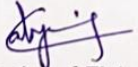


PRESS NOTE

The Directorate of Fisheries, A&N Administration proposes to frame Policy, namely '**Harnessing the Potentials of Blue Economy through Mariculture Policy,2025**'.

Accordingly, objection and suggestions are invited from stake holders/persons to be affected thereby upon the policy. The draft policy is available in the official website of A&N Administration <https://www.andaman.gov.in>. The objections and suggestions (if any) should reach the Directorate of Fisheries, A&N Administration, Sri Vijaya Puram either in writing or through email to [dirfish.and@nic.in](mailto:dirfish.and@nic.in) within 30 days from the date of publication of this Press Note.

  
Director of Fisheries



File No.: M/7/2023-ADF(HQ-I)-Fisheries-FISH\_AN/ 291  
**ANDAMAN AND NICOBAR ADMINISTRATION**  
**DIRECTORATE OF FISHERIES**  
**SRI VIJAYA PURAM**  
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Dated, the 18<sup>th</sup> February, 2025


Copy to:

1. The Chief Editor, The Daily Telegrams with the request to publish the above Press Release on 19/02/2025, 26/02/2025, 04/03/2025 & 11/03/2025.
2. The Chief Editor, Dweep Samachar with the request to publish the above Press Release on 19/02/2025, 26/02/2025, 04/03/2025 & 11/03/2025..
3. The Public Relation Officer, DIPT with the direction to publish the news item in the local newspapers.
4. The News Editor, All India Radio, Sri Vijaya Puram with the request to broadcast the Press Release in the **Pradeshik Samachar**.
5. The Programme Executive, Doordarshan Kendra, Sri Vijaya Puram with the request to broadcast the Press Release in the **Dweep Darpan Programme** for wide publicity.
6. The Executive Officer, SOVTECH, DBRAIT Campus, Old Pahargaon, Sri Vijaya Puram for uploading the Press Note in the official website of A&N Administration along with the draft Policy document for 30 days.

7. The Assistant Directors of Fisheries, Zonal Fisheries Office, **N&M Andaman/South Andaman/Nicobar** for information and wide publicity through respective Fisheries Sub-Stations.
8. Shri Amar Kumar Singh, IT Analyst, Directorate of Fisheries with the direction to coordinate with SOVTECH for uploading the press release in the official website of A&N Administration along with draft Policy document.
9. Notice Board of Directorate of Fisheries, Sri Vijaya Puram.

**Copy also forwarded to:**

1. P.S to Chief Secretary for kind information of Chief Secretary, A&N Administration.
2. P.S to Commissioner-cum-Secretary (Fisheries) for kind information of Commissioner-cum-Secretary (Fisheries), A&N Administration
3. P.S to Secretary (Fisheries) for kind information of Secretary (Fisheries), A&N Administration.

  
Director of Fisheries

## **DRAFT POLICY**

The Directorate of Fisheries, A&N Administration proposes to frame Policy, namely **'Harnessing the Potentials of Blue Economy through Mariculture Policy,2025'**. Accordingly, objection and suggestions are invited from stake holders/persons to be affected thereby upon the policy. The objections and suggestions (if any) should reach the Directorate of Fisheries, A&N Administration, Sri Vijaya Puram either in writing or through email to [dirfish.and@nic.in](mailto:dirfish.and@nic.in) within 30 days from the date of publication of this Press Note.

### **1. Short Title and Commencement: -**

- i. This policy may be called 'Harnessing the Potentials of Blue Economy through Mariculture Policy,2025'.
- ii. This shall come into force from the date of its Notification in the Official Gazette.

### **2. Introduction**

The Andaman and Nicobar Islands (ANI) is a tropical archipelago in the Bay of Bengal well known for its pristine beauty yet fragile environment. Situated in a strategically important location in the Indian Ocean region, the Islands remain the easternmost frontier of India. Marine ecosystems such as corals, mangroves, and seagrasses display rich marine biodiversity that provides invaluable services to mankind in the form of food, livelihood, recreation, and tourism. Considering the nature of the tropical archipelago, seafood remains a promising avenue for trade, export, and local consumption. Plenty of resources such as finfish, shellfish, mollusks, and cephalopods, are available as seafood. Particularly, the deep-sea fisheries resources such as tuna and tuna-like fishes are highly underutilized when compared to the estimated potential available for harvest. Coastal and inshore fishing practices are becoming competitive leading to a better harvest of resources however, for a long-term strategy and sustainable resource management alternative food production sectors such as Mariculture should be promoted to reduce the fishing pressure on the coastal fisheries sector. The vulnerability of small Islands to climate-induced extreme events also challenges the food security needs through the alternative sector. Considering this background information, the Mariculture policy guidelines for ANI were prepared by taking account of the fragile ecosystems, food-security demands, challenges in the coastal fishing sector, and the prospects for sea-based culture activities to promote livelihood, resilience, employment opportunities and boosting the seafood exports in the tropical archipelago of Andaman and Nicobar Islands.

### **3. Background**

Mariculture in this document is broadly defined as the culture, growth, and harvesting of marine organisms including plants in their natural environment (which includes estuarine, brackish, coastal, and offshore waters). In ANI, Mariculture activities were less developed in comparison to the freshwater aquaculture sector. This is because of the prospective scope available in the capture fisheries sector that provides fish supplies to cater to livelihood and market needs. The marine capture sector was also known to be underutilized over these years in the Islands which has led to an increased emphasis on bridging the gap between the potential and harvest in capture fisheries. However, the recent developments in the research field of Mariculture and the increased emphasis on fisheries and allied activities through national-level flagship programs such as Pradhan Mantri Matsya Sampada Yojana (PMMSY) have very well promoted the scope and importance of Mariculture as an alternative food production sector in the Islands. Mariculture in pre-tsunami times (i.e., before December 2004) was mostly pond-based culture activities undertaken by the research culturing commercially important species such as mud crabs, mullets, milkfish, seabass, and shrimps. The culture of marine ornamental fish such as clownfish was also successful in the pre-tsunami period as institutional research program in research institutes. Post-tsunami the land topography of the Islands was heavily altered leading to the subduction of land and inundation by seawater. Seawater has permanently stagnated in some places whereas, in few places, it was partially inundation due to tides. During the post- tsunami period, Mariculture activities were focused on diversification through aquaculture activities such as open-sea cage culture, seaweed culture, mud crab fattening, shrimp farming, and milkfish culture. Even the attempts at pearl oyster culture were also proven to be successful. Although these activities have proven to have potential, only very few entrepreneurs have come forward in activities limited to crab fattening and shrimp farming. There are several operational issues like infrastructure, and logistical constraints that were often cited by the stakeholders that have hindered sectoral growth. Andaman Nicobar Islands have a lot of marine protected areas that are rich in marine biodiversity. The marine protected areas will be avoided for culture-related activities, thereby protecting the exploitation of ecologically sensitive areas for fishing by conserving resources.

### **4. Brief profile of Mariculture in the Islands**

Mariculture includes the culture of marine finfish and shellfish in open water and estuarine/brackish water conditions. Mariculture activities in ANI are mostly focused on the popularization of open sea cage culture, seaweed culture, crab fattening, and shrimp farming. In Andaman and Nicobar Islands, Mariculture is still in the developing stage as open sea cage culture and seaweed farming are in the research and development stage

whereas shrimp farming and crab fattening were undertaken by private entrepreneurs in the Islands. The open sea cage culture demonstration unit is at present functional at ACOSTI-NIOT, Sri Vijaya Puram wherein the HDPE cage units are deployed in North Bay, Sri Vijaya Puram to popularize cage culture in the Islands. The cage culture unit has been functional since 2011 and has been actively engaged in popularizing cage culture through the culture of candidate finfish such as Asian seabass and Cobia. Further, seaweed cultivation trials are also undertaken by institutes like ACOSTI-NIOT, ICAR-CIARI, and CSMCRI in different regions of the ANI. Approximately twenty farmers are engaged in shrimp farming and crab fattening practices on the Island and all these farming activities are centered in the proximity of Sri Vijaya Puram, South Andaman. Live mud crabs are exported to foreign markets on a seasonal basis whereas the shrimp culture caters to the local demand as well as transportation to the mainland in frozen form. During the pre-tsunami of 2004, brackish water finfishes such as mullets, milkfish, and seabass were cultured in earthen ponds, for research and demonstration purposes however, post-tsunami due to land subduction issues, these areas were submerged and are unutilized. Since then, Mariculture activities stagnated for a few years post-tsunami however the sector started emerging post-2010 due to emerging technologies and government flagship programs in the field of open sea cage culture, seaweed aquaculture, and finfish culture practices.

## **5. Purpose and Approach**

The lack of a robust policy and roadmap has resulted in poor growth of the aquaculture sector in the Islands. The purpose of the policy guidelines is to streamline the networking among the stakeholders engaged in the fisheries and aquaculture sector and to establish an operational framework for sustainable management of the aquaculture sector in the Islands. A series of stakeholder meetings were organized by the Andaman and Nicobar Administration to discuss and deliberate on the points that could strengthen the seafood exports from the Islands. The approach is mainly designed by taking the ideas of all stakeholders and developing a policy guideline that could be imperative for boosting the seafood trade as well as a roadmap that could serve in identifying the short-term and long-term strategies envisioned for sectoral development in the Islands.

## **6. Vision**

To tap the potential of the Island's Blue Economy and to develop Andaman and Nicobar Islands as a commercial hub for seafood trade to Southeast Asian region.

## **7. Mission**

An end-to-end transformation and strategic planning in the aquaculture sector by engaging the stakeholders and key players from government agencies, research organizations, extension departments, fish farmers, etc towards boosting the trade opportunities, employment generation and sectoral reformation.

## **8. Objectives**

1. To bring a stimulus into the Mariculture sector and to capitalize on the market potential to boost seafood exports.
2. To promote environment-friendly investment in this sector for sustainable development in the Islands.
3. To promote the aquaculture sector as an important component of the Blue Economy growth of the Islands.
4. To promote sectoral support services that could boost aquaculture production.
5. To promote research, extension, and capacity-building programs for sector development in the Islands.

## **9. Responsible authorities**

The Andaman and Nicobar Administration through the Directorate of Fisheries would be responsible for the implementation of the outlined Policy.

## **10. The legal and administrative framework**

Mariculture involves the use of land, water, sea area, and fish species, thus raising legal and institutional issues and the use of natural resources. Andaman and Nicobar Administration with its constituent departments shall approve the process pertaining to land use, sea/inundated areas use, species determination, etc. Any issue concerning change of land use, or allocation of sea area/inundated area for Mariculture use shall be placed before Hon'ble Lt. Governor, A&N Islands for consideration.

### **A) Sea-based culture**

#### **1) Open-sea cage culture**

1.1 Andaman and Nicobar Islands are known to have numerous protected sites that are conducive to open-sea cage culture. The Directorate of Fisheries, A&N Administration in consultation with Research organizations such as NIOT, CMFRI, CIARI, RGCA, etc. shall identify the sites that are suitable for open-sea cage culture using in-situ surveys and geospatial tools.

The following sites have so far been identified for this purpose: -

- (i) Shoalbay
- (ii) North bay
- (iii) Chidiyatapu
- (iv) Minnie Bay

Adequate care will be taken by the Survey team in the criteria selection for cage culture considering the ecological and environmental factors in the Islands. Site suitability studies shall be completed within 15 days from the date of notification of this Policy and shall furnish a list of suitable sites within 07 days after completion of site suitability studies and decision.

- 1.2 For the declaration of new sites in the future, a Committee chaired by the Director of Fisheries shall carry out the site suitability studies and furnish the list of new sites to the A&N Administration for requisite development.
- 1.3 The list of sites would be put to Auction on PPP mode at no cost to the A&N Administration and will be allocated to the H1 bidder through an Open e-tender. The allocation will be done by execution of the Leasing Agreement for a lease period of **10 years**, extendable to a period as decided by the Competent Authority.
- 1.4 A single Window Mechanism the Directorate of Fisheries shall process the bidding for leasing of the suitable sites.
- 1.5 A minimum sea area of 150m<sup>2</sup> shall be made available to a farmer/entrepreneur bidder depending on the total area of the suitable site. This would ensure that multiple stakeholders shall be engaged to operate the cage culture activities in leased waters. Sites shall be accordingly earmarked by the Directorate of Fisheries and allocated after bidding through PPP Mode.
- 1.6 The successful bidder will be allowed to construct a temporary roof structure on cage platforms as well as a temporary shore-based facility near the cages for watch and ward as cage culture activities are prone to vandalism.

## **2) Type of Open-sea cage culture**

Andaman and Nicobar coasts experience extreme climatic events such as heavy rainfall, cyclones, storm surges, etc. Under such a scenario, HDPE/GI cages would be robust and sturdy to withstand such extreme events in comparison to wooden cages. However, the choice of cages to be deployed will be with the successful bidder. The size and shape of the cages shall be determined by the farmer based on the investment, site, and as per technical guidance from the Directorate of Fisheries, NIOT, CMFRI, CIARI, RGCA, etc.

### **3) Open-sea Cage management practices**

- 3.1 Training and capacity-building programs shall be organized by the Directorate of Fisheries in collaboration with the research institutes on cage fabrication, culture, and management practices. The Department of Industries shall also be actively involved in cage fabrication-related training programs.
- 3.2 The Directorate of Fisheries shall develop a record management sheet for fair and transparent management in cage farming practices. The sheet shall encompass details such as feeding, stocking density, mortality, disease incidences, treatment provided, etc. This would ensure a fast-track management of ongoing activities. The record sheets shall be verified Quarterly by the Directorate of Fisheries.
- 3.3 Lobster fattening in sea cages shall also be promoted based on the wild stock assessment and availability of juveniles of lobsters.

### **4) Finfish hatchery requirements**

- 4.1 A marine finfish hatchery shall be developed to meet the growing demand in the Islands for fish seed. The establishment of nuclear seed production or brooder collection centers would be encouraged in the private sector to meet the current seed demand in different districts. The Directorate of Fisheries will support the endeavors of private enterprise through Govt. of India schemes and technical support.
- 4.2 Large commercial multispecies marine finfish hatcheries will be encouraged to be established by the Private sector/Directorate of Fisheries/Research Organizations. The Directorate of Fisheries shall take up the case with NFDB, Hyderabad for having such facilities in the Islands.
- 4.3 Latest technologies available for finfish breeding and seed production of commercially important fish species such as Asian Sea bass (*Lates calcarifer*), Cobia (*Rachycentron canadum*), and Indian pompano (*Tracynotus blochii*) shall be adopted by the investors.

### **5) Fish Seed transportation**

- 5.1 Fish seeds that are required to be stocked in the open sea cages are to be procured from the mainland hatcheries that could be either from Government or private sources. The Government or private hatcheries shall also provide a quarantine health certificate on the status of the fish seed along with the consignment. The details shall be verified by a nominated member of staff from the Directorate of Fisheries for further clearance of the culture operations. The period for clearance shall be kept at a minimum considering the stress associated with mortalities in fish seeds.
- 5.2 The list of Government as well as private hatcheries that shall supply the fish seeds for rearing in open sea cages shall be enlisted by the Directorate of Fisheries and may be updated on a timely basis for the benefit of the stakeholders.



5.3 Import of smaller size fish seeds are prone to high mortality during rearing due to cannibalism, diseases, microbial load, and water quality issues till they reaches to 100 g size (stockable). Therefore, intermediate-level arrangements through the government or private firms are allowed in seed import, rearing up to stockable zero size, and reselling of supply.

5.4 Fish seeds procured from mainland hatcheries need to be conditioned in nurseries for further stocking in the cages. The cages fabricated shall also have a provision to hold nurseries. The seed in rearing facilities shall have quarantine facilities to avoid disease transmission.

5.5 Directorate of Fisheries in collaboration with NFDB, Hyderabad shall work out incentives or subsidies that could reduce the cost of transportation.

5.6 In general, an Aquatic Quarantine Facility (AQF) with a PCR lab shall be developed in Sri Vijaya Puram by the Directorate of Fisheries in collaboration with Research Institutes to rapidly diagnose any possible diseases.

## **6) Insurance to climate-driven vulnerabilities**

The Andaman and Nicobar archipelago is highly vulnerable to extreme events and uncertain weather conditions that prevail over a period considering the Southwest and Northeast Monsoon. Such events could potentially disrupt the culture operations leading to loss of infrastructure as well as farmed fish. Insurance for Mariculture-related activities shall be pursued in consultation with the lead bank and other banks.

## **7) Exotics/Non-natives**

The introduction of non-natives, hybrids, or species having invasive nature that could potentially disrupt the ecological balance shall be carefully examined before introduction in the Islands. A Risk Intelligence Team headed by the Director of Fisheries, A&N Administration with representatives from the Department of Environment & Forests, Department of Science & Technology, and Research Organizations like ICAR-CIARI and NIOT shall be constituted by the Directorate of Fisheries to examine the case of the introduction of exotics/non-natives in the Islands. The findings of the same shall be submitted to the Aquaculture Authority of India and MoEF&CC for recommendations before allowing/not allowing any exotic /non-native species.

## **8) Marine ornamental fish culture**

Marine ornamental fishes like anemone fishes in the coral reef areas offer tremendous scope for breeding, seed production, and entrepreneurship activities in the Islands.

The technologies available with institutes such as CMFRI, CIBA, and CIARI shall be popularized through training programs in the Islands. Entrepreneurs shall be identified in the Islands and the promising technologies shall be commercialized to the private investors. Research and development activities shall be promoted by research institutes and small fund grants can be encouraged by the Directorate of Fisheries, NABARD, etc to promote such programs.

## **9) Seaweed aquaculture**

- 9.1 The introduction of *K. alvarezii* shall be withheld considering the ambiguity in their environmental impacts, especially on the coral reefs. EIA for the introduction of this species shall be conducted, and the prospects of their introduction shall be examined by the Directorate of Fisheries.
- 9.2 The locally available seaweed such as *Gracilaria sp*, and *Acanthopora sp* could be tried for aquaculture. Research institutes shall focus on standardizing aquaculture techniques of *Gracilaria*, and *Acanthopora* species biomass production in the Islands.
- 9.3 The culture technology of brown seaweeds such as *Sargassum sp* is not standardized as of date. However, they have potential in industrial applications. Efforts shall be made to standardize the local culture technology of the species.
- 9.4 Considering the sensitive ecological habitats of seaweed, their wild harvesting for commercial/industrial purposes shall be prohibited till the proper stock assessment is done annually. Annual quantity to be harvested may be permitted after stock assessment for each area.

## **B. Brackish water aquaculture**

### **1. Background:**

The potential of brackish water aquaculture in strategic locations like Andaman and Nicobar is enormous, however, yet to gain a nation-wide attention. The National Action Plan on Mission Saline/Brackishwater aquaculture-2022 was developed for the period 2017-22 by the Government of India. This policy therefore also addresses the significance of the allocation of funds by Govt. of India and resource deployment for the development of this sector in the A&N Islands.

- 1.1 Post-tsunami and earthquake of 2004, there had been a widespread inundation/submergence of land area by sea water which can be suitably utilized for brackish water aquaculture activities in the Islands.

The list of identified sites suitable for the purpose is given as under:

<b>Sl.No.</b>	<b>Village</b>	<b>Survey no.</b>	<b>Area (in hectares)</b>
1.	Ograbraj	176	3.3800
		177	1.9500
		179	1.4300
		183/2	1.0
		181	1.54000
		182/2	0.6975
	<b>Total</b>		<b>9.9975</b>
2.	Wandoor	165/1	2.8214
		165/3	7.5879
		181/1/P	1.2966
		186/1	0.8400
		186/3	0.800
		193/P	0.7680
	<b>Total</b>		<b>14.1139</b>
	<b>Grand Total (1 +2)</b>		<b>24.1114 hecets</b>

- 1.2 For the declaration of new suitable sites, survey number-wise inventory of such suitable sites will be made by the Directorate of Fisheries in consultation with Revenue Department, ISRO/NSIL, NIOT, and NCCR after completing the detailed survey by a Joint Inspection team headed by Joint Director (Fisheries) and representative of Organizations mentioned above.
- 1.3 The detailed list of suitable sites along with survey number, area in each survey number, ownership of the land, etc shall be furnished to the Director of Fisheries for taking measures for allocation of the submerged land for Brackishwater Aquaculture activities.
- 1.4 The list of sites would be put to Auction on PPP mode at No-cost to the A&N Administration and will be allocated to the H1 bidder through an Open e-Tender. The allocation will be done by execution of a Leasing Agreement for a lease period of 10 years.
- 1.5 A Single Window Mechanism in the Directorate of Fisheries shall process the bidding for leasing the suitable sites.
- 1.6 A minimum land area of 1.00 hectare shall be made available to a farmer/entrepreneur bidder depending on the total area of the suitable site. This would ensure that multiple stakeholders shall be engaged to undertake brackishwater aquaculture activities in the allocated sites. Sites shall be accordingly earmarked by the Directorate of Fisheries and allocated after bidding through PPP Mode.
- 1.7 The successful bidders will be allowed to construct temporary structures for watch & ward other purposes related to brackishwater aquaculture activities.

## **2. Shrimp farming**

- 2.1 Shrimp farming activities are governed by the latest norms of the Coastal Aquaculture Authority (CAA), Chennai. Directorate of Fisheries, Andaman and Nicobar Administration to mandatorily register the new and existing shrimp farms or hatcheries as per CAA norms 2024(amendment). No shrimp farm operations shall be allowed without the Registration.
- 2.2 As per ICAR-Central Institute of Brackish Water Aquaculture (CIBA), culture technology in shrimp farming has been well standardized in India for species such as *Litopenaeus vannamei*, and *Penaeus indicus*. (Annexure-I) The shrimp farmers shall adopt the culture practices for shrimp farming accordingly.
- 2.3 Directorate of Fisheries with technical support of RGCA/CIBA to establish shrimp hatchery for seamless distribution of shrimp seeds to farmers in A&N Islands. The Directorate of Fisheries will regulate the breeding of any one or combination of the above-said variety of shrimp in the Andaman and Nicobar Islands.
- 2.4 ICAR-CIBA has standardized feeds for shrimp culture activities. The Directorate of Fisheries will publish the shrimp feed details on its official website for ease of procurement by the shrimp farmers.
- 2.5 Directorate of Fisheries to regulate the use of banned antibiotics. A list of such banned items is available on CAA and shall be made available on the Official website of the Directorate of Fisheries, Andaman and Nicobar Administration. Also, Probiotics recommended by CAA used for soil and water conditioning are to be mandatorily regulated by the Risk Intelligence Team constituted in the Directorate under the current Policy. The Directorate of Fisheries will conduct monthly awareness drives regarding the use of such banned antibiotics.
- 2.6 The Department of Fisheries along with the Drug Control Department will ban the import of these antibiotics in Andaman and Nicobar Islands.
- 2.7 Disease management in shrimp farming: To reduce the risks of the introduction and spread of aquatic animal diseases, species-specific awareness drives for Good Aquaculture Practices (GAPs) are developed and implemented. To reduce the risks of the introduction and spread of aquatic animal diseases, species-specific Good Aquaculture Practices (GAPs)/ Best Management Practices (BMPs) shall be made amongst the Aquaculture farmers. Regular training shall be organized by the Directorate of Fisheries in coordination with Research Organizations both at the National level and international level.
- 2.8 Use of medicines in Mariculture will be in accordance with CAA norms 2024 (amendment) that ensure effectiveness, safety of public and animal health, and protection of the environment.

- 2.9 The Directorate of Fisheries shall establish Proper quarantine facilities, and biosecurity should be ensured with advisory/guidelines for any kind of disease outbreak in A&N Islands.
- 2.10 Shrimp seeds should be procured only through the hatcheries enlisted by the Coastal Aquaculture Authority. The Directorate of Fisheries shall ensure the same in the verification process before clearance of seed import from the mainland.  
An Aquatic Quarantine Facility (AQF) and PCR Laboratory for disease management shall be established at the Island level. However, the existing PCR laboratory facilities available in NIOT, RGCA, and ICAR-CIARI can be utilized at Sri Vijaya Puram. The existing facilities of RGCA, ICAR-CIARI through programs such as National Surveillance for Aquatic Animal Diseases shall be utilized for testing the diseases as per the OIE list.
- 2.11 Seed import formality as per the existing scenario shall be continued however, the source hatchery for procurement should be as per the list identified by CAA.
- 2.12 **Shrimp hatcheries:** The establishment of private hatcheries for shrimp seed production shall be entertained as per the guidelines of Coastal Aquaculture Authority in consonance with the requirements of the Andaman and Nicobar Administration along with Rajiv Gandhi Centre for Aquaculture (RGCA).
- 2.13 Shrimp farming is identified as a key driver for boosting seafood trade in Andaman and hence, the Administration shall provide all possible support for the establishment of shrimp hatcheries with a single-window clearance through the Directorate of Fisheries.
- 2.14 Production of SPF (Specific Pathogen Free) shrimp seeds shall be promoted to reduce the risk of disease incidences in the Islands. RGCA and Directorate of Fisheries shall regulate this activity.

### **3. Mud Crab farming/ fattening**

- 3.1 Mud crab (*Scylla spp*) fattening is one of the active brackish water aquaculture sectors in the Islands. For mud crab farming, proper pond preparation procedures should be followed as per the CAA/NFDB guidelines.
- 3.2 Fattening of mud crabs in pen cages, bamboo, GI, or FRP cages will be promoted by the Department of Fisheries, private enterprises, SHGs, and Cooperatives.
- 3.3 Vertical farming units of mud crabs shall be promoted in A&N Islands considering the existing land-based constraints and limitations.
- 3.4 The water crablets are collected from estuarine waters and are used for fattening purposes. For better regulation and protection of the juvenile population, the Directorate of Fisheries shall regulate the collection of baby crablets (less than 200g) to be prohibited as a punishable offense. The export of mud crabs is less than 300g and harvesting of berried crabs is also prohibited for sustaining the population.

- 3.5 Mud crab hatchery technology has been developed and standardized by RGCA. As a long-term strategy, the technology shall be promoted by the establishment of a hatchery in the Islands through private investors with Govt. incentives. Till such facility is developed and operational, import mud crab seeds following quarantine guidelines, and certification norms through the Directorate of Fisheries will be permitted.
- 3.6 Coastal area / Mangrove area mud crab sea ranching shall be initiated by Directorate of Fisheries for replenishment of depleting mudcrab resources
- 3.7 Directorate of Fisheries along with ICAR-CIARI, NIOT, and CMFRI will conduct joint training programs for Farmers, SHGs, enterprises, etc. on Mud crab fattening.

#### **4. Mussel culture practices**

- 4.1 Green mussels are known to have a limited wild distribution in the Andaman Islands in the tidal creeks.
- 4.2 The culture of Green mussels (*Perna viridis*) have been standardized for commercial scale in India and a few experimental trials were undertaken by Research Institutes in Andaman to harness the potential of green mussels. Green mussel culture in submerged creek areas shall be promoted upon undertaking a preliminary survey in the identification of green mussel seeds in South Andaman creeks.
- 4.3 A Joint team involving the Department of Fisheries, ICAR-CIARI, NIOT, and RGCA will be identifying the suitable sites where green mussel resources are located to determine their extent and abundance so that its culture activities can be planned.

#### **C.1. Funding Research programs**

- 1.1 The Directorate of Fisheries, Andaman and Nicobar Administration shall earmark funds that would facilitate Aquaculture research and development activities in the Islands.
- 1.2 The Research Organizations working in the Islands shall be encouraged to avail themselves of the facility by undertaking the R & D activities for sectoral development in the Islands.

#### **C.2. Good governance principles**

- 2.1 An Andaman and Nicobar Island Mariculture Authority shall manage the development of the Mariculture sector following the guidelines outlined under the Chairmanship of Secretary (Fisheries) with members as concerned Deputy Conservator of Forests, Chief Port Administrator, concerned Deputy Commissioner, Member Secretary, ANPCC, Director of Industries, Director/representative, ICAR-CIARI, Deputy Director, RGCA, Officer-In-charge, ACOSTI-NIOT with Director of Fisheries as Member Secretary.

- 2.2 Aquaculture activities are subjected to regulatory frameworks including the need for a license or registration to undertake culture activities with appropriate standards as per International or National Development plans. The Authority shall ensure that the entire Mariculture activity both sea-based culture and land-based aquaculture is practiced as per prescribed norms of Govt. of India.
- 2.3 The Department of Fisheries under the Director of Fisheries shall ensure a robust monitoring and evaluation process to ensure the compliance of good governance principles in the aquaculture farms operated in the Islands.

### **C.3. Linkages and collaboration**

- 3.1 Organizations such as Central Marine Fisheries Research Institute (CMFRI), Central Institute of Brackishwater Aquaculture, National Institute of Ocean Technology (NIOT), Central Institute for Brackish Water Aquaculture (CIBA), Central Salt and Marine Chemicals Research Institute (CSMCRI) and Rajiv Gandhi Centre for Aquaculture (RGCA), have significant roles in technology development and promotion of Mariculture in India. The Directorate of Fisheries will work closely with these organizations and with the private sector, fishermen co-operatives, and Self- Help groups (SHGs) in a synchronized manner to promote Mariculture technologies in the Islands.
- 3.2 The Andaman and Nicobar Islands are in proximity to Southeast Asian countries like Thailand, and Indonesia where Mariculture and hatchery technologies were well developed. Establishing regional linkages with the neighboring countries with a broad vision of boosting seafood exports and trade could benefit the Mariculture sector in the Islands.
- 3.3 National institutes of repute in aquaculture like CMFRI, CIBA, RGCA, and NIOT shall be consulted to nominate designate and nominate a link officer with desired specialization to with whom the Andaman and Nicobar Administration shall coordinate the aquaculture development projects.

### **8 Regulatory framework of Mariculture activities:**

Mariculture in open sea conditions and coastal areas often generates pollutants that might have adverse environmental impacts if unregulated. The case would be more pertinent in the Andaman and Nicobar Islands due to the vast spread of coral reefs across the archipelago. Marine National parks and sanctuaries also need to be dealt with carefully considering various factors as they are ecologically sensitive areas. Site selection studies using multi-criteria-based methods are crucial in mitigating ecosystem adverse impacts. For open sea cage culture, seaweed aquaculture, and brackishwater aquaculture (shrimp,

crab, and fish culture), GIS-based site suitability studies should be employed taking multiple criteria that are essential to determine a site suitable for Mariculture without compromising the environmental factors. Coastal Aquaculture Authority (CAA) regulates the activities connected with coastal aquaculture in coastal areas of India. In the case of coastal aquaculture activities like shrimp farming, finfish culture and crab fattening in ANI, the guidelines outlined by Coastal Aquaculture Authority (CAA), Chennai shall be implemented by the stakeholders. The Department of Fisheries, Andaman and Nicobar Administration shall ensure that the farms operated in the Islands are registered and operated as per the guidelines of the Coastal Aquaculture Authority. A separate guideline for leasing out the sites for coastal aquaculture activities shall be developed for the benefit of stakeholders. In the case of open sea cage culture, the escape of farmed fish from cages could be detrimental to native species through competition for food, space, spread of diseases, and the chemical effluent discharge from farms.

Hence the species introduction for aquaculture purposes should be cleared up with the approval of the Risk intelligence team constituted by the Department of Fisheries. Open sea cage culture practices near coral reefs could have adverse impacts due to heavy nutrient discharge from aquaculture activities. Multi-criteria based site selection studies should consider these factors while choosing the culture site in the archipelago. Other regulatory actions shall be governed by the stakeholders from different government departments and private parties related to Mariculture activities in open sea conditions as well as estuarine, creek, and nearby shore regions.

The regulatory framework for commencement of activities with multi-agency roles and responsibilities are detailed below.

SI. No	Activities/Regulating frameworks	Associated Departments/ institutions	Role of Departments/institutions
1.	<b>Environmental Impact Assessment (EIA)</b> <ul style="list-style-type: none"> <li>• Site selection and carrying capacity</li> </ul>	Department of Environment & Forests, A&N Administration ACOSTI-NIOT, Dollygunj	The Institutions/departments has to conduct detailed Environment Impact
	<ul style="list-style-type: none"> <li>estimation</li> <li>• Environmental impact assessment</li> <li>• Prediction, precaution and adaptation of environmental impact.</li> </ul>	ICAR-CARI, Garacharma. Department of Fisheries, A&N Administration	Assessment for undertaking Mariculture by analyzing the probable ecological impacts of proposed endeavors taking also into account the inter connected social economic, cultural and human health impact both beneficial and adverse.



2.	<b>Site allotment and licensing</b> <ul style="list-style-type: none"> <li>• Demarcation of identified sites</li> <li>• Formulation of licensing/allotment criteria and duration.</li> <li>• Periodical review of allotted sites and extension/cancellation of allotment.</li> </ul>	Port Management Board. Department of Environment and Forests. Directorate of Shipping Services. Indian Coast Guard ICAR-CARI, Garacharma ACOSTI-NIOT, Dollygunj Department of Fisheries, A&N Administration.	Timely identification of the beneficiaries, finalization of sites, allotment with specific terms and conditions. Extension/cancellation of lease/licensing as per periodical review of joint committee for promotion of Mariculture activities.
3.	<b>Imports/supply if inputs and seeds</b> <ul style="list-style-type: none"> <li>• Identification of Mariculture seed suppliers, Hatcheries</li> <li>• Identification of feed and other supply chain</li> <li>• Ensuring of entry of diseases free seeds to the islands and its proper quarantine.</li> <li>• Exploring possibility of creation of hatcheries, seed banks and input manufacturing units in the Islands.</li> </ul>	Coastal Aquaculture Authority, ICAR-CMFRI ICAR-CARI ACOSTI-NIOT MPEDA-RGCA Department of Fisheries	A high level of technical committee to be constituted by involving the member institutes for procurement of disease free Mariculture seeds from Government hatcheries/Government approved hatcheries of mainland and approved hatcheries of neighboring countries. The disease surveillance of cultured species will be the responsibility of these institutes/committee. The feed and other inputs of Mariculture activities to be procured as per the suggestion of Mariculture division ICAR-CMFRI Cochin/MPEDA-RGCA, Sirkali.
4.	Post-harvest management and marketing.	Export Inspection Agency, Kolkata MPEDA, Cochin Major approved processing unit of India Department of Fisheries, A&N Administration.	To ensure timely harvest, processing, trade and transport/Export of the produce for promotion of Mariculture and thereby fisheries and aquaculture sector of A&N islands.
5.	Solid waste management, effluent treatment and its safe discharge.	Department of Environment and Forests, Department of Science and Technology, Coastal Aquaculture Authority, ICAR-CARI Department of Fisheries, A&N Administration.	For Effective management and disposal of waste and discharge from Mariculture sites by formulating a strict management protocol.

## **9 Capacity building requirements of stakeholders**

One of the major impediments in initiating Mariculture activities in the Islands is inadequate technical manpower for imparting skill development among the stakeholders of the Islands. The Mariculture activities specially need knowledge on Marine finfish/Shellfish/Algal culture, Nutrition and its Health Management. The fabrication of cages, enclosures/rafts, nets etc. using different kinds of materials is the basic requirement of Open sea cage culture, Seaweed farming and Pearl culture.

The local research institutes such as NIOT, ICAR-CIARI, RGCA, and the Department of Fisheries shall play a major role in fulfilling the capacity building needs of the stakeholders. Other Institutes working in Mariculture such as CMFRI, CIBA, and CSMCRI may also be involved when required in capacity-building programs. The Department of Fisheries shall develop an annual training calendar of events that would fulfil the requirements of stakeholders in the Mariculture sector. Tailor-made capacity building modules shall be developed in close collaboration with the research organizations.

The funding of NFDB, Hyderabad to be utilize for all such kind of programmes.

Major training and capacity building areas under Mariculture are identified as under:

1. Breeding and Seed production of marine fin-fishes.
2. Fabrication of cages and rearing of marine finfishes through open sea cage culture.
3. Nutrition and health management in open sea cage farming.
4. Various method of seaweed farming.
5. Seaweed processing and product development.
6. Marketing and trade of Mariculture produce.
7. Coastal aquaculture practices.
8. Marine Pearl farming- principal and practices.

Exposure visits to foreign countries and mainland institution can also be considered for understanding and adoption of technological advancement in Mariculture sector.

## **10. Resource allocation and Funding**

To achieve rapid and sustainable Mariculture development, require more intensive and coordinated institutional support and direct involvement of Fishermen, Fish Farmers and other stakeholder population of the Islands. The Mariculture projects to be categorized as Large, Medium and Minor activities for proper resource allocation and onboarding. In the large projects, option to be provided for creation of Major Open Sea Culture, Seaweed Farming and Pearl culture parks to be run by private players includes National companies, Transnational corporations and Mainland entrepreneurs. For supporting larger projects, specific Sea areas and adjoining facilities to be identified as Special Fisheries Economic Zones and the suitable

parties for undertaking such private sector projects to be identified by conducting National and International conclaves in Sri Vijaya Puram and Mainland India. The Department of Fisheries along with other technical agencies will facilitate for all required statutory clearances through single window systems.

Whereas the medium Mariculture projects to be allocated to the NGOs, Cooperatives and custom-made Self-Help Groups wherein the Department of Fisheries will play a major role in identifying/forming such groups and suitable sea area, getting statutory clearances and for resource identification to start such ventures. In addition to this, the Department of Fisheries to ensure coverage of such groups in appropriate Entrepreneurship scheme of Pradhan Mantri Matsya Sampada Yojana(PMMSY) or any existing Centrally Sponsored Scheme for availing Financial assistance. The National Fisheries Development Board(NFDB), Hyderabad will act as the point of contact for availing such financial assistance. The individual entrepreneurs and local population to be hand-held from the beginning by imparting appropriate intensive skill development programmes and to be encouraged for availing assistance for the No. of units of Mariculture activities and as per the area allotted to each beneficiaries.

The assistance will be imparted as per the existing patterns under Govt. of India for commencing the minor activities without delay after receipt of the applications. The beneficiaries under general category to be covered by extending financial assistance @40 % and the women beneficiaries @60 % as per the existing guidelines of PMMSY. Convergence of Large, Medium and Minor Mariculture projects with loan assistance from Banking institutions is very much required for initial thrust in development of the Mariculture sector of A&N Islands and the A&N Administration will facilitate for providing such loans from the banks.

**Key areas identified for sectoral development with details on implementation and timeline**

<b>Programme</b>	<b>Activity</b>	<b>Implementation agency</b>	<b>Locations</b>	<b>Timeline</b>
Conduct studies on site suitability for Mariculture in submerged and open sea conditions	Demarcation of sites suitable for open-sea cage culture, and seaweed culture; Identification of submerged inundated waters suitable for shrimp/crab culture; Developing geospatial maps for public use.	ACOSTI/NIOT/CIARI/Dept. of Disaster Management/Marine Biology, Pondicherry University	South Andaman (First phase)  North & Middle Andaman (Second phase)	To be initiated in 2024.  To be completed in a year from the date of publication.
Preparation of leasing guidelines for Mariculture activities	A comprehensive list of guidelines to be enumerated for sea-based and land-based leasing guidelines	Andaman and Nicobar Administration (Office of the Deputy Commissioner of districts; Dept. of Environment & Forest - Lead initiative by Dept. of Fisheries	Andaman and Nicobar Islands	Six months from the date of publication
Establishment of hatcheries for seed production of fin fishes, Mud crabs, and shrimps	Identify the Investors through business meet-ups at mainland India in association with NFDB, CMFRI, NIOT, RGCA; enumerate the incentive and benefits	Coordinated by the Dept. of Fisheries; site identification by investors, Land allotment protocols as per norms by the office of the Deputy Commissioner	South Andaman district	To be organized upon publication of this policy document; the Outcome of the Investor meet, and entrepreneur meet shall be submitted.
Monitoring the seed introduction/exotics for aquaculture purposes	Constitute a Risk Intelligence team to make decisions	Lead by the Andaman and Nicobar administration with a team of experts from CIARI, NIOT, RGCA, Pondicherry University, ZSI, FSI, etc.	Andaman and Nicobar	As on when required
Promote Marine Ornamental Fish Culture activities in the Islands	Capacity building programme for local entrepreneurs, encourage commercial scale operators to set up ornamental units.	Led by the Andaman & Nicobar Administration through CMFRI, CIARI, CIBA	South Andaman district	As and when required.

Disease management in aquaculture	Establish new disease diagnostics labs as well as utilization of existing PCR labs for disease diagnostics	Existing PCR labs of CIARI, RGCA, and NIOT shall be used for disease diagnosis through Dept. of Fisheries.	Andaman and Nicobar	As per the requirement
To conduct collaborative research in Mariculture.	Identify the priority research areas that could support the growth of the Mariculture sector in the Islands.  Andaman and Nicobar administration shall financially support the small-grant projects of less than 02 years period that could deliver results.	Research institutes like CMFRI, CIBA, CIARI, NIOT, Pondicherry University	Andaman and Nicobar	
Establish education, awareness, and sensitization programs for stakeholders in the Mariculture sector	Develop Awareness of Govt. schemes, organize special events to promote public awareness of such schemes, encourage the participation of the stakeholders, and promote mass media information.	Directorate of Fisheries, CIARI, NIOT, RGCA and other stakeholders	Andaman and Nicobar	Shall be initiated upon publication of this policy document.