Budget Allocation

The funds for tourism sector are not only minimal but has been reducing over the past years. As illustrated in the following figure, the funds allocated for tourism sector was INR 12.71 crores in 2014-15 budget which was further reduced to INR 8.35 crores in 2019-20.



The component- wise distribution of funds are mentioned in the following table for the last two years-

Name of the Sector	BE 2018-2019 (INR Crores)	BE 2019-20 (INR Crores)
Tourism	9.16	8.35
Tourist Accommodation	0.25	0.25
Assistance to Lakshadweep Diving Academy	1	0.5
Assistance to SPORTS	0.05	0.05
Tourism Promotion in Lakshadweep	6.92	6.59
Others	0.94	0.96

The tourism is at very nascent stage in the islands. Hence, huge investment is required in this sector for development of tourist infrastructure. Currently, the funds allocated to this sector are very minimal, out of which, almost 80% is dedicated for just promotion and marketing of tourism. Thus, more funds are needed to be allocated towards development of tourism accommodation facilities, other than promotion and marketing.

Proposed Projects

UT administration has proposed three water villa projects were proposed under PPP model with SPORTS as PMA. These projects worth INR 806 Cr. are under pipeline which will add 370 premiums resort keys spread across Minicoy, Suheli and Kadmat.

With the objective of streamlining the visit of foreign cruise ships and yacht to the islands directly, Agatti and Minicoy islands have been notified by Ministry of Home Affairs as authorized Immigration Check Post and Custom Port for entry into and exit from India with valid travel documents for all classes of passengers.

3.2.5. Education

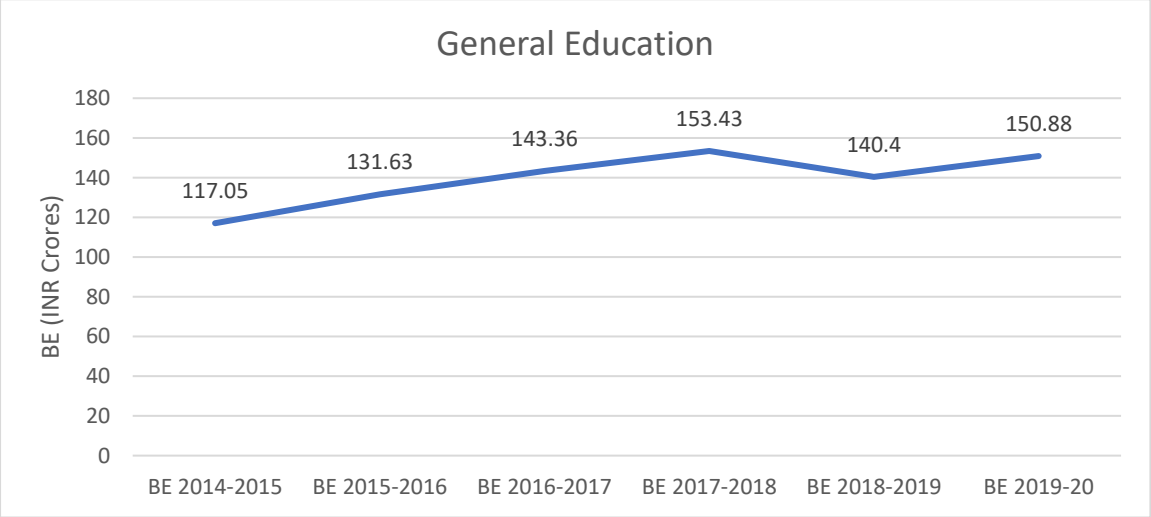
Existing Situation

Lakshadweep has a total of 70 educational institutions, which includes one Jawahar Navodaya Vidyalaya and one ITI, with 14,200 student enrolment. Though, not all inhabited islands are provided with schools with an optimum level of infrastructure facilities. Moreover, there are no institutions of higher education available in the UT and the islanders depend on Kerala and Karnataka for Higher Education.

The medium of education in Lakshadweep is normally English and Malayalam. Other than the courses offered in the schools, there are other prevocational courses too, like that of Coir technology and Fisheries Technology. The average literacy rate of Lakshadweep as per 2011 census is 91.85%. The total male literacy rate is 96.11%, whereas female literacy rate is 88.25% as per the 2011 census. Further, the Pupil-Teacher ratio is 1:7 which is higher than the standard recommended in the URDPFI guidelines.

Budget Allocation

The Education sector has around 12% of the total funds allocated to UT. The following graph shows the allocation of funds to the education sector for the past 6 years.



The component- wise distribution of funds are mentioned in the following table for the last two years-

Name of the Sector	BE 2018-2019 (INR Crores)	BE 2019-20 (INR Crores)
Education	**140.4**	**150.88**
Government Primary Schools	49.8	55.7
Government Secondary Schools	47.77	55.2
University and Higher Education	13.6	13.6
Assistance to Gram Panchayats	28.92	26.08

3.2.6. Health

Existing Scenario

Lakshadweep has 3 Hospitals – Indira Gandhi Hospital in Kavaratti, Rajiv Gandhi Hospital in Agatti and a Government Hospital in Minicoy. Further it has 3 community health centres (one each in Agatti, Amini and Androtti) and 4 primary health centres (one each in Kalpeni, Kadmat, Kiltan and Chetlat). An Ayurveda dispensary is functioning in Kavaratti and Androtti. There is a Homeopathy dispensary in Amini Island. Even though Primary medical facilities are available in the 11 inhabited islands, specialized medical care is not available in all islands. So, in case of emergency, patients are air-lifted either to IG Hospital at Kavaratti or to the mainland via helicopter. The referral/ air lifting of the patients causes great economic burden on the people. The infrastructure and work force are inadequate in all hospitals.

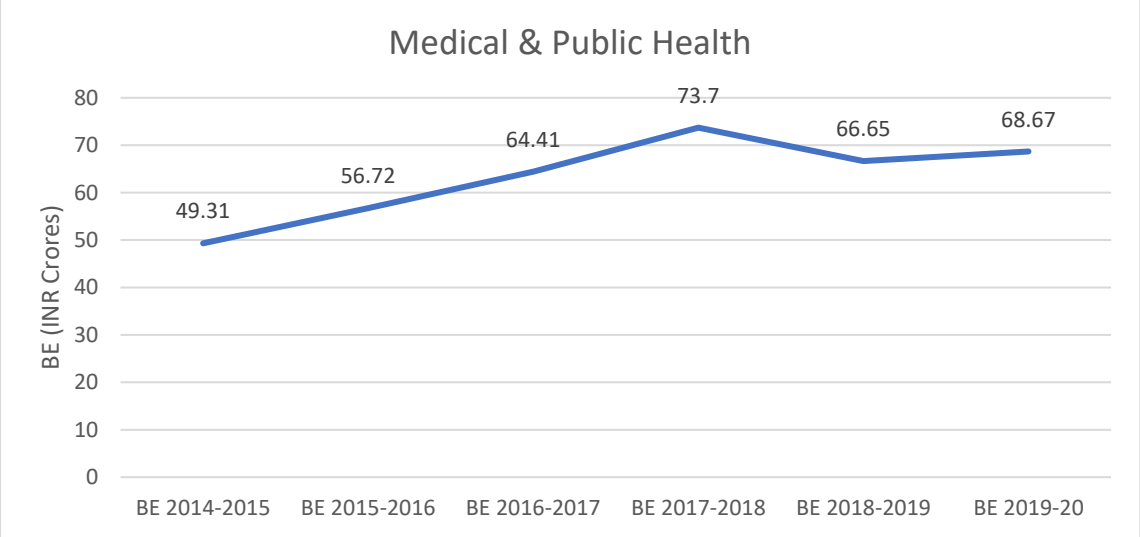
The infrastructure availability in Lakshadweep is quantitatively adequate in consonance to the standards of Indian Public Health Standards, but majorly inaccessible to the islanders due to poor inter-island connectivity.

PPP projects in Health Sectors

1. In 2011, a Specialty Hospital was set up at Agatti Island which offers eleven specialty services for the people of Lakshadweep: Physician Surgery, Anesthesia, Gynecology, Orthopedics, ENT, Pediatrics, Pathology, Radiology, Ophthalmology, Psychiatry, Dermatology. The present Implementing Agency is Daya General Hospital Ltd Thrissur. The monthly deployment charge for the PPP service is INR 84.00 lakhs.
2. In the year 2019, the four Specialty Services under PPP mode was started in major four Islands viz Andrott, Kavaratti, Amini & Minicoy. The specialist services offered for these Islands are Physician, General Surgeon, Gynecology, Pediatrics, Anesthesia, radiology, orthopedics, pathology. The monthly deployment charge for the PPP services is INR 94 lakhs. The present Implementing Agency is IQRAA International Hospital Research Centre Malparamba, Calicut.

Budget Allocation

The health sector has about 5% of the total funds allocated to UT. The following graph shows the allocation of funds to the health sector for the past 6 years.



The component- wise distribution of funds are mentioned in the following table for the last two years-

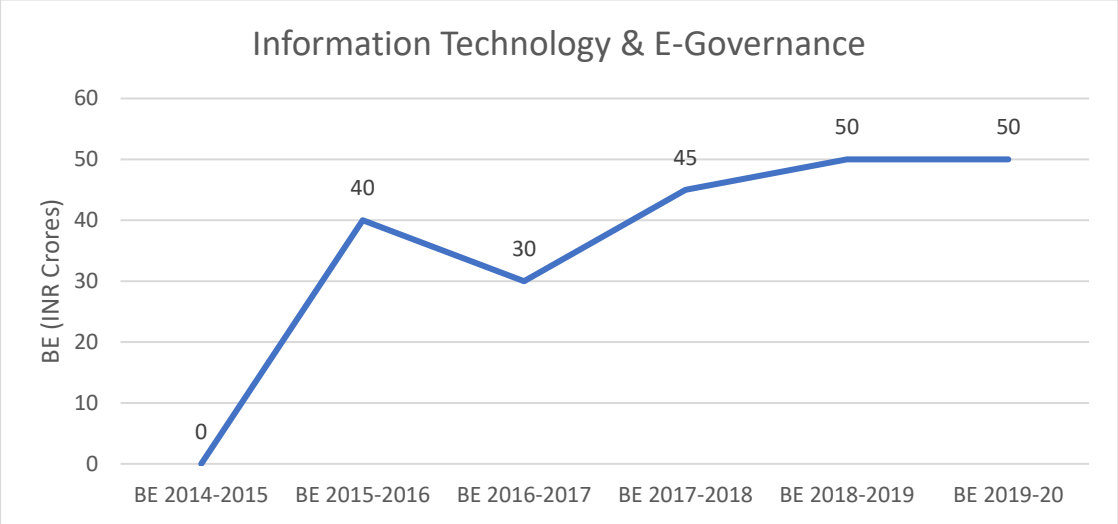
Name of the Sector	BE 2018-2019 (INR Crores)	BE 2019-20 (INR Crores)
Health	66.65	68.67
Urban Health Services-Allopathy	23.21	26
Rural Health Services-Allopathy	30.79	31.88
Ayurveda	1.05	1.04
Health Education	0.6	1
Assistance to Gram Panchayats	11	8.75

3.2.7. Information Technology

Existing Scenario

Lakshadweep is barely connected to the world of internet with the very low satellite band width of 102 mbps, which is divided further to distribute among different islands and also for SWAN communication system for administrative purposes. This is because of the non-availability of optical fibre cable connectivity. Kavaratti being the UT Administration headquarters (District Head Quarters) has 2G and 3G telecommunication connectivity. Apart from Kavaratti, Agatti and Minicoy are now connected with 2G and 3G network. BSNL and Bharati Airtel are the service providers, but Airtel is providing services only at Agatti, Bangaram and Kavaratti.

Budget Allocation



Despite the poor ICT services in the islands, the funds dedicated for this sector are quite less as compared to other essential sectors. As per the analysis of the budget for past 10 years, the allotment of dedicated funds for this sector was only initiated in the BE 2015-16 with an amount of INR 40 crores.

Proposed Projects

The Union Govt. have proposed a direct communication link through a dedicated submarine Optical Fibre Cable (OFC) between Kochi and 11 islands of Lakshadweep -- Kavaratti, Kalpeni, Agati, Amini, Androth, Minicoy, Bangaram, Bitra, Chetlat, Kiltan and Kadmat. The estimated cost of implementation is about Rs 1,072 crore including operational expenses for 5 years. The project would be funded by Universal Service Obligation Fund. The project is expected to be completed by May 2023.

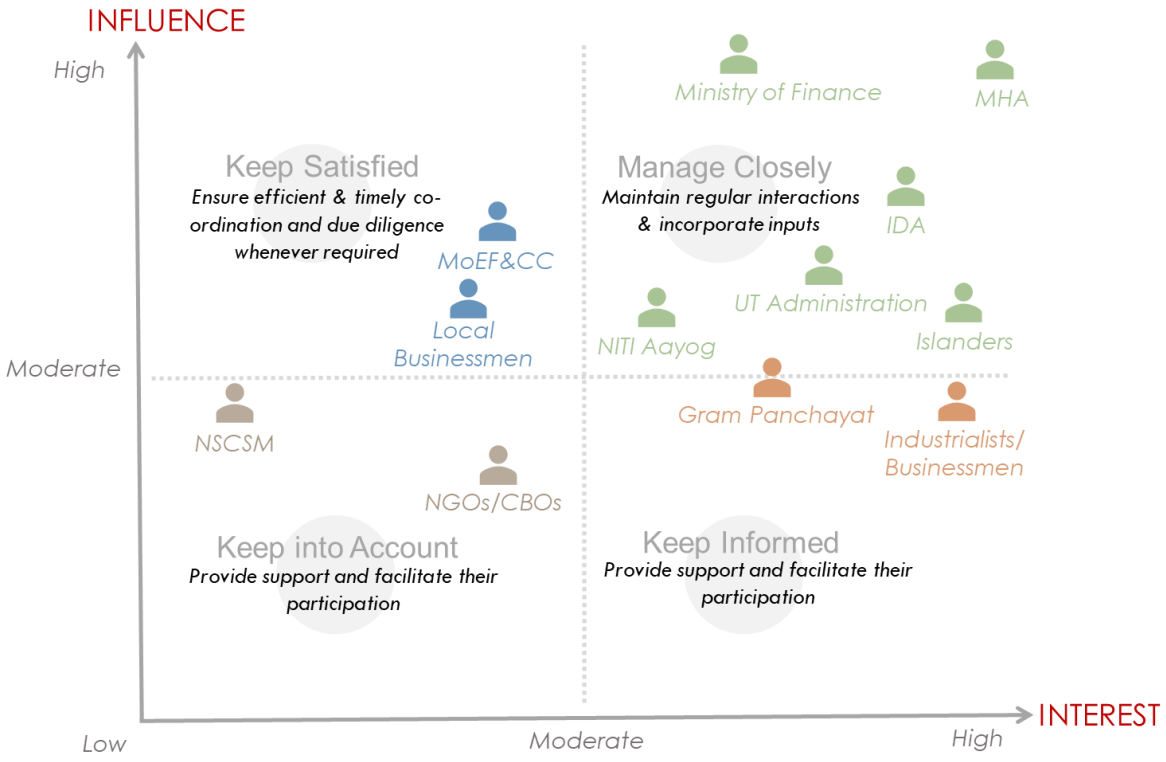
3.3. Stakeholder Aspirations

In Lakshadweep there are several stakeholders involved in the development and financial reforms of the islands. Each stakeholder is vital for effective allocation of resources and the success of individual developments. When identifying these stakeholders, that are or will be affected by, and thus have of action or particular issue, it is important to also prioritize them according to their level of interest and engage and communicate with them effectively.

Figure 3 Stakeholder consultation levels and scale

As per the initial study of the project area in consideration, and analysing the administrative setup with respect to the project, the initial list of stakeholders was made, and an interest-influence matrix was prepared (Figure 4)

Figure 4 Illustration of Key Stakeholders and interest-influence mapping for Lakshadweep Islands



At the UT level, extensive consultations were conducted with the various departments of UT Administration as well as the islanders to understand the existing scenario, issues, challenges and opportunities available in the islands. The following graph shows the various concerns of the Administration as well as the islander. The facilities such as construction of jetty, improvement of ICT services, marketing of tuna etc. were at the top priority for both the groups.

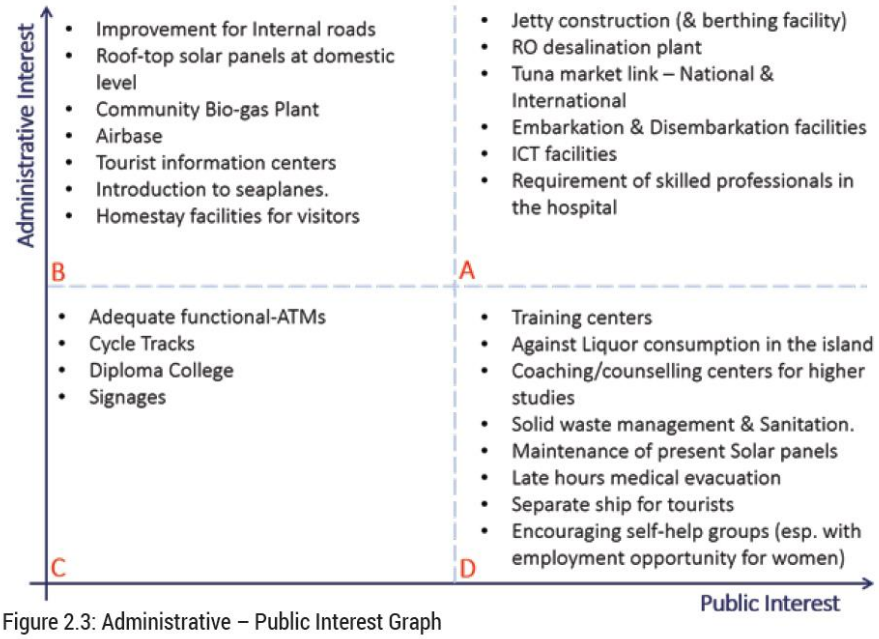


Figure 2.3: Administrative – Public Interest Graph

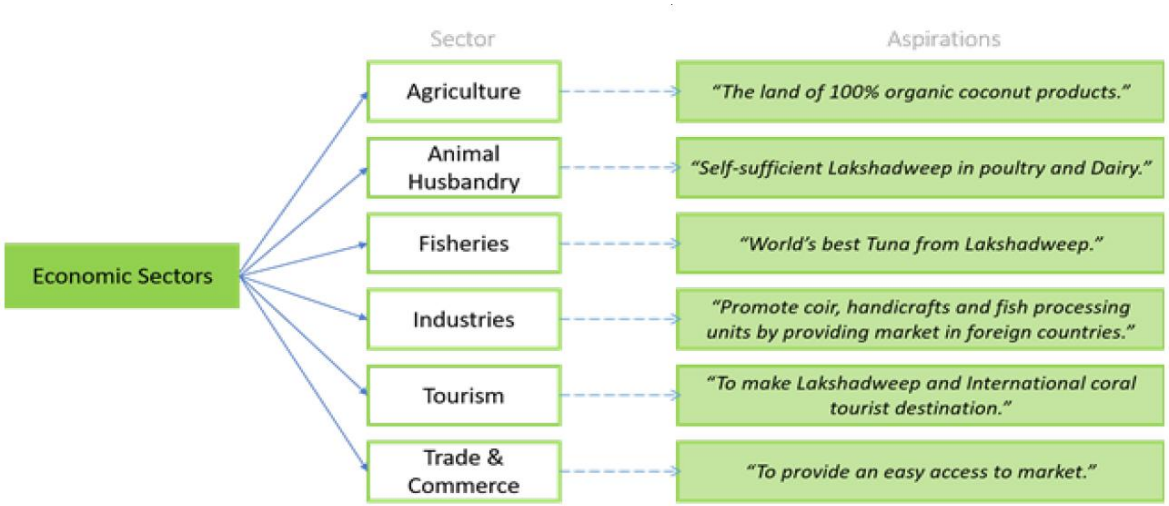
Quadrant-A: High administration interest and High public interest.

Quadrant-B: High administration interest and Low public interest.

Quadrant-C: Low administration interest and Low public interest.

Quadrant-D: Low administration interest and High public interest.

The following figure shows the aspiration of the concerned departments for the various existing and potential economic sectors in the Lakshadweep islands.



4. Regulatory framework and Policy assessment

4.1. Centrally Sponsored Plan Schemes

Some of the centrally sponsored schemes which can be implemented in Lakshadweep are listed below:

Sl.No	Scheme	Sector
1	Rashtriya Uchchatar Shiksha Abhiyan (RUSA) Abhiyan	Education
2	Scholarship schemes for Minority students	
3	Rashtriya Madhyamik Shiksha Abhiyan	
4	ICT Enabled SWAYAM (Study Webs of Active –Learning for Young Aspiring Minds) PROGRAMME	
5	PRAGATI - Providing Assistance for Girls' Advancement in Technical Education Initiative	
6	Pradhan Mantri Kaushal Vikas Yojana	Skill Development
7	National Skills Development Mission of India	Skill Development
8	Deen Dayal Upadhyaya Grameen Kaushalya Yojana	Youth Employment Scheme
9	UDAN – Regional Connectivity Scheme	Connectivity
10	Sagarmala	Port Development
11	Merchandise Export from India Scheme	Exports of Goods
12	Organic Farming Programme	Agriculture
13	Paramparagat Krishi Vikas Yojana (PKVY).	
14	National Project on Management of Soil Health and Fertility (NPMSHF)	
15	National Programme of Organic Production (NPOP)	
16	Rashtriya Krishi Vikas Yojana (RKVY)	
17	National Mission for Sustainable Agriculture	
18	Pradhan Mantri Fasal Bima Yojana (PMFBY)	
19	Gramin Bhandaran Yojna	
20	Atal Jyoti Yojana	Development of renewable energy
21	Development of Marine fisheries infrastructure & post-harvest operation	Fisheries
22	National scheme for Welfare of Fishermen	Fisheries
23	National Health Mission	Health
24	Pradhan Mantri Swasthya Suraksha Yojana	Health
25	Swadesh Darshan	Tourism
26	Marketing Development Assistance - Overseas Marketing	
27	International Cooperation	
28	Pradhan Mantri Matsya Sampada Yojana	Fisheries
29	Fisheries and Aquaculture Infrastructure Development Fund	
30	Blue Revolution - Integrated Development and Management of Fisheries	

4.2. Related and applicable Acts, Policies, Programs, Institutions & Regulations

Regulation	Implementing Agency	Salient Features
Central level Regulations		
Environmental Impact Assessment (EIA) notification 2006	MoEF&CC/ SEIAA	Imposes restrictions and prohibitions on the expansion and modernization of any activity or new projects being undertaken in any part of India unless prior environmental clearance has been accorded by the Central Government or the State Government in accordance with the procedure specified.
Coastal Regulation Zones (CRZ) Notification 2019	MoEF&CC/ LCZMA	Through the CRZ, the government seeks to prohibit certain activities in various types of zones in coastal areas of mainland India. For this purpose, there has been categorization of the coastal zones into 4 areas from category I (CRZ 1) to category IV (CRZ 4). All the activities falling under these four categories need to obtain CRZ clearance prior to any construction activity.
Island Protection Zone Notification 2019	MoEF&CC/ LCZMA	In the Andaman and Lakshadweep islands, CRZ clearance is required for the permitted project activities attracting the provisions of this notification prior to their commencement. This notification reconciles three objectives: protection of livelihoods of traditional fisherfolk communities; preservation of coastal ecology; and promotion of economic activity that have necessarily to be located in coastal regions.
Forest Conservation Act 1980	MoEF&CC/ Department of Environment & Forest, UTLA	This act stipulates that all proposals in forest area for a change of use to 'non-forest purpose' or de-reservation requires approval of Central Government.
Wildlife protection Act 1972	National Board for Wildlife (NBWL) under MoEF&CC	This act offers protection to marine biota and creates conditions favourable for in situ conservation of fauna and flora. It was amended in 2001 to include several species of fish, corals, sea cucumbers and sea shells in Schedule I and III.
National Tourism Policy 2002	Ministry of Tourism & Culture	The National Tourism Policy was formulated in order to develop tourism in India in a systematic manner, position it as a major engine of economic growth and to harness its direct and multiplier effects for employment and poverty eradication in an environmentally sustainable manner.
UT level Regulations		
Lakshadweep tourism policy 2020	Department of Tourism, UTLA	The policy envisions tourism as an engine of socio-economic development by harnessing its direct and multiplier effects on employment and poverty eradication in a sustainable and eco-friendly manner by active participation of all members of society. The policy identifies issues, potentials and constraints for developing tourism in the islands and provide an action plan for promoting tourism.
Lakshadweep Building Bye Laws 2016	LPWD, UTLA	Lakshadweep Building Bye-Laws set forth the guidelines, instructions and restrictions that are mandatory to be followed for construction of any building in the islands. It is mandatory to obtain the development/building permits and certificates as mentioned in the bye-laws before the commencement of any construction activity.
Guidelines for Approval for Development of Eco-Friendly Tourist Resorts in Inhabited Islands of UT of Lakshadweep 2017	Department of Tourism, UTLA	The objective of the guidelines is to develop quality accommodation in the inhabited islands within the carrying capacity of islands and with eco-friendly structure, having non-conventional sources of energy supply to the extent possible and environmentally waste/sewage disposal. It provides guidelines with respect to land & ownership, infrastructure, utilities, etc. and lays down the process for obtaining permits for the development and operation of tourist accommodation in the islands.
Guidelines on tourist home establishments 2017	Department of Tourism, UTLA	Understanding the importance of tourist accommodations and considering the cultural and religious sensitiveness of people of Lakshadweep, the Lakshadweep administration issues these guidelines to license tourism homes in undeveloped and sparsely inhabited portions identified for tourism in IIMPs.
Integrated Island Management Plan (IIMP)	Department of Science and Technology, UTLA	IIMP represent the total sustainable development of the islands, dividing the entire area into 3 zones- preservation, conservation and regulated. The plan comprises of the development already in existence and the future

		developments as well as management measures for conservations and preservation of the entire area. Any development in the islands need to be in sync with the IIMPs. IIMPs of all inhabited islands have been prepared by NCESS in accordance with the IPZ Notification 2011.
The Laccadive, Minicoy and Amindivi Islands Land Revenue and Tenancy Regulations, 1965 and Rules of 1968	Lakshadweep Administration	All the land in the Union Territory of Lakshadweep has been brought under the operation of this Regulation and there are no exemptions. This Regulation contemplates progressive land reforms such as conferment of occupancy rights on cowledars and other persons in occupation of Pandaram (government) land, and fixity of tenure to tenants and Kudiyans, abolition of Nadapu tenancy.
The Laccadive Minicoy & Amindivi (LM&A) Islands (Restrictions on Entry and Residence) Rules, 1967	Lakshadweep Administration	After the commencement of these rules no person who is not a native of the island shall enter or reside in or attempt to enter or reside in the islands except under and in accordance with a permit issued by the competent authority
The Lakshadweep Prohibition Regulation, 1979	Collector cum Development Commissioner, UTLA	This regulation bans the import, export, transportation, possession and manufacture of liquor or any intoxicating drugs in the UT. Being an international tourist centre, Bangaram is exempted.
Lakshadweep and Andaman & Nicobar Islands Industrial Development Scheme, (LANIDS) 2018	Department of Industries, UTLA	All new industrial units and existing industrial units undertaking substantial expansion in manufacturing and services sectors located in the Lakshadweep and Andaman & Nicobar Islands, are eligible for incentives under the scheme.
Solid Waste Management & Sanitation Conservancy Byelaw 2018	Department of Environment & Forest, UTLA	This byelaw was issued for regulation and prohibition of nonbiodegradable waste in the UT. As per this byelaw, production, distribution or sale of polythene carry bags in any manner is banned in the UT. Moreover, Administrator can declare any area within the UT limit as sanitation zone or waste free area under this byelaw.
Lakshadweep Action Plan for Climate Change (LAPCC)	Department of Environment & Forest, UTLA	The LAPCC integrates the action plan of the Union Territory of Lakshadweep with the ongoing and proposed developmental programmes in the Union Territory, and in tandem with the eight national missions along with the principles and guidelines listed out in the NAPCC.
The Lakshadweep Marine Fishing Regulation 2000; The Lakshadweep Marine Fishing Regulation and Rules 2000	Department of Fisheries	Regulation of fishing and fishing vessels in the lagoon and sea around the UT of Lakshadweep. As per the provision of this regulation all fishing craft are to be registered and licensed for fishing. The lagoons and waters around our islands are highly rich in marine fishery resources and hence, these regulations are imperative for the optimal use of our marine fishery resources to conserve them for our future generations and to avoid disputes among the fishermen/boat-owners

Pandaram Land Issue in Lakshadweep and formation of Dr. T. Haque Committee

In Lakshadweep, government land known as Pandaram land is classified into two categories:

- One which is owned and possessed by the Government with exclusive right to use or allocate or lease out.
- Another which is in the possession of individual local islanders or local community on indefinite lease basis for agriculture since several decades. The present land holders are largely the lawful successors of ex-cowledars (tenants) with permanent and heritable rights, but without any right to transfer through lease or sub-lease.

The stringent rules and regulations as specified by the U.T Administration regarding the Land Policies in 'The Laccadive, Minicoy and Amindivi Islands Land Revenue and Tenancy Regulations, 1965 and Rules of 1968' have made it ambiguous as to whom exactly the second category of Pandaram land

shall belong to. Therefore, a Committee was appointed by the Islands Development Agency (IDA) in its third meeting held on 24.04.2018 under the Chairmanship of Hon'ble Union Home Minister. The committee visited the islands, conducted a detailed study and recommended that a long term solution would lie in conferring ownership/occupancy right to all regular holders of Pandaram land, which will, in turn facilitate land acquisition for development projects in a lawful and non controversial manner and also help in growth of an active land sale/land lease market.[4] This will help to **accelerate holistic social and economic development of the islands, through growth of air transport, ports, communication infrastructure, agro-industries, tourist accommodations, etc.**

5. Anchor Opportunity Areas

Based upon the extensive stakeholder consultations, analysis of existing situation and the potential of the Lakshadweep islands, following anchor investment areas have been identified for a development of the islands which will enhance the connectivity, infrastructure as well as socio-economic condition.

1. Seaweed Cultivation
2. Renewable Energy
3. Health Facilities
4. Tuna Fish Export
5. Organic Coconut Export
6. Eco-Tourism Development
7. Skill development
8. Interisland connectivity
9. Education Services

The extensive measures in terms of hard interventions (such as Infrastructure development) and soft interventions (such as skill development, regulatory reforms) need to be taken to ensure the implementation of the anchor investment projects. In terms of financing, the budget for these sectors shall also be increased to meet the expenses of necessary infrastructure and skill development. The study focuses on a detailed assessment of three major opportunity areas of Seaweed cultivation, renewable energy and health facilities.

5.1.Health

The current health sector in Lakshadweep faces different problems due to the poor connectivity and difficulty to access specialized hospitals from each island. This result in the worst- case scenario where patients are air-lifted to mainland (Medical Evacuation). However, the Rajiv Gandhi Speciality Hospital (RGH), Agatti which functions on PPP with the IQRAA Hospital, Calicut is able to provide treatments in various specialised departments. From 2011 onwards, hospital was functioning with the help of Amrita Institute of Medical Sciences (AIMS) with about 70-75 staffs and specialised doctors of different speciality like Physician, Surgeon, Anaesthetist, Gynaecologist, Orthopaedic Surgeon, ENT Specialist, Paediatrics Pathologist, Radiologist, General Duty Medical Officers and physiotherapists were rendering their services at RGH, Agatti. Furthermore, after 5-year tenure from 2016 onwards, IQRAA International Hospital and research Centre, Calicut made a new MoU with UT administration and started functioning at RGH, Agatti. Earlier there were lack of specialized doctors in the above-mentioned departments, but after the new MoU, the specialised doctors available for providing

[4] Summary Record of Discussion of 118th Meeting of National Commission for Schedule Tribes (NCST) held on 27.08.2019. Retrieved from https://ncst.nic.in/sites/default/files/copy_of_minutes_of_meeting/2917.pdf

special medical services at RGH. This model is considered to be one of the best examples for providing medical services on PPP mode.

Currently, UT Administration had extended the MoU with IQRAA hospital to Indira Gandhi Memorial Hospital, Kavaratti, which is also functioning better than previous years. Using viability gap funding, the UT administration is paying the private hospitals for providing medical services in the hospitals which are already constructed by the UT administration. Hence, it is recommended to establish this successful mode of operation in other islands too. Moreover, once the optical fibre cable network is established in the islands, the ICT sector can be utilised to encourage telemedicine facility. Connecting the hospitals of Lakshadweep with the medical colleges of mainland through tele-medicine facility will improve the health scenario in Lakshadweep.

Potential interventions/opportunities

Exploration of Development Impact Bonds/Social Impact Bonds Targeting Health Outcomes

Rationale

- The process to get a chopper facility for emergency is usually very time consuming. It becomes very difficult to sustain a patient's medical criticality, especially for islands that are remotely located. There are no night landing facilities for air ambulances to the islands and the affected patient has to wait till morning before being evacuated to specialty hospitals located in Kavaratti/Agatti or to the mainland. On an average, an average of 102 evacuations are performed from other islands to Kavaratti and an average of 265 evacuations are performed every year from islands to mainland[5].
- Though there are equipment for medical assistance in the hospitals and health facilities, it lacks skilled professional to operate them. There is no expertise for consultation of costly equipment.
- Repeated e-tender failure due to non-participation of bidders, resulting in delay in procurement.
- Also, none of the islands have a well-established and fully-functioning telecommunication system to communicate to Kavaratti or the mainland for a medical emergency.

Project Concept

Development Impact Bonds (DIBs) or Social Impact Bonds (SIBs) are a results-based financing structure for external financing of public services in low- and middle-income countries. The difference between DIBs and SIBs is that DIBs can involve foreign funding and SIBs only involve domestic funding. SIBs link multiple organisations via outcomes-based contracts, where payment for delivery of public services is only made following achievement and verification of a predefined set of social outcomes associated with services.

The core group of organisations involved in a SIB includes outcome funders, service providers, and private investors. Typically, an outcome funder or service provider will propose the use of a SIB and private investors will be involved once initial design of the SIB is complete. From the outset, outcome funders (typically) define the population cohort and set of social outcomes they will pay for. Once outcomes are reported and independently verified, outcome funders release payments that positively correspond to the level of results achieved—better outcomes result in bigger payments. Private investors provide the upfront financial investment for service providers to implement a program of interventions. Outcome funders repay investors their initial investment plus an interest payment if

[5] National Rural Health Mission (NRHM) Programme Implementation Plan (PIP) 2011–2012 - UT of Lakshadweep

outcomes are achieved. If outcomes are not achieved, investors can lose some or all of the interest payment and their upfront investment.

According to the Centre for Global Development and Social Finance Development Impact Bond Working Group, the three ways DIBs can shift the paradigm of funding public services:

- DIBs introduce incentives for investors to support the performance of implemented projects because financial returns are tied to the success of these projects.
- DIBs create incentives to fund programmes over a longer period (5-10 years) and allow service providers to create the requisite foundations to scale up interventions.
- DIBs leverage private capital to address market failures which traditional funders (i.e. governments or other donors) cannot because of political, financial, or operational constraints

Case Study: The Utkrisht Impact Bond is a Development Impact Bond (DIB) aimed at improving maternal and newborn health outcomes in Rajasthan, India[6]. Its goal is to improve the quality of service provision in 440 private medical facilities in Rajasthan to help them obtain two important certifications of quality maternal care in India: *The Manyata certification and recognition from the National Accreditation Board for Hospitals and Healthcare Providers (NABH)*.

Outcome payments were tied to private health facilities, focusing on achieving a new Indian joint quality standard for maternal and new-born healthcare. This metric was chosen following a baseline survey of health facilities, which revealed large gaps between current quality levels and those required to meet the joint quality standard (JQS). The joint quality standard combines criteria from existing patient care and hospital management standards with guidance for specific practices in quality maternal and newborn care. These standards were set by the National Accreditation Board for Hospitals (NABH) and Federation of Obstetric and Gynaecological Societies of India (FOGSI). The joint quality standard contains 10 "chapters" of NABH standards and 16 applicable FOGSI standards. It was concluded that if the joint quality standard is implemented successfully in these facilities, up to 10,000 maternal and new-born deaths could be averted over a five-year period.

Payments for outcomes #1 and #2 were negotiated by the Utkrisht Impact Bond's outcome funders and private investors. The payments were split between achieving progress and reaching the minimum requirements for the joint quality standard as given below.

Outcome	Evaluation Method	Target	Allocated Outcome Payment
Improved quality of care provision	Pre-post reporting and evaluation	More than or equal to 30% of points met in all 10 chapters of NABH standards AND More than or equal to 40% of FOGSI standards are 100% met	25% of total (US$4,500 per facility)
Reaching JQS level of care provision	Pre-post reporting and evaluation	More than or equal to 50% of points met	75% of total (US$13,500 per facility)

[6] Lorcan Clarke, Kalipso Chalkidou, and Cassandra Nemzoff. 2018. "Development Impact Bonds Targeting Health Outcomes" CGD Policy Paper. Washington, DC: Center for Global Development. https://www.cgdev.org/publication/development-impact-bonds-targeting-health-outcomes

		in all 10 chapters of NABH standards AND More than or equal to 70% of FOGSI standards are 100% met	

Way Forward

The above-mentioned case study could be a templates for future SIBs and may offer insights in the future about more effective ways to fund health services. Some of these social outcomes could be based on the following:

- Increasing number of Institutional Deliveries at health centres on islands to reduce number of evacuations to the mainland
- Reducing number of still births and maternal deaths
- Targeting 100% immunization (currently at 98%)
- Increasing number of trainings for doctors and paramedical staff on the islands
- Increasing number of medical camps and vaccination drives on islands - workshops or participatory interactive sessions can be conducted for increasing medical awareness (viz. local seaweeds and plants with medicinal benefits, first aid techniques at the time of injury especially water sports, hygiene, etc.) - *target outcomes can be based on number of such camps/drives undertaken and people participating*

Other Interventions and Implementation Framework

a. Strengthen the existing health care facilities with creating two additional hospital facilities.

In the present scenario, health sector faces different problems as the connectivity is poor and it is difficult to access specialized hospitals from each island. Currently the Rajiv Gandhi Hospital Agatti and the Indira Gandhi Hospital Kavaratti are the only specialized hospitals in Lakshadweep. Because of travel time taken to reach these islands from Minicoy is more than 10 hrs through passenger ships and the helicopter facilities are not available all the time. Thus, the major concern is to provide specialised facilities in the islands wherever it is required.

The General Comment on the right to health, adopted by the Committee on Economic, Social and Cultural Rights in 2000 sets out four criteria (often referred to as "AAAQ" criteria) by which to evaluate the right to health:

- Availability: meaning goods services, and programmes related to health need to be available in sufficient quantity)
- Accessibility: meaning non-discrimination, physical accessibility, affordability and information accessibility
- Acceptability: ethical, gender-sensitive and culturally appropriate facilities, goods and services
- Quality: health facilities, goods and services of good quality e.g. trained health professionals, safe drugs etc.

The sustainability development goals also stress on the '*good health*'. (Goal 3, Sustainable Development Goals).

b. To offer regular medical camps in every island of the UT

Top benefits of conducting health camps and medicine distribution programs:

Health Check-ups: Most often, people who live in rural areas and islands like Lakshadweep suffer from several health complications. Medical experts in health camps perform thorough diagnosis and provide suitable solutions to these people and help them recover from the complications.

Health Care at Doorsteps: People who live an underprivileged lifestyle in islands with poor connectivity cannot afford the rising medical costs in mainland. This is when the importance of health camps and free medicine distribution programs by NGO's/Medical Colleges has come into existence. Availing medical treatment and medicines without any cost can allow people to stay worry-free from costly medicines and health check-ups.

Awareness of Health and Hygiene: Unawareness is the main reason why people suffer from adverse health complications. Conducting health camps and providing health tips and recommendations is the best way to bring awareness among underprivileged people and help them to lead a heathy life.

Thus, it is recommended to conduct, medical camps in every island with collaboration of NGOs, Medical Colleges etc.

c. **To uplift the quality of medical services provided by community health centres in all major inhabited islands by connecting with private hospitals in the mainland through PPP mode.**

Lakshadweep, being located remotely faces shortage of specialized doctors. This result in the worst-case scenario where patients are air-lifted to mainland (Medical Evacuation). However, the Rajiv Gandhi Speciality Hospital (RGH), Agatti which functions on PPP with the IQRA Hospital, Calicut is able to provide treatments in various specialised departments.

From 2011 onwards, hospital was functioning with the help of Amrita Institute of Medical Sciences (AIMS) with about 70-75 staffs and specialised doctors of different speciality like Physician, Surgeon, Anaesthetist, Gynaecologist, Orthopaedic Surgeon, ENT Specialist, Paediatrics Pathologist, Radiologist, General Duty Medical Officers and physiotherapists were rendering their services at RGH, Agatti. Furthermore, after 5-year tenure from 2016 onwards, IQRAA International Hospital and research Centre, Calicut made a new MoU with UT administration and started functioning at RGH, Agatti. Earlier there were no lack of specialized doctors in the above-mentioned departments. However, now specialised doctors are providing services at RGH, it is considered to be one of the best examples for providing medical services on PPP mode.

Currently, UT Administration had extended the MoU with IQRAA hospital to Indira Gandhi Memorial Hospital, Kavaratti, which is also functioning better than previous years as per the understandings from consultations. Using viability gap funding, the UT administration is paying the private hospitals for providing medical services in the hospitals which are already constructed by the UT administration. Hence, it is proposed to have the successful mode of operation in other major inhabited islands such as Minicoy, Kalpeni Kadmat Androth etc.

Project Name	Rationale	Components	Costing
Provision OP in all the islands on collaboration with	By providing OP at all islands, will ensure	Health Dispensary Building 2000 sqft	30 Cr (per island) For the islands of Minicoy, Kalpeni

multi-speciality hospitals/Medical Colleges in Mainland.	access to basic health services Can reduce airlifts by helicopter Can reduce dependency on Kavaratti and Agatti for health care Previously Ayurvedic and Homeopathic health facilities were available only in Kavaratti. Can ensure vaccinations Pathology facilities will be made available Early determination diseases Capacity building for clean and healthy living	Furniture Medical Laboratory Lab Equipment Waste management unit	Kadmat and Androth ~ 120 cr
10 bedded AYUSH wellness centre in Minicoy. (Ayurvedi and Homeopathic)		Ayush Hospital 2500 sqft Equipment's Furniture	19 Cr
Procurement of Pathological Equipment's on PPP Mode		Costing to be tendered out	-
Renovation of Indira Gandhi Hospital, Kavaratti		Renovation of the rooms and wards Renovation of labs, OP	15 Cr
Renovation of Community Health Centre in all inhabited islands		Renovation of causality, ICU and Operation Theatres	50 Cr
Total Cost			**204 Cr**

d. To Collaborate with Multi-Speciality/Medical College Hospitals in mainland

By establishing optical fibre cable network, the ICT sector can be utilised to encourage telemedicine facility. Connecting the hospitals of Lakshadweep with the medical colleges of mainland through tele medicine facility will improve the health scenario in Lakshadweep.

e. To provide health security to tourists.

Tourist destinations in Lakshadweep offers water sports activities and diving, even though these activities are carried out with 100 percentage safety measures, there are minor chances to get injured. For instance, a small wound on stepping on corals by mistake will be needing a first aid assistance. Thus, First Aid Centres are can be established in the uninhabited tourism islands of Bangaram, Thinnakara, Cheriyam, Suheli Cheriyakara and Suheli Valyakara.

Project Name	Rationale	Components	Costing

First Aid Centre at Bangaram.	To provide emergency first aid care to all tourists Care from small wounds and other minor injuries and health problems To stop spread of communicable diseases. To provide check-up for tourists from the countries with virus break-out issues.	Building Furnishing cost	0.2 Cr
First Aid Centre at Thinnakara.			0.2 Cr
First Aid Centre at Suheli Cheriyakara.			0.2 Cr
First Aid Centre at Cheriyam			0.2 Cr
First Aid Centre at Suheli Valyakara.			0.2 Cr
Total Cost			**1 Cr**

5.2. Organic coconut export

Other than tuna, Lakshadweep also has potential of contributing to the global market of coconut products. Lakshadweep Islands produced 90.7 million coconuts in 2015-16 with a yield rate of 35,292 coconuts per hectare. Though coconut palms are in abundance in all the islands of Lakshadweep, coconut is not cultivated, managed, and utilised as a resource in a systematic and scientific manner due to various socio-economic and other factors. Some of the major issues include overcrowding of palms due to lack of adoption of proper spacing which result in low productivity, lack of adoption of multiple cropping and integrated farming practices, lack of availability of skilled palm climbers, crop loss due to pests, rodents, and diseases and low-level of product diversification, lack of knowledge and skills among farmers, and lack of storage and marketing facilities.

It can be summarised from the global and Indian market assessment of coconuts and coconut products that Asian countries dominate in terms of exporting coconut products to the United States and Europe, the two biggest importing regions, which evidently are the biggest importers and offer higher values. Correspondingly, some Asian countries, too, have a competitive demand for coconuts and its products. Internationally, Coconut Oil has the highest demand and offers greater returns, followed by Desiccated Coconut across the U.S, Europe, and Asia. Additionally, Coconut itself is another product, which has a high demand and offers good capital returns in the Asia Region, followed by Copra Cake, which is high in demand but offers low returns in terms of prices. Also, demand for other coconut products such as coconut water, coconut coir and its products, coconut shell charcoal and activated carbon, coconut milk and cream, etc. in the domestic as well as international market is on the rise and pose an opportunity that needs to be tapped. India at present is the premier producer of coconuts with maximum productivity at the global level, producing 13 billion nuts per annum, and with large numbers of farmer's co-operative societies and government agencies involved in primary processing and marketing different coconut products. In fact, Indian export of coconut products such as coconut shell charcoal, desiccated coconut, coconut oil, etc. (excluding coir and its products) have increased from Rs.1354.9 crore in 2014-15 to Rs.1384.7 crore in 2015-16. Similarly, the exports of coir and coir products have increased from Rs.1630.3 crore in 2014-15 to Rs.1901.4 crore in 2015-16.

The value-added products processed locally in Lakshadweep such as desiccated coconut powder, coconut oil and coconut milk have a high value and demand in the domestic along with international markets and are capable to compete on an international level. However, the products produced by

these processing units lack an organised and strong marketing and branding strategy which results in attracting few customers and not fetching premium pricing even though they are organic products. Hence, emphasis should be laid more on finished products rather than on primary commodities, and its export in the long run so as to increase job opportunities, benefits to the community at large and for ramping up investment. **Diversification of coconut-based products and value-addition** will help the coconut growers in getting remunerative prices and improve competitiveness. Also, it is critical to have **marketing and branding strategy** for utilising Lakshadweep's coconut resource for reaping its full potential.

Hence, the U.T of Lakshadweep Administration should lay attention towards promoting the importance of organic certification, other certifications and standardization, and certify coconuts along with all its processed and value-added products as organic.

A Case of Palakkad Coconut Producers Company Ltd. (PCPCL), India – Benefitting from a collective approach

Palakkad Coconut Producers Company Ltd. was constituted in 2013 under the Coconut Development Board (India) led programme. 25,685 coconut farmers from Palakkad district are shareholders of the Company. The objective of PCPCL is to ensure just, fair and stable price for farmers, and thus address the root of the agrarian crisis. Through its retail outlets – branded as Coconut Points, PCPCL offers safe, natural, and unadulterated farm products to the consumers.

The Company procures coconuts, tender coconuts and Neera (un-fermented coconut sap), palm sugar and other produce from the shareholders and resells the raw or value-added products to various governmental and business agencies and through its own outlets. The Company's product basket includes Neera, Coconut Nectar, Coconut Sugar, Coconut Oil and other value-added products. All these products are processed at manufacturing facilities owned by the Company and associated Federations spread across Palakkad District, using the latest technology. According to the Company, farmers having 15 palms under Neera tapping can earn up to an average of INR 45000/month with the current price of Neera. Apart from farmers, Neera technicians, the skilled labour force involved in Neera tapping, are also earning a good income. There are 25 permanent Neera tappers in the federation who are paid INR 20,000/month as salary and incentives, along with additional INR 5,000 towards their social security net. Out of the 1500 palms marked in Muthalamada federation, Neera tapping is currently done from 250 palms. Entire Neera collected is sold through Neera parlour at Vytilla hub and another stall at GCDA complex in Kochi. Neera is sold under the brand name "Pamdew" for INR 25/- per 200 ml. Owing to the huge success of Neera sales at these two sale points, PCPCL now intends to open 50 new Neera outlets within Cochin, Thrissur and Palakkad districts.

Keeping in view the geographical and ecological setting, coupled with abundant natural resources, high-yield agriculture is an element that could be explored and promoted to enhance and further strengthen the socio-economic growth and development of Lakshadweep.

Coconut production is another important source of income of the Islanders. Its processing and expanding the range of value-added coconut products, needs to be promoted and enhanced as it seems to be a promising opportunity that would induce positive and stringent socio-economic changes. Furthermore, coconut cultivation and production of value-added products will resonate its impact and supplement the Tourism industry, and other socio-economic sectors.

Lakshadweep produced 90.7 million coconuts in 2015-16 with a yield rate of 35,292 coconuts per hectare[7]. Though coconut palms are in abundance in all the islands of Lakshadweep, coconut is not

[7] Coconuts development Board (India). 2016,

cultivated, managed, and utilised as a resource in a systematic and scientific manner due to various socio-economic and other factors. Some of the major issues include overcrowding of palms due to lack of adoption of proper spacing which result in low productivity, lack of adoption of multiple cropping and integrated farming practices, lack of availability of skilled palm climbers, crop loss due to pests, rodents and diseases and low-level of product diversification, lack of knowledge and skills among farmers, and lack of storage and marketing facilities.

In order to understand the scale of availability of coconuts in Lakshadweep, the study focuses on one island of Minicoy. Thus it was necessary to comprehend and analyse the existing area in Minicoy that is under coconut plantation, number of coconut palms that are currently present in Minicoy and annual coconut production. However, due to unavailability of information on these factors and other details required for harnessing Minicoy's coconut resource, an approach consisting of preliminary models along with few calculations was adopted, considering assumptions, standards, and techno-economic parameters specified by various agencies and organisations[8]. This helped in establishing economics of production and associated expenditures to deduce and present the potential and profitability of coconut production, which remains untapped till date.

Two scenarios were assumed - the first modelling was done based on the existing condition of coconut cultivation that is being done without proper spacing and minimal husbandry, resulting in low yield. The second modelling was performed assuming if the coconut cultivation is practiced by adopting proper spacing and timely husbandry that would enable achieving the optimal yielding capacity of the coconut palms present in Minicoy.

Currently, around 340 ha. of land in Minicoy is under coconut plantation, if only South Pandaram area is considered. However, around 237 ha. was considered to be available for future expansion of plantations. Hence, for the models, 237 ha. has been considered to be available for coconut plantation. According to the first modelling, there are around 41,949 coconut palms in Minicoy yielding around 4.2 million coconuts, going by the standards for spacing between coconut palms[9] and standard average yield rate of a coconut palm[10]. Whereas, under the second modelling, there would be around 41,949 coconut palms in Minicoy, similar to the first scenario, but yielding around 5.7 million coconuts annually, going by the standards for spacing between coconut palms[11] and standard average yield rate of coconut palm varieties in Lakshadweep Islands[12].

From both the models (Scenarios – A & B), it was established that simply selling coconuts would not be a profitable business activity and the coconut producers are prone to incur losses and selling only Copra would provide minimal profit in comparison to the input cost. Therefore, the scenarios proved that if Copra can generate certain profit, then by investing some capital in creating an infrastructure such as a coconut processing unit, production of value added products could be facilitated in Lakshadweep Islands to fetch more premium pricing of organic produce. Most importantly such an

[8] Agencies and organisations such as APCC, CDB (India), Ministry of Agriculture & Farmers Welfare, GoI, etc. which have laid out some standards and models for coconut cultivation and production.

[9] Spacing standard between coconut palms specified by Department of Agriculture Cooperation & Farmers Welfare (GoI) = 7.5x7.5m spacing between coconut palms, resulting in 177 palms per hectare.

[10] Average yield of a Coconut palm @ 100 nuts/palm/annum as specified by CPCRI-ICAR for Minicoy (Lakshadweep Islands) and Department of Agriculture Cooperation & Farmers Welfare (GoI).

[11] Spacing standard between coconut palms specified by Department of Agriculture Cooperation & Farmers Welfare (GoI) = 7.5x7.5m spacing between coconut palms, resulting in 177 palms per hectare.

[12] @ 135 nuts/palm/annum as specified by CPCRI-ICAR for Minicoy (Lakshadweep Islands).

infrastructure influx would generate employment opportunities to many and collectively opening a new avenue for improving the livelihood in Minicoy and other islands of Lakshadweep.

It can be summarised from the global and Indian market assessment of coconuts and coconut products that Asian countries dominate in terms of exporting coconut products to the United States and Europe, the two biggest importing regions, which evidently are the biggest importers and offer higher values. Correspondingly, some Asian countries, too, have a competitive demand for coconuts and its products. Internationally, Coconut Oil has the highest demand and offers greater returns, followed by Desiccated Coconut across the U.S, Europe, and Asia. Additionally, Coconut itself is another product, which has a high demand and offers good capital returns in the Asia Region, followed by Copra Cake, which is high in demand but offers low returns in terms of prices. Also, demand for other coconut products such as coconut water, coconut coir and its products, coconut shell charcoal and activated carbon, coconut milk and cream, etc. in the domestic as well as international market is on the rise and pose an opportunity that needs to tapped.

India at present is the premier producer of coconuts with maximum productivity at the global level, producing 13 billion nuts per annum, and with large numbers of farmer's co-operative societies and government agencies involved in primary processing and marketing different coconut products21. In fact, Indian export of coconut products such as coconut shell charcoal, desiccated coconut, coconut oil, etc. (excluding coir and its products) have increased from Rs.1354.9 crore in 2014-15 to Rs.1384.7 crore in 2015-16 whereas imports have increased from Rs.453.7 crore to Rs.532.3 crore during the corresponding period. Similarly, the exports of coir and coir products have increased from Rs.1630.3 crore in 2014-15 to Rs.1901.4 crore in 2015-16. Altogether, the major coconut products exported from India are coconuts (dry and fresh) and coconut oil22.

Even the value added products processed locally (in other islands of Lakshadweep U.T and not Minicoy Island) such as desiccated coconut powder, coconut oil and coconut milk have a high value and demand in the domestic along with international markets and are capable to compete on an international level, the products produced by these processing units lack an organised and strong marketing and branding strategy which results in attracting few customers and not fetching premium pricing even though they are organic products. Hence, emphasis should be laid more on finished products rather than on primary commodities, and its export in the long run so as to increase job opportunities, benefits to the community at large and for ramping up investment. Diversification of coconut-based products and value-addition will help the coconut growers in getting remunerative prices and improve competitiveness. Also, it is critical to have marketing and branding strategy for utilising Minicoy's coconut resource for reaping its full potential.

Hence, its ideal that setting up a Coconut Processing Facility/Unit and constitution of a collective Coconut Producers Society in synergy with a Coconut Advisory Board would prove to be a catalyst in the socio-economic development of Lakshadweep by instigating improvement in productivity, cost reduction, efficient aggregation, better utilisation of by-product and production of value added products, and efficient marketing of the produce. Such initiatives will organise the unorganised coconut sector. These initiatives will also promote socio-economic development and true empowerment amongst the community if the people in Minicoy, especially women get involved – directly or indirectly in all stages in the value addition supply chain, such as, production, aggregation, processing, marketing, distribution, and sales. The promotion and expansion of the coconut enterprise, with special focus on by-products and value-added products would significantly improve the lives and resilience of coconut farmers.

Objectives of the proposal:

- Better utilisation of by-products & production of value-added products.
- Efficient processing & zero wastage.
- Efficient marketing & branding.
- Organise the unorganised coconut sector.
- Improve the yield & focus on 100% Organic cultivation.

Implementation Strategies:

Step 1: Establishing Coconut Producers' Society (CPS) – This would merge small-scale and fragmented industry structure into CPS to streamline the disconnected coconut industry in Minicoy and other Lakshadweep Islands. This merger shall encourage synchronization and coordination, integrate supply chains and activities, further instil the sense of community, spearhead initiatives towards market development, etc.

Step 2: Constituting Coconut Advisory Board – It would function as an exclusive, overarching, and prime intermediary for facilitating, advising, assisting the CPS, setting up coconut processing unit/facility in Lakshadweep, and subsequently, promotion and expansion of a stringent coconut enterprise of the islands. It would be a pool of agencies both, public and private that are involved in coconut industry and associated market segments, such as Food and Beverages, Personal Care, Beauty, Health Care, Energy and Sports Drinks, Home Care, Grocer retailer, etc. One of the reasons behind the formation of this Advisory Board for Lakshadweep and inclusion of private retailers/manufacturers/consultants, etc. would be that the Board would split up the burden from LCMF and LDCL, giving easy access to unexplored market segments.

Step 3: Identification of product basket (value added coconut products) – A number of by-products and value added products can be identified such as virgin coconut oil, Coconut Vinegar, Jaggery etc., keeping in view the analysis of intensity of demand of the products in both, international and domestic markets, wholesale prices in one of the closest domestic market – Kochi, supplemented by the export prices of various coconut products, and other relevant market assessment.

Step 4: Streamlining the Value Chain - The overall value chain for the success of coconut processing unit/facility, and branding and marketing the coconut enterprise of Minicoy will consist of three tiers or entities, which are as follows:

- Primary – level: Coconut Producers Society (CPS)
- Intermediate – level: Coconut Advisory Board
- Tertiary – level: End Market/Consumers

Step 5: Strengthening marketing and branding strategies - Developing a customer base is a major challenge in the marketing of coconut products. However, it can be facilitated by developing a proper distribution network, supply chains, and transportation hubs for simplifying the movement of products and scale up the enterprise for Lakshadweep, and definitely setting up a coconut processing unit/facility and formation of CPS would further enhance this component.

Marketing Strategy for Organic produce is required to focus on Market Development for current market and new market needs to be in place by product differentiation. A strategy to shift from traditional market channel to alternative organized market chains for domestic market and export through a systematic plan to have promotion strategy using product life cycle concept for organic market needs to be formulated together by the U.T Administration, CPS, Coconut Advisory Board and

other relevant agencies and organisations. Overall, the marketing strategy would comprise of the components such as market penetration strategy, market development strategy, place strategy, and promotion and communication strategy, which have been detailed out in the Volume – II.

Step 6: Establishing Coconut Processing Unit/Facility - This facility will act as collection and storage point - wherein all coconut producers of Lakshadweep can deposit their harvests, as a processing facility – wherein certain share of young and mature coconuts will undergo primary and advanced processing depending on the types of products and their quantity is in the demand, considering the local requirement (consumption) of coconuts in Minicoy itself, and a facility that can function as a manufacturing and packaging facility for coconut products.

There are few considerations for setting up a coconut processing unit depending upon the requirements, which have been recommended by Coconut Development Board, NABARD, CIARI, ICAR and other agencies that should be taken into account in the case of Minicoy. Nevertheless, the location and size of this unit/facility would be a critical determinant and should be decided mutually by all stakeholders involved and the scale of production and operation that is desired at the time, as these factors would relatively determine the initial investment required, operational and management costs and the pricing of the commodities, etc.

Step 7: Benefitting from National level schemes, policies, and programmes - It is evidently clear that any infrastructure development and planning for a project of any scale comes with a requirement of capital investments, which holds true for establishing coconut enterprise of its kind in Minicoy and Lakshadweep Islands, in general. It might be argued that setting up of a Coconut Processing Unit/Facility, its operations and maintenance would require capital investment to bear certain expenditures associated to this processing unit/facility, and this might generate exponentially high losses making the processing unit unfeasible. However, the solution to this can be addressed if the all coconut producers in each of the islands are unified by constituting a CPS registered by Coconut Development Board (India), which will strengthen and enable this Society to claim benefits from numerous National level schemes, policies and programmes in the form of financial and technical assistance right from cultivation and harvesting to processing and product diversification and even marketing and promotion of the coconut products.

Step 8: Obtaining Indian & International Certifications and Standards, and adopting relevant practices - The land of Lakshadweep islands has been certified as organic certification. However, the coconut producers are unable to realise a premium pricing for the focus is strictly on the production and selling of Copra and missing out on the fetching premium pricing that the other organic by-products and value-added coconut products can substantially fetch.

Market access is governed through a number of closely related mandatory public and voluntary private standards required by buyers, at industry and firm levels, to ensure food safety and compliance with social and environmental demands, and even, industry codes of practice, in niche markets. Additionally, different market segments have their specific technical requirements or standards of various natures, such as to control contaminations and adulteration, regulate various value chain processes, product specifications, etc. For instance, currently, in the retail food segment, HACCP based food safety standards for exports to the U.S. and Global G.A.P for exports to the European countries are being demanded by the buyers.

Hence, the U.T of Lakshadweep Administration should lay attention towards promoting the importance of organic certification, other certifications and standardisation, and certify coconuts along with all it's processed and value added products as organic. Consequently, initiating

Lakshadweep coconuts and its products as a brand in domestic and international market and advertising all its unique features.

Other than coconuts, exploring the method to cultivate vegetables and other agro-based items on the island is essential. This is because, the island is densely populated with coconut plantation. The foliage of these trees is so dense that, it blocks sunlight hitting the ground. Moreover, the proximity of the trees also makes it challenging to grow any other crop within these plantations. Hence, with various discussions with the experts and other stakeholders, the following targets were proposed:

- Planting coconut trees in a grid pattern with enough set-back to let sunlight hit the ground.
- Practicing cultivation of other agro-based crops within the spaces of coconut plantation.
- Introducing and practicing Aquaponics on the island for efficient agriculture cum aquaculture produce.

A.	Coconut Processing Unit/ Facility, Minicoy and Kalpeni	For the abundant availability of raw material but inadequate facilities and approach to manufacture high quality finished-products. The lack of marketing or establishing Lakshadweep Coconut as 100% organic and high-grade quality brand that could potentially fetch a higher price in the global market, deters the local islanders from earning more revenue from coconut production.	Building Furniture Costs Machineries for Processing Packaging Unit Storage Unit Vehicle for collection and transportation	~12 Cr
B.	Aquaponic units on pilot basis, Minicoy and Kavaratti	Islanders run short of vegetables if not shipped on a weekly basis. Non-availability of quality open space and freshwater hinders agro-based cultivation and farming activities in the island.	Green House Solar Panels and Batteries Temperature Controller Plumping Utensils Growing Tray Fish Tanks	~0.88 Cr

5.3. Renewable energy

As the country is galloping towards being a developed nation, the per capita consumption of energy is bound to increase. This will lead to a huge surge in residential demand for energy. All this growth cannot be at the expense of conventional sources of energy which are bound to be depleted in some centuries, if not decades. Lakshadweep is largely dependent on the diesel power generation (DG sets) systems, hence in-order to reduce the dependency on the fossil fuels, potentiality of solar power plants both on land and lagoon (floating solar plants) needs to be explored.

As a part of encouraging renewable energy extractions, feasibility studies for floating solar, ocean thermal energy, wave/biomass/hybrid power projects need to be explored. The UT administration lacks technical expertise in conducting detailed techno-economic feasibility studies for wave energy, Biomass and other hybrid power projects. Thus, UT administration should identify stakeholders who

conduct detailed techno-economic feasibility to explore potential areas for sustainable power generation.

In order to achieve optimal utilization of the opportunities for energy generation form renewal sources of energy; policy level interventions to mandatorily include renewable energy as an integral component of tourist resort guidelines and bid documents for all projects in tourism. Lakshadweep tourism policy, 2016 mentions that renewal sources of energy must be used to the possible extents. The rules and regulations must be re-visited to recommend maximum usage of renewal sources of energy. Based on detailed stakeholder consultations, the identified list of potential interventions UT can take up immediately to promote renewable energy options are:

Solar Energy (PV on Land)

Owing to proximity to the equator, the Union Territory of Lakshadweep Islands has tremendous potential for solar power as an energy source. Furthermore, solar power, a clean / renewable energy resource with zero emission, can be harnessed through a variety of devices. From the regular solar PV on land to rooftop solar PV, this energy source also has the potential to be combined with other sources.

The Capacity Utilization Factor (CUF) of Solar Energy for the Lakshadweep Islands is 16.98%. The generation capacity of solar PV on land has been estimated to be ~ 1.48 million units per MW. Further, this energy resource requires capital expenditure of INR 4 to 5 crore per MW and the price per unit generated is expected to be INR 5 per kWh. With no adverse ecological impact, this resource is ideal with regards to the eco-sensitive environment on islands.

Solar Energy (Floating Solar PV)

Floating Solar PV is a variation of the regular Solar PV on land. For this technology, solar panels are installed in calm waters and connected to an inverter on land through an underwater cable. The CUF for solar energy for Lakshadweep Islands is 16.98%. The generation capacity of Floating Solar PV is ~1.48 million units per MW. Being a new and innovative technology especially for seawater the capital cost for floating solar PV is INR 15 crore per MW, almost three times that of regular solar PV on land. The generation cost for Floating Solar Technology is expected to be INR 16-18 per kWh.

This technology has been tried and tested across the Maldives. The geographical similarity between Lakshadweep Islands and the Maldives, makes this technology suitable for islands. The adequate lagoon area in the islands can be utilized for the floating solar PV technology. The biggest advantage of this technology is the minimal requirement of land which is a big issue for islands.

Ocean Thermal Energy Conversion (OTEC) is an indigenous technology developed by the National Institute of Ocean Technology (NIOT) which uses the temperature difference between cooler deep water and warmer shallow or surface seawaters to run a heat engine and produce electricity. OTEC will be one of the continuously available renewable energy resources. This technology is capital intensive and is economical only at very large scales.

Lakshadweep islands are best suitable for having land based OTEC plants because of the nearness to deep sea water. Currently NIOT along with Ministry of Earth Science is establishing a pilot OTEC plant in Kavaratti with a capacity of 75KW capacity catering to the energy requirements of the existing Desalination plant.

Offshore Hybrid energy system – solar, wind and wave: Renewable energy based standalone hybrid systems are compatible for remote areas and islands. The main limitations of solar based system in the islands are the large land area requirement for setting up solar panels and the dense tree cover that shades the ground and rooftops.

The islands of Lakshadweep, being location near to equator receive abundant sunlight throughout the year except for a couple of days during monsoon that provides an ideal opportunity for the use of solar power in the islands. It can be seen that in Lakshadweep, the wind, wave and solar resources complement each other - June, July and August are months with the highest wave and wind speeds and lowest solar radiation. Thus, due the complementary nature of the wind wave and solar radiation, it is suggested to have plants with mix of all these sources for greater efficiency. Offshore hybrid plants would not place any additional stress on the already scarce land resources. Breakwaters of the proposed port in Agatti can be a suitable location for installing the hybrid energy systems.

Hybrid wind wave solar systems produce energy from wind, waves and solar in the same marine space, which may be an ideal renewable energy system of the future. Generating energy on a common platform from multiple energy sources would ideally improve the levelized cost of energy, increase the amount of power generated, and reduce the structural loading on the offshore platform. Future visions of hybrid wind wave solar systems include an offshore platform that optimizes use of the marine space as it generates significant power at a reasonable cost. The common platform enables maintenance and grid connections to be streamlined as compared with two separate systems and may provide improvements for both CAPEX and OPEX. In addition to technical and economic advantages, other marine users may appreciate the optimal use of space and less exclusionary zones of hybrid wind wave solar systems from social and environmental perspectives.

Biomass Energy

Biomass energy plant using coconut waste is another alternative for production of renewable energy. Typically, 10,000 MT to 15,000 MT of biomass is required per annum for a 1 MW plant (quantity depends on the calorific value of the biomass and the type of technology used – incineration or gasification). By processing 1000 – 1200 MT waste per annum, around 500 – 800 MT of usable biomass from coconut waste can be produced which can tentatively power a 30 – 80 KW unit, though a more detailed probe into the technical and the financial feasibilities is required.

Immediate Interventions for Lakshadweep

Encouraging solar power facilities with the private sector involvement.

As the country is galloping towards being a developed nation, the per capita consumption of energy is bound to increase. This will lead to a huge surge in residential demand for energy. All this growth cannot be at the expense of conventional sources of energy which are bound to be depleted in some centuries, if not decades. Lakshadweep is largely dependent on the diesel power generation (DG sets) systems, hence in-order to reduce the dependency on the fossil fuels, potentiality of solar power plants both on land and lagoon (floating solar plants) were explored.

Development of rooftop solar plants on the government institutions of 0.8 MW, floating solar plant of 1.7 MW and Development of 2.5 MW Floating solar plant as Early Priority Project can be implemented at Minicoy and Kavaratti as pilot basis.

Government subsidies to establish Ocean Thermal Energy Plants in Lakshadweep: OTEC being a new technology and involves huge capital cost, government and concerned ministries can extend subsidies and implement OTEC plant as pilot basis in one of the island.

Project Name	Rationale	Components	Costing
Ocean Thermal Energy Plant at Agatti	To Reducing the dependency on fossil fuels 24*7 power supply To Control pollution' Shifting into renewable sources of energy will eventually improves the sustainability index Tropical climate ensures the maximum productivity of solar panels	1 MW Ocean thermal energy plant by NIOT	200 cr
Floating Solar Energy Facility at Minicoy and Kavaratti Island		2.5 MW Floating Solar Power Plant - 37.5 Cr	75 Cr
Biomass Energy Plant, Kalpeni.		250 KW Biomass Energy Plant Waste compressing and packaging unit Raw materials storage Coconut frond chipping unit	3.96 Cr
Rooftop Solar, Minicoy.		Development of 0.8 MW Rooftop solar plant	5 Cr
Solar power facilities at Thinnakara		Instalments for Power Panels Battery Unit and Control Room Shelter for Employees	18.6 Cr
Solar power facilities at Cheriyam		Instalments for Power Panels Battery Unit and Control Room Shelter for Employees	26.6 Cr
Solar power facilities at Suheli Valyakara		Instalments for Power Panels Battery Unit and Control Room Shelter for Employees	26.6 Cr
Solar power facilities at Suheli Cheriyakara		Instalments for Power Panels Battery Unit and Control Room Shelter for Employees	26.6 Cr

5.4.Tuna fish export

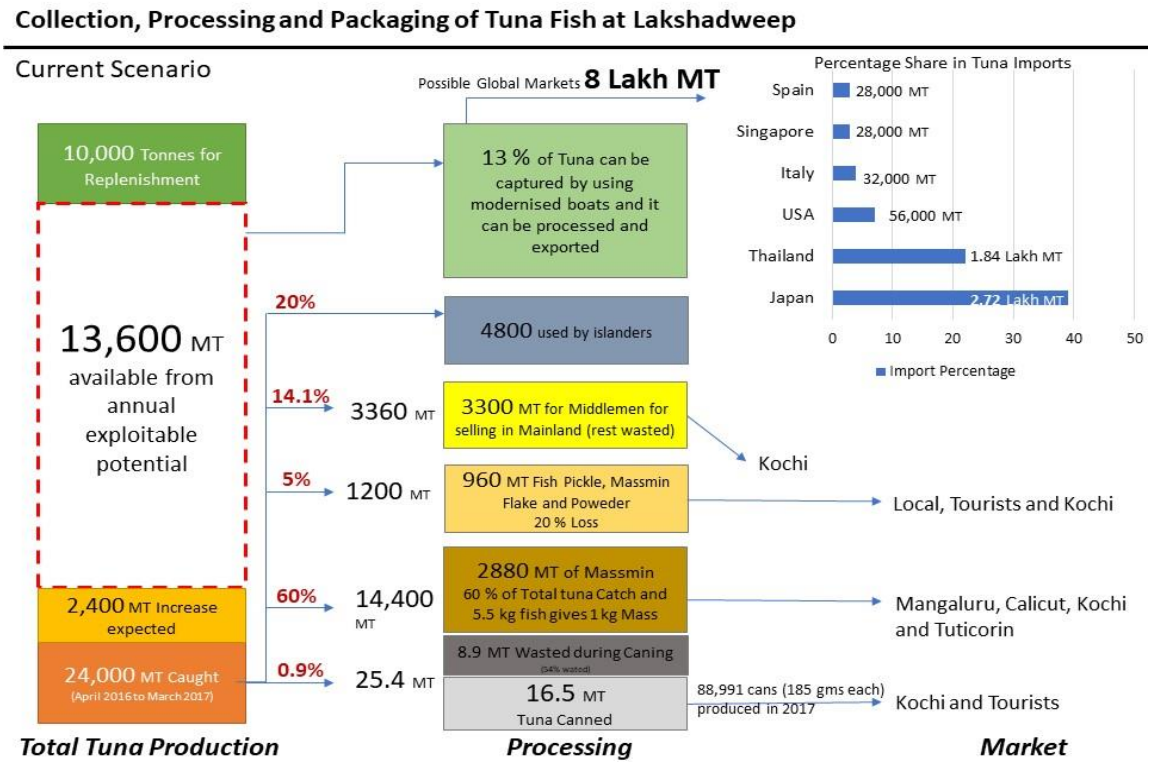
Lakshadweep has a vast lagoon of 4,200 sq km, territorial waters of 20,000 sq km, Exclusive Economic Zone (EEZ) of 4,00,000 sq km and a coastline of 132 km. The sea around Lakshadweep is rich in

resources and the main fishery resource in the islands is tuna. On a global scale, Tuna is one of the most fished saltwater fish and the third most traded seafood. This reveals a high potential for Lakshadweep Tuna to reach global markets where the profit margins are higher. Out of the whole fifty thousand metric tonnes of tuna available in Lakshadweep waters, around 48% i.e. 24,000 MT is captured and about 13 percent of it remains un-tapped. Out of total fish landings in Lakshadweep, 60 percent of it is processed by islanders into “massmin” and 20 percent is consumed by islanders. 25 MT of tuna is processed in Minicoy Tuna Canning Factory, which accounts to 0.9 percent of the total tuna captured.

Tuna catch in Lakshadweep islands

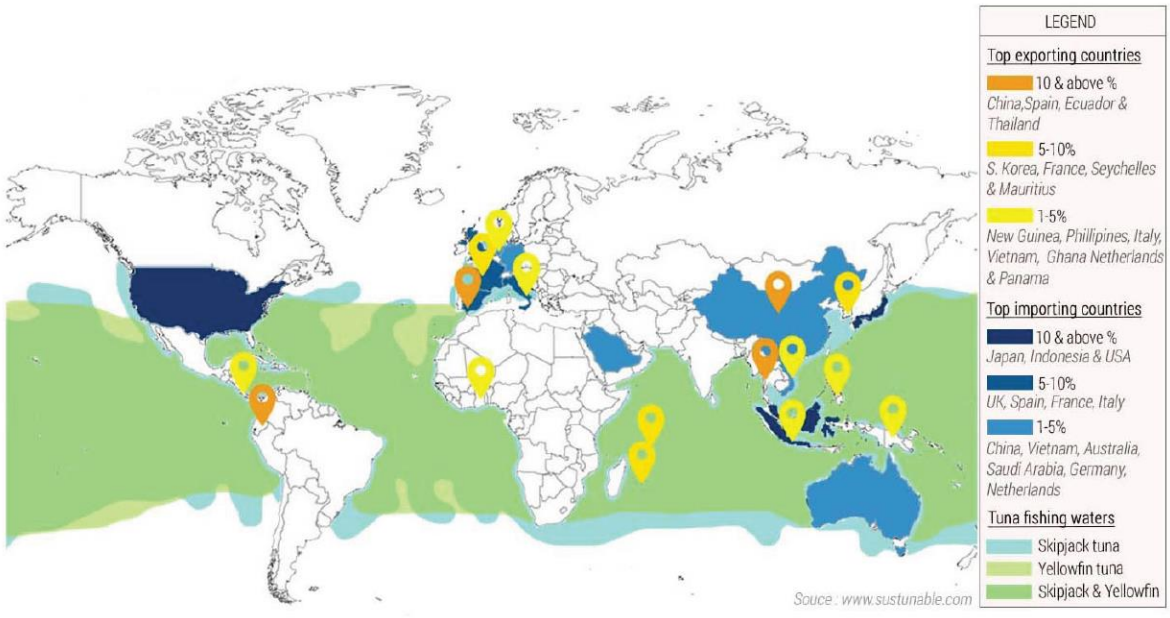
Tuna Canning Factory, Minicoy

Tuna is marketed in different forms all over the world - sushi grade, fresh, canned and dried. Fresh tuna from Lakshadweep is marketed in Kochi, in a price of 150 to 200 rupees per kg. Due to poor connectivity, islanders are not able to reach the fresh fish market in Kochi by themselves. Most of the cases they are reaching this market by middlemen, which somehow ends in loss. Thus, islanders process tuna into ‘massmin’ by drying and smoking. After processing into ‘massmin’, tuna reduces into one-sixth.



Potential Market for Tuna

The global tuna market reached a value of US$ 11.38 Billion in 2017. This market is being driven by factors such as increasing demand for processed/ready to cook tuna, rising disposable income and increasing per capita consumption. Tuna is a part of the mackerel fish family and a very important part of the global fishing scenario. Tuna is enjoyed worldwide freshly cooked, frozen, canned and as sushi. The top 10 exporters of Tuna are China, Spain, Equator, Thailand followed by South Korea, France, Seychelles, Mauritius, New Guinea, Philippines, Italy, Vietnam, Ghana, Netherlands, and Panama. The highest tuna consuming countries comprise of Japan, Indonesia and USA followed by the UK, Spain, France, Italy, China, Vietnam, Australia, Saudi Arabia, Germany, and the Netherlands. The following figure shows the top tuna exporting and importing countries around the world.



Southeast Asian countries, especially Thailand, Philippians and Indonesia are major exporters and importers of processed and canned tuna. Japan is the major importer of Tuna in the world. Out of 2.7 lakh MT tuna imported to Japan, 42,000 MT is canned tuna. Japan is also the highest consumer of sushi grade Tuna.

Thus, the availability of 8 lakh metric tonnes of tuna market per year makes it one of the most potential resources of Lakshadweep. This potential currently remains un-tapped.

Fisheries Sector Development in Maldives[13]

The fisheries sector has been an important and special industry in Maldives, being a small island nation which is highly dependent on its unique natural environment. The five-year average catch of Maldives in 2012-2016 was almost 1,30,000 MT. The sector generates more than 95% of its revenue through the export of fresh and processed fish products, particularly tuna. The main export markets include the EU, North America, Sri Lanka, and Thailand. The fisheries sector also functions as a major source of employment, with more than 17,000 fishermen in 2017, almost 10% of employment in the state, and more than 25% of total population is associated with the sector in some way.

It has been a top priority of the government to sustain the growth of fisheries sector. In the last 10 years, the government conducted a lot of industrial policies for the sector including **developing infrastructures for increased production of ice, established the cannery industry, and strengthened cold-storage facility, and gaining Marine Stewardship Council Certification for pole and line fishing**, which allows greater and improved market access to the sector. The current administration, which was established in November 2018, included seven pledges supporting the fisheries sector in its 100 - day action list:

(i) slash import duty on diesel for fishing boats
(ii) regulate issuance of permits for foreign fishing vessels
(iii) make bank loans and credit schemes accessible to fishermen
(iv) provide soft loans to fishermen for the installation of freezing systems on fishing boats
(v) make the constructed ice plants operational to provide ice to fishermen
(vi) introduce diamondback squid fishing for Maldives

[13]https://www.adb.org/sites/default/files/institutional-document/544946/maldives-economic-update-2019.pdf

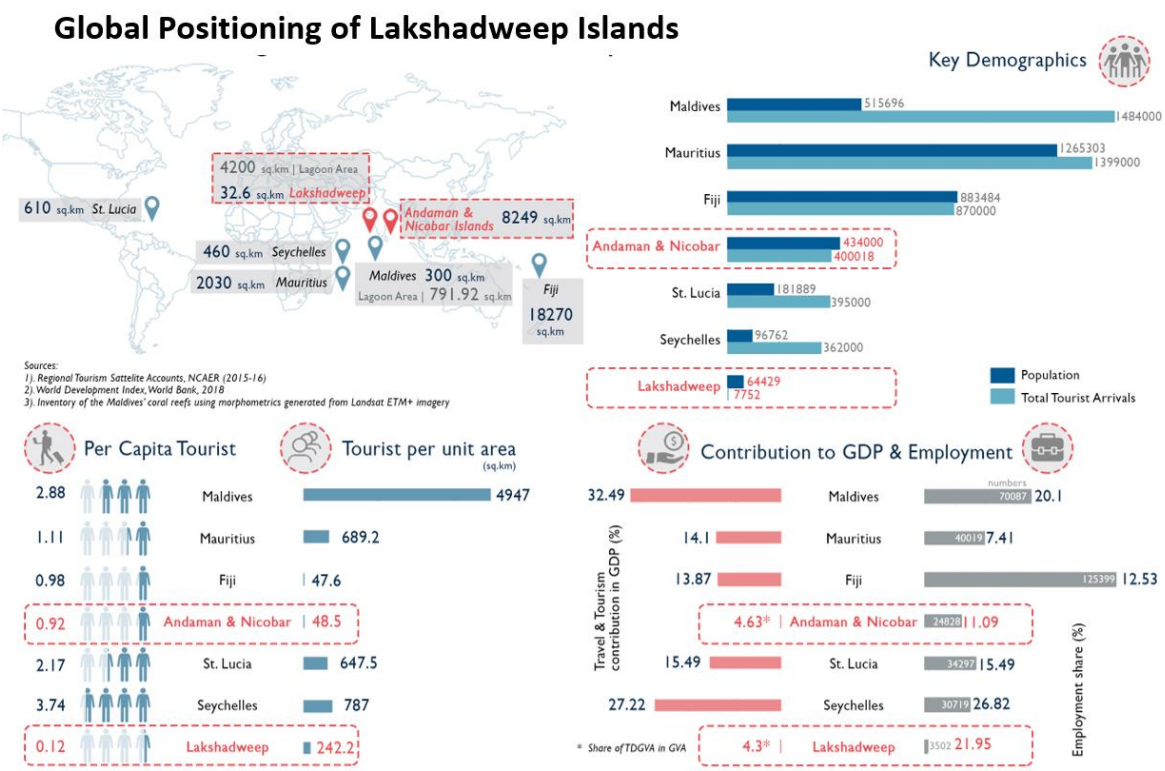
(vii) amend the Fisheries Act to support modernization of the sector.

The development of the fisheries sector is recognized as essential for the government strategy to promote decentralization from Greater Malé region to atolls. Sound development of the sector contributes to the improvement of the livelihood of people in islands in atolls.

5.5. Eco-Tourism Development

The tourism industry plays a vital role for the economy of Lakshadweep and the government continues to develop a wide range of tourism packages to enhance Lakshadweep's overall attractiveness for visiting tourists. The peak tourist season is from October to May and the off-season is from May to September. All the islands demonstrate the remote tranquillity of nature. The abundance of picturesque marine life, crystal clear water and enchanting coral atolls are manifestations of oceanic assets that hold both tourism and ecological value. The pristine silver sand beaches and luscious greenery contribute to a notable marine experience and adds to the unique charm of the islands providing myriad sights of coral reefs and vibrantly colored coral fishes. Most islands host various water sports. Options like scuba diving, swimming, rafting, snorkeling, windsurfing, parasailing, kayaking, water skiing, catamaran sailing, and deep-sea fishing are possible and available across islands open to visitors. A majority of these water sports are offered in Bangaram and Thinnakara, Minicoy and other inhabited islands also offers activities like shore snorkeling, shipwreck snorkeling, deep sea snorkeling, day turtle watch, kayaking, pedal boating, game fishing (deep sea and lagoon) jet skiing, sail boat, water ski, open water diving and scuba diving.

The development at Lakshadweep Islands has to be directed by initiatives and concepts that promote and nurture the island's budding tourism sector with the underlying objective of sustainable tourism. This includes improving informed participation of all relevant stakeholders by catering to the needs and aspirations of all involved through community-oriented tourism products and revenue generating tourist engagements under the umbrella of environmentally conscious regulatory mechanisms. This will ensure a high level of tourist satisfaction, steady growth of the local communities and uncompromised conservation and preservation of the delicate, natural features of the island system.



Currently, eco-tourism projects have been proposed to be developed under PPP model by Lakshadweep Administration. These **projects worth INR 806 Cr. are under pipeline which will add 370 premiums resort keys spread across Minicoy, Suheli and Kadmat**. These resorts will enable Lakshadweep to compete on somewhat equal grounds with other popular island tourism destinations. Under the guidance of the right regulatory mechanism, water and beach villas in Lakshadweep can be developed in a sustainable manner that reigns in the impacts of the tourism sector and prevents environmental damage.

5.6. Education

In Lakshadweep, there is need to improve the overall quality of education services, including the infrastructure present in the inhabited islands. The education system shall gradually adopt institutional strategies and policies and adequately resourced programs to ensure quality education opportunities for all age groups including adults. This will include special measures to address the needs of adult learners and children, youth and adults who remain unaware of the benefits of education in the long run. To ensure the acquisition of new knowledge and skills, the idea will be to promote the institutionalization of mechanisms and processes to assess skills requirements and ensure that curricula and education and training systems are responsive to the needs of the improvement in the local economy and society. Cross-sector approaches traversing education, science and technology, family guidance, employment, industrial and economic development, social welfare and public finance policies will be used.

The following table provides some recommendations/strategies to improve the education facilities in the islands-

Potential Projects	Brief Rational
Introducing well-resourced specialized classrooms like library, science & computer labs and practical subjects necessary to teach all curriculum subjects	To make it necessary for all the institutions with higher-secondary provision to provide smart-classroom facilities such as online classrooms, computer labs, interactive projectors. Moreover, making it mandatory to have a library (physical and online) in all the schools.
Collaborate with the schools in mainland, have exchange programs, summer schools, inter-school and state sports competition, study tours, camping trip etc.	This would create a strong bonding with other institutions and would also boost the exchange of ideas that would help in enhancing and developing the knowledge of the students and teachers. Moreover, signing MoUs with other organizations would also be an upright approach for positive growth in the education sector. These practices would be good sources of exposure for the students in various fields with respect to higher studies, co-curricular activities and career opportunities.
Developing higher education institutions according to the demand and locational importance	A fundamental idea of this plan is to introduce and rethink the need and development of new institutional arrangement that will provide the right environment to develop and implement a new system for national and international level opportunities within the islands. Educational institutions such as Institute for Advance Merchant Studies, Vocational Training Institute, Institute of Fisheries, Hotel Management Institution, Diving and Swimming Training Institute, etc., can be set up in the islands based upon the need and availability of resources.

6. Conclusion

The report comprises of detailed sectoral assessment including the budget overlay, expenditure, existing sectoral assessment and identification of relevant schemes and programs by central and UT governments. This also establishes the need for a reform in the particular section and identifies key anchor opportunity areas to act as enablers for such reforms. A further detailed potential opportunity areas of investment has been identified for critical sectors based on multiple stakeholder consultations and field visits.

Throughout this study various discourses have been pursued and concluded towards developing Lakshadweep islands with a sustainable and responsible approach. We have seen that majority of the UT budget share goes in sectors like power, transport, health etc and still implementation of major reforms is still a big challenge in Lakshadweep because of its uniqueness and locational disadvantages. The UT being largely dependent on central budget allocation for performing almost all of its functions and the revenue being generated from the sectors are negligible. Thus, it becomes imperative to introduce innovative financing for at least some of the critical and potential sectors and substantially reduce the risk on government behalf. All such critical sectors have been identified and the existing conditions and potentials are mapped. Three critical sectors of Agriculture, Power and Health are explored in detail to identify and list down potential areas for introducing private sector financing through PPP modes. Innovative technologies such as OTEC etc. would require financial supports and renewable energy subsidies to implement and establish in the islands.

Together, these sectoral opportunities will work in consonance to drive the islands economy, provide opportunities to the islanders, ensure infrastructural and individual development as well as secure revenue flow across islands. Identified projects with broad cost estimates complement sector wise strategies and implementation plans provide reckoning to its imminent materialisation on ground.

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