PROGRESS REPORT 2021

State Ministry of Ornamental Fish, Inland Fish & Prawn Farming, Fishery Harbour Development, Multiday Fishing Activities And Fish Exports

Maligawatta, Colombo 10

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State Ministry of Ornamental Fish, Inland Fish & Prawn Farming, Fishery Harbour Development, Multiday Fishing Activities and Fish Exports.

Vision

Creation of self-sufficient fisheries economy

Mission

Enhance the output and the productivity of the fisheries and aquaculture sector to cater to local as well as export markets by introducing modern and sustainable technologies and promoting investments

Policy Objectives

- Increasing the nutrition level and food security of people through increased fish production
- Minimizing post-harvest losses and improving the quality of fish supply up to accepted standards
- Increasing employment generation and socio-economic condition of the fisher community through fisheries and fisheries related industries.
- Boosting foreign exchanged income through non-traditional fishery products.
- Fisheries and aquatic resources conservation to ensure the biological sustainability of fisheries resources

Institutions Giving Contribution To The Fisheries Sector And Their Objectives

National Aquaculture Development Authority (NAQDA)	**Desired objectives -** Development and Management of culture – based inland fisheries and aquaculture **Responsibilities-** NAQDA having been established in terms of the National Aquaculture Development Authority Act No 53 of 1998, is responsible for supply of fish seed in aquaculture and extension services for inland fisheries and aquaculture, shrimp culture monitoring and aquaculture training faculties
National Aquatic Resources Research & Development Agency (NARA)	**Desired objectives –** To conduct researches on Aquatic resources and development, conservation and management of the same **Responsibilities-** NARA, having been established in terms of the National Aquatic Resources Research & Development Agency Act No 54 of 1981 is responsible for aquatic resources and aquaculture, fisheries technology, fish and post-harvest technology and environmental, oceanographic and hydrographic studies
Ceylon Fishery Harbours Corporation (CFHC)	**Desired objectives -** Planning, construction and operation of Fishery harbors and Anchorages **Responsibilities-** CFHC, having been established in terms of the State Industrial Corporations Act No 49 of 1957, is responsible for the operation of 20 fishery harbors and 58 anchorages.
Ceylon Fisheries Corporation (CFC)	**Desired objectives –** Intervention in fish marketing providing the best advantage to both the supplier and the consumer **Responsibilities-** CFC, having been established in terms of the State Industrial Corporations Act No 49 of 1957, is responsible for purchasing and sale of fish and ice, operation of cold room facilities and sale of fishery by-products.
Cey-Nor Foundation Ltd	**Desired objectives-** Supply of fisheries inputs and gears **Responsibilities-** Cy-Nor, having been registers under the Companies Act No 7 of 2007, is responsible for manufacture and sale of fiberglass boats and supply of fishing nets and gears

01.

Current progress and Actions in respect of special priorities under the State Ministry of Ornamental Fish, Inland Fish & Prawn Farming, Fishery Harbour Development, Multiday Fishing Activities, and Fish Exports.

Actions taken under special priorities and current progress

Sri Lankan fisheries sector consists of 517,000 km sea area with abundant fish resource and 489,000 hectares of lagoons, estuaries and reservoirs that show high potential of development .Moreover, the fishing community and the indirect employees who have been making a living by harvesting fisheries resources from the past are highly skilled human resources in the sector. It is obvious that the Government has built a number of costly infrastructure facilities to uplift the fishing industry of Sri Lanka to a higher level through the efficient and effective utilization of the human and natural resources.

The State Ministry of Ornamental Fish, Inland Fish and Prawn Farming, Fishery Harbour Development, Multi-Day Fishing Activities and Fish Exports is the State Ministry responsible for Fisheries sector in Sri Lanka . The Ministry directly involves in the implementation of projects under the National Budget, Public Investment and National Development Programs, assist in formulating policies related to the subject of multi-day fishing and fish exports and provide ornamental fish, fresh water fish and shrimp culture, in accordance with the relevant laws and regulations to create a self-sufficient fisheries economy.

The special priorities.

1. Providing to facilitines eastablish ornamental fish industries targeting at export market.
2. Formulating necessary strategies to promote inland fisheries in lakes,lagoons, and lands
3. Developing fishery harbours for the efficient operations of large scale boats.
4. Taking actions to develop refrigeration systems using seawater for multi-day fishing crafts and to encourage of the use of solar power in such equipment.
5. Improving all fishery harbours and anchorages with modern communication facilities, refrigeration, fuel supply and sanitation facilities.
6. Commencing programmms in colloboration with the Fisheries community associations and the National Aquaculture Development Authority for expanded breeding of both sea and freshwater fish.
7. Taking actions to increase the fish harvest using modern environment friendly thigh technological techniques.
8. Improving the vocational training and knowledge of the fishermen and peoplewho are engaging in that industry

The State Ministry of Ornamental Fish, Inland Fish and Prawn Farming, Fishery Harbour Development, Multi-Day Fishing Activities and Fish Exports with the support of other affiliated institutions, National Aquatic Resources and Development Agency,National Aquacultural development authority, Ceylon Fishery Harbours Corporation, Ceylon Fisheries corporation and Cey-Nor FoundationLtd. takes in to consideration the favorable socio-economic conditions of the country that contribute to achieve the desired advanced development levels. Accordingly, the

Ministry and its affiliated institutions are operating their human, physical and financial resources to accomplish the targets specified in the Mid Term Plan for the fisheries 2020- 2025.

Further ,In line with agreements with international and regional organizations related to the fisheries sector, steps have been taken to amend the domestic laws required to prevent illegal, unreported and unregulated fishing activities (IUU) and to take legal action against illegal fishing activities.

For the year 2020, the Government has allocated Rs. 2906.94 million for the State Ministry of Ornamental Fish, Inland Fish and Prawn Farming, Fishery Harbour Development, Multi-Day Fishing Activities and Fish Exports and out of which Rs. 2496.34 million has been spent in the year 2020.

The total fish production has decreased to 428,740 metric tons in the year 2020 as compared to the total fish production of 505,830 metric tons in the year 2019. The contribution of the marine fishing industry to the total fish production in the year 2019 was 415,490 metric tons and the contribution of the fresh water fishing industry was 90,340 metric tons. Moreover in 2020, the marine and freshwater fisheries have contributed 326,930 metric tons and 101,810 metric tons of fish, respectively.

Following are the details of the development activities implemented by the State Ministry of Fisheries.

Promotion of ornamental fish farming

- A number of activities have been implemented to promote ornamental fish farming. In addition to expanding the existing facilities of the National Aquaculture Development Authority to supply fish brood fish / fry to ornamental fish farmers, a new breeding centre was utilized for production at Sevanapitiya, Polonnaruwa. Also, the construction of a marine fish breeding center in the Kusalabangadeniya area is nearing completion. A programme to introduce new fish species is under implementation. Priority has been given to train stakeholders related to ornamental fish and a programme to provide National Vocational Qualifications in association with National Vocational Training Authority is in progress.

- Under the Livelihood Development Program implemented with the assistance of the Minister of Samurdhi, a program is being implemented to provide technical and financial assistant to the beneficiaries under two categories (i) to start ornamental fish farming (ii) to expand facilities of small scale ornamental fish farmers.

- Ornamental fish exports show an increase of 53.0% in January-September 2021, when compared the relevant period in 2020.

Promotion of fresh water fisheries industry

- Measures have been taken to increase the fish production in the reservoirs by stocking suitable fish species and also to increase the production capacity of the fish seed required for the reservoirs.

- The Government has allocated Rs. 390.0 million for the year 2021 for the stocking of fish and prawns in reservoirs

- 82.4 million fish fingerlings and 39.6 million fresh water prawn post larvae have been stocked during Jan-Sept 2021 period .Targetted stocking figures for 2021are 168 million fish fingerlings and 88 million freshwater prawn larvae..

- Several strategies are being implemented to increase the production capacity of fish fry required for freshwater reservoirs. These strategies include expanding the capacity of the Aquaculture Development Authority's breeding centers, setting up and maintaining small fish breeding centers and fish seed farming units with the participation of community organizations, and involving the fishing community in the reservoir to produce juveniles in cages installed in reservoirs.

Sea cucumber Farming

Sea cucumbers have a great demand in the export market. Around 5,000 acres of land with high potential for sea cucumber farming have been identified in the shallow sea areas in Mannar, Jaffna and Kilinochch in the Nothern Province and Kalpitiya area in the District of Puttalam .A program is already underway to involve low-income families under a cluster system with investors and two sea cucumber production villages are in operation Walepadu and Iranativu areas of the Kilinochchi District. The National Aquaculture Development Authority established a breeding centre for sea cucumber and commenced production.

Sea weed farming

- There is a high potential to expand export oriented seaweed farming in the coastal areas of the Northern Province. Several export companies have already engaged in the seaweed farming with the fishing community in the Northern Province. About 117 people in the Northern Province are currently engaged in seaweed farming and a program to provide technical and financial assistance to another 200 beneficiaries under the Livelihood Development Program under the Ministry of Samurdhi is in progress.

Sea bass fish farming

A large scale project using large floating cages in the sea waters around Trincomalee is in operation. In addition, the necessary approvals to set up a similar investment project are in the final stages. Technical and financial assistance is being provided to another 200 beneficiaries under the Livelihood Development Program to further expand small scale fish farming.

Livelihood development in the field of aquaculture

Under the Livelihood Development Progrmme implemented in collaboration with the Ministry of Samurdhi 2169 beneficiaries for 11 small scale aquaculture enterprises have been selected and financial assistance has been provided to start enterprises

Promotion of Shrimpfarming

- Shrimp farming in Sri Lanka is a private sector driven industry . Following measures are being taken to further promote shrimp farming in Sri Lanka.

- (a) Producing Post-larvae for shrimp farming using only specific pathogen free brood stocks (b) Promoting the farmingof high yielding ‘vanami’ prawns and facilitating the intensification of farming using new technology (c) Steps are being taken to expand shrimp farming to the North and East. Suitable lands in Mannar, Jaffna, Batticaloa and Hambantota districts have been identified and Expression of interests have been invited from investors. Shrimp exports have increased in the year 2021 and the quantity of prawn exports up to September 2021 has increased by 93% and 175.0% as compared to 2019 and 2020 respectively.

Development of fishery harbours

Construction of new fishery harbours

Construction of Kalametiya and Vellamankara fishery harbors is in the final stages. Gandara fishing harbor, Rekawa and Mawella anchorages are under construction. The Environmental Assessment Report on the Balapitiya Fisheries Harbor has been published for comments of the general public.

Modernization of existing fisheryharbors

- Construction contract awarded for the second phase of Myladdy Fisheries Harbor. Plans are underway to modify and construct breakwaters at Hikkaduwa, Ambalangoda and Dodanduwa fishery harbors to prevent long-term sand filling, and steps are being taken to conduct an environmental study. Formation of the project related to the development of Beruwala, Galle, Puranawella and Kudawella as green fishing harbors with the assistance of the French assistance is in the final stage..

Promotion of multi day vessels fishing activities

*A new refrigeration system for multi-day fishing vessels is being introduced with the aim of minimizing post-harvest losses on multi-day fishing vessels and ensuring avaibility of higher percentage of quality fish suitable for export. NARA, NERD, and the Department of Fisheries and Aquatic Resources and the Food and Agriculture Organazation (FAO) are involved in the project. The developed refrigeration system will be installed and tested on two multi-day vessels as a pilot project.

*Steps are being taken to amend the legal provisions to prevent illegal, unregistered and unregulated fishing activities in accordance with internationally agreed standards.

* With the assistance of the Government of Australia, measures have been taken to install a VMS systems for all multi-day vessels and VMS systems have already been installed in 200 vessels.

Promotion of fish export

Our aim is to earn more foreign exchange through fish exports and to reduce fish imports by increasing domestic production.

- Fish exports show an increase of 14.2% in volume and 38.0% in value during 2021 compared to January-September 2020 . Earnings from Fisheries Exports in 2020 is USD 215 Mn and it has reacted USD 218 Mn during the peroid from January-September. Shrimp exports have shown a significant growth in the year 2021 and the growth achieved during the period January-September 2021 are 93.4% and 175.8% respectively compared to the years 2019 and 2020,.

- Imports of fish products during January-September 2021 were valued at US $ 95 Mn

- Measures will be taken to increase the contribution of the private sector to increase domestic canned fish production. At present, the 8 active canning factories have a production capacity of 3,000,000 cans per month. In addition, two more factories are to be set up near the Oluvil and Dickowita fishery harbors..

- A program is being implemented in collaboration with NARA and the Agriculture Modernization Project to improve the hygeine and quality of domestically produced dried fish and maldive fish.

02.

National Aquaculture Development Authority (NAQDA)

OUR VISION

TTo be an apex organization responsible for sustainable development and management of aquaculture and inland fisheries to ensure food security and improve the quality of life of the people.

OUR MISSION

To contribute to the improvement of the social-economic conditions of rural societies and alleviation of poverty by facilitating the supply and availability of freshwater and brackish water fish through sustainable management of the aquatic resource and encouraging the development of small, medium and large scale aquatic enterprises.

The functions of the NAQDA

- To develop aquatic resources and the aquaculture industry for increasing fish production in the country and the nutritional status of the people.
- To promote the creation of employment opportunities through the development of freshwater aquaculture, coastal aquaculture and sea farming.
- To promote the farming of high valued fish species including ornamental fish for export.
- To promote the optimum utilization of aquatic resources through environmental friendly aquaculture programs.
- To promote & develop small, medium & large scale private sector investment in aquaculture.
- To manage, conserve and develop aquatic resources and the aquaculture industry.
- To carry on business as an importer, exporter, seller, supplier and distributor of aquatic resources.
- To prepare and implement plans and programs for the management, conservation & development of aquaculture and aquatic resources.

Inland Fisheries and Aquaculture Production

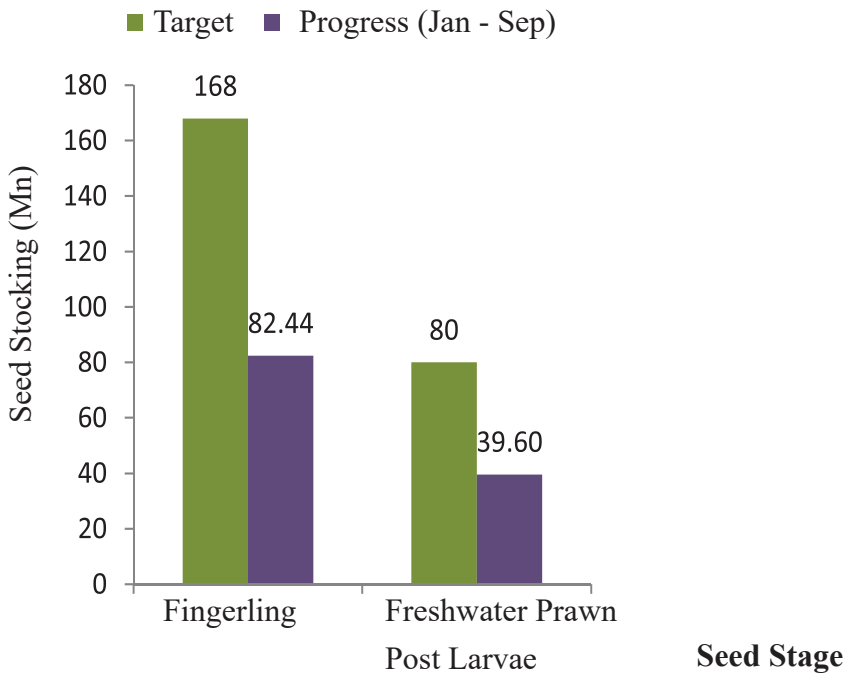
2021 Target (Mt)	Inland Fisheries and Aquaculture Production (Mt) (January – September)	Achievement (January – September)
125,400	76,660	61%

The inland fish production from culture-based fisheries in the perennial reservoirs and freshwater aquaculture production was 62,340 Mt up to September 2021. Coastal Aquaculture production including Shrimp production was 14,510 Mt up to September 2021.

During Covid 19 period fisheries sector was declared as an essential service. Therefore, fishing in inland reservoirs was carried out throughout the period. But we have noted that there is a decreased in production due to low fishing effort with less movement of fishermen even though fisheries were declared as essential service..

Stocking of Fish Fingerlings and Freshwater Prawn Post Larvae

Annual stocking targets for fish fingerling and freshwater prawn post larvae with progress up to July is given in Figure 1.



Stocking Targets of fish fingerlings, freshwater prawn post larvae and achievement

Government special assistance programme for fish seed stocking (Budget Proposal)

The budget proposals for the year 2021 have allocated Rs. 390.00 Mn for Fish Seed Free Stocking Programme. Accordingly, it is planned to stock 120 million fish fingerlings, 50 million fish fry and 30 million freshwater prawn larvae (Table 1).

Table 1: Stocking of Fish Fingerlings, Fish Fry and Freshwater Prawn Post Larvae Free of Charge

Category	2021 Target	Stocking (Mn) Jan-Sep	Expenditure (Rs. Mn) Jan-Sep
Fish Fingerlings (Mn)	120	47.75	119.38
Fish Fry (Mn)	50	35.50	17.75
Freshwater Prawn Post Larvae (Mn)	30	23.37	35.06
Transport Cost (Rs. Mn) 20 - 4.91 Total Fund	20	-	4.91
Total Fund Allocation (Rs. Mn)	**390.00**		**177.10**

Freshwater Fish Seed Production

One of the major activities of NAQDA is the production of fish seeds for stocking of inland water bodies to enhance fish production. The Aquaculture Development Centers (AQDCs) at Udawalawa, Dambulla, Inginiyagala, Iranamadu, Kalawewa, Nuwara Eliya, Polonnaruwa and Muruthawela produced fry and were distribute to Private Pond Owners (PPO), Pens, Cages and Community Based Organizations (CBO) managed Mini Nurseries for rearing to fingerling size. Also Freshwater Prawn post larvae produced at Pambala, Kahandamodara and Kallarawa AQDCs. Fish seed production up to September is given in Table 2.

Table 2: Fish seed production

Production unit	Fish Seed Stage	Target (Mn)	Production (Mn)
AQDCs	Post Larvae	404	270.33
	Fry	290	178.81
	Fingerling	50	31.97
Mini Nurseries, Cages, Ponds, Pens	Fingerling	130	50.46
AQDCs	Freshwater Prawn Post Larvae	80.0	39.60

There are more than 12,000 numbers of perennial and seasonal reservoirs scattered over the country however; we are still unable to utilize all potential aquatic resources for aquaculture and culture-based fisheries, because of insufficient of fish seeds production. In order to increase the fingerling production of the country following strategies were adopted.

a) Establishment of 05 community based fish breeding units

In order to increase the supply of fish seed required for stocking in reservoirs it was planned to introduce the breeding technology to community. This will enable the sustainable supply of Carp fingerlings annually. Rs. Mn 50 has been allocated to establish 5 community based fish breeding units in 2021. Selected sites are given in Table 3.

Table 3: Selected sites and Physical progress

District	Site	Physical Progress
Ampara	Ekgaloya	Ponds construction is in progress
Trinocmalee	Pareipagnan	
Ampara	Sagama	Procurement completed
Kilinochchi	Pudumarippu	
Puttalam	Battuluoya	

b) Improvement of small scale fish seed production units for post larvae rearing

Currently, most of mini nurseries are only functioning for rearing fish fingerling from fish fry that purchased from NAQDA breeding centers. As the demand for fish seed is difficult to cater only from NAQDA owned breeding centers, it is planned to upgrade 10 mini nurseries into rearing of post larvae up to fingerling stage. This will enhance the fish seed production/ fish breeding both in NAQDA and mini hatcheries. Rs. Mn 20 has been allocated for this project. Improvement works commenced and are in progress. Selected sites are given in Table 4.

Table 4: Selected sites

District	Site
Badulla	Nawamedagama
Ampara	Kirawana
Polonnaruwa	Sevanapitiya
Monaragala	Dozar wewa
	Kesellanda
Hambantota	Adiyangama
Puttalam	Vijayakatupotha
	Devalahandiya
Kurunegala	Hakwatunaoya
Kilinochchi	Muthiyankaddu

c) Fish farming in cages to encourage and provide facilities to fishermen's societies

It is planned to provide 312 numbers net cages to perennial water bodies. This will increase national fingerling production and as well as assurance of consistence supply of food fish from reservoirs. Rs. Mn 25 has been allocated for this project in 2021.

d) Rehabilitation and Improvement of Aquaculture Development Centers in order to increase the fish fingerling production of the country

To enhance fish breeding at Aquaculture Development Centers of NAQDA, Rs. Mn 422 has been allocated and Improvement works are in progress. Renovation of existing ponds, improvement of infrastructure facilities, laboratory facilities will help to fulfil the freshwater fish fingerling and freshwater prawn post larvae requirement in the country.

Coastal Aquaculture Development

Shrimp Farming

This is the biggest commercial aquaculture activity in Sri Lanka. At present, the shrimp industry is being managed to an effective level due to continuous surveillance and monitoring activities of NAQDA. Shrimp production up to September 2021 is 11,420 Mt.

Common Electricity Supply for shrimp farms

In order to increase the shrimp production NAQDA has planned to intensify the shrimp culture activity through introduction of water recirculation system and enhancing the biosecurity of farming area.

Rs. Mn 90 has been allocated under 2021 Budget Proposals for the Establishment of Common Electricity Supply for 64 Shrimp Farms in Puttalam District. Relevant sites were identified and inspected by CEB to place transformers and ready to commence work.

Dredging of Dutch canal

Rs. Mn 88 has been allocated under 2021 Budget Proposals for Dredging of Dutch canal and this will increase the productivity of farms in Puttalam District. Cabinet paper has been approved to carryout excavation work by the Land Reclamation and Development Corporation.

Introduction of a loan scheme under concessionary terms for shrimp farming

A loan scheme under concessionary terms is being implemented through government banks to upgrade 1000 ponds using HDPE lining to increase the productivity of shrimp farms. Shrimp production is expected to increase to 50,000 MT by 2025 through upgrade of ponds and intensification of farming.

Sea cucumber Breeding and Farming

In order to promote and develop sea cucumber farming, NAQDA established a sea cucumber hatchery in Oleithuduwai, Mannar and commenced its operations in 30th March 2021.

Also, NAQDA provided expertise to breed Sea cucumber in private hatcheries; one hatchery is operating in Jaffna. Farming is carrying out by private sector in Mannar, Kilinochchi and Jaffna. 357 Mt (wet) were harvested from pens up to September 2021.

Sea Cucumber Export village

In order to increase the sea cucumber exports and livelihood opportunities sea cucumber villages were commended at Valeipadu and Iranativu in Kilinochchi District in this year.

Identification of suitable sites for sea cucumber farming

Rs. Mn 12 has been allocated under 2021 Budget Proposals for identification of suitable sites and 1900 acres have been identified in the Jaffna District shallow sea and mapping is in progress. In addition, about 3900 acres of sea areas have been identified for the sea cucumber farming

Sea bass Farming

The private sector is engaged in sea bass farming in Gampaha, Batticaloa, Galle, Trincomalee and Puttalam Districts. Further, a private company is carrying out a sea bass farming project in the Trincomalee Sea. 323 Mt was harvest up to September 2021.

Sea weed Farming

NAQDA facilitates sea weed farming with community participation in the Northern, Eastern and North Western Sea. Sea weed harvest in 2021 up to September was 181 Mt (wet).



Milk Fish breeding and farming

NAQDA has taken steps to establish a Milk fish hatchery in Bangadeniya, Puttalam with an annual production capacity of 10 million fry and the construction is in progress. Since the cost of importing bait fish is very high, the objective is to promote the milk fish farming for tuna bait and the estimated cost is Rs. 380.

Milk fish farming for bait is carried out in Jaffna, Kilinochchi, Mannar, Puttalam Districts and 2.0 Mt was harvested in up to September 2021.

Crab Breeding and Farming

NAQDA provided expertise to breed mud crabs in two private hatcheries and 3.9 Mt of crabs were harvested from ponds up to September 2021.

Other development works initiated for development of coastal aquaculture

Expression of Interest (EOI) called for operation of following brackishwater aquaculture activities

a) Operation and management of brackish water shrimp hatchery – puthukuduirippu, batticaloa.

b) Implementation of brackish water aquaculture project in the prepared pond complex at rekawa in hambantota district with pond owners' association

c) Establishment of cluster - based sea cucumber farms in Sea Cucumber Export Villages in Kilinochchi and Jaffna Districts

d) EOI called for shrimp farming in Galmulla & Kokkadacholei Lands

Ornamental Fish Farming

NAQDA is involved in development of new ornamental fish strains, development of technology, provide brood fish, fish disease diagnosis, provide training and technical assistance etc. to support development of ornamental fish and aquatic plant culture and exports.

Ornamental fish Breeding Centres at Rambodagalla, Ginigathena and Sevanapitiya are dedicated for ornamental fish and plants. These centers sold 4.18 Mn ornamental fish for farmers and exporters up to September 2021. Also, 615 people were trained in ornamental fish farming at Ornamental Fish Breeding and Training Centre, Rambodagalla and due to Covid 19 training programmes were not conducted as planned.

Freshwater aquarium fish comprise the more colorful and striking species of guppies, swordtails, platys, bards, tetras, angels, gouramies and catfish. Out of these freshwater species exported from Sri Lanka, about 50-60% consists of guppies. There are about 45 regular exporting companies in Sri Lanka. Major buyers for Sri Lanka ornamental fish are USA, UK, Germany, China, France, Japan, Poland, Italy, Czech Republic, and Netherlands.

Marine Ornamental Fish Breeding Centre

In order to disseminate the technology, increase the product range of ornamental fish and enhance foreign exchange earnings, NAQDA has continued the establishment of Marine Ornamental Fish Breeding Centre in Kusala Bangadeniya, Puttalam. Estimated Project cost is Rs. 250.

Other activities initiated for development of Ornamental Fish Industry

- Import of new strains of ornamental fish and aquatic plants and distribute among Breeders
- NAQDA has taken steps to develop a national strategic plan with collaborating key industry stakeholders in order to develop this sector.
- Establishment of Ornamental Fish Culture Development Division under NAQDA for the promotion of ornamental fish industry.
- Establishment of new ornamental fish farming units at rural level

Aquaculture Export Performance

Table 5: Export Quantity and Value

Species	Export Quantity (Mt)	Export Value (Rs. Mn)
	(January – September)	
Ornamental Fish	n.a	2754.1
Shrimp	3277.4	5819.8
Crabs	1233.6	4226.8
Sea cucumber	184.8	1123.0

"Sawubhagya" Production Villages Programme

This programme is implementing together with Ministry of Samurdhi. Aquaculture projects implemented under this are especially establishment of Ornamental fish cluster villages and Quality improvement of dry fish, smoked fish, value added products. This programme will be implemented in all districts. Technical support will be given by NAQDA and other relevant organizations and financial assistance given by the Ministry of Samurdhi. Project coordination, implementation and supervision will be carried out by NAQDA Extension Officers.

Under this programme 28 projects were started in Anuradhapura, Hambantota, Colombo, Polonnaruwa, Ampara, Gampaha, Monaragala, Kurunegala, Puttalam, Badulla, Nuwara Eliya, Galle, Kalutara. The government contribution for these 28 projects amount to Rs. Mn 144.05. The projects included ornamental fish farming smoked fish, pond fish culture, dried and salted fish.

Livelihood Development Programme together with Department of Samurdhi

NAQDA has planned to commenced 3300 projects under the Full pledged Household economy development programs for Samurdi & Low income families together with Samurdhi Department. Conducting technical trainings are in progress for the selected beneficiaries. Rs. Mn 101.40 released for 1491 beneficiaries to commence the projects.

No.	Livelihood Project	District	Allocation (Rs. Mn)	No. of Projects Proposed	No. of Projects Selected
01	Pond fish Culture	All District except Jaffna	50.0	500	240
02	Small scale ornamental Fish farming	All District except Jaffna, Batticaloa, Mannar, Mullaitivu, Kilinochchi	100.0	1000	1000

03	Sea Weed Farming	Jaffna, Batticaloa, Ampara Mannar, Mullaitivu, Kilinochchi	20.0	200	44
04	Food fish cage culture in reservoir	All District except Jaffna, Gampaha, Colombo, Kalutara, Mannar, Vavunia	12.5	50	24
05	Improvement of ornamental Fish farms	All District except Jaffna, Batticaloa, Mullaitivu, Mannar, Kilinochchi, Vavunia	250.0	1000	658
06	Establishment of small scale fish feed production units	All District except Jaffna	12.5	50	10
07	Improvement of fish seed production units	All District except Jaffna	12.5	50	18
08	Sea bass farming in Cages	All District except Jaffna, Batticaloa, Trincomalee, Mullaitivu, Kilinochchi, Mannar, Colombo, Gampaha, Kalutara	50.0	200	64
09	Improvement of Ornamental. fish aquariums	All District except Jaffna Batticaloa, Trincomalee, Mullaitivu, Kilinochchi, Mannar, Vavunia	25.0	100	64
10	Modernization and repair of Boats / canoes and Fishing gears	All District except Colombo, Gampaha, Kalutara, Galle, Kegalle, Jaffna	12.5	50	10
11	Salt or Smoked fish production units	All District except Colombo, Gampaha, Kalutara, Galle, Kegalle, Jaffna	10.0	100	37
12	Training and monitoring		13.00		
Total			**568.00**	**3300**	**2169**

03.

National Aquatic Resources Research and Development Agency (NARA)

VISION

To be the premier institution for scientific research in conservation, management and development of aquatic resources in the region.

MISION

To provide innovative solutions for national development issues in the aquatic resources sector utilizing scientific and Technological knowledge and resources base.

MANDATE

The National Aquatic Resources Research and Development Agency (NARA) is the principal national institute charged with the responsibility of carrying out and co-coordinating research, development and management activities on the subject of Aquatic Resources.

Ensure the application and utilization of scientific and technological expertise for the implementation of the national development program on the subject of living and non-living aquatic resources

Promote and conduct research activities directed towards the identification, assessment, management, conservation and development of aquatic resources and in particular in the following fields;

1. Oceanography and Hydrography

2. Improvement and development of fishing craft, fishing gear and equipment, and fishing methods

3. The social and economic aspects of the fishing industry, including the welfare of fishermen and their dependents

4. The processing, preservation and marketing of fish and aquatic products

5. The development, management and conservation of aquatic resources in the inland waters, coastal wetlands and off-shore areas

6. Provide advisory and consultancy services on scientific, technological and legal matters relating to the exploitation, management, conservation and development of aquatic resources.

7. Co-ordinate the activities of institutions engaged in the exploitation, planning, research, development, conservation, control and management of aquatic resources

8. Undertake the collection, dissemination and publication of information and data useful for the management, conservation and development of aquatic resources and the fishing industry in Sri Lanka.

9. Provide training for persons required to carry out or assist in the work of the Agency.

Exercise, discharge and perform all the powers, functions and duties conferred or imposed on the Agency under the National Aquatic Resources Research and Development Agency Act No. 54 of 1981 as amended by act No. 32 of 1996.

MARINE BIOLOGICAL RESOURCES

Small pelagic fishery monitoring and assessment

The preparation of two management plans with regard to the small pelagic fishery in the west coast and demersal fishery in the south-east coast are in place with DFAR for managing respective resources in a sustainable manner. In this regard, a stock assessment with regard to small pelagic fishery in the west coast was conducted in 2020/2021. The key findings of the stock assessment showed that key small pelagic fish stocks in the west coast are subjected to overfishing. Formulation of new regulations and introduction of effective management measures such as spatial and temporal closures during the spawning season of small pelagic fish and measures to control the fishing effort will be necessary to rebuild the stocks to a sustainable level.

Large pelagic fishery monitoring and assessment

The main objective of the project is to comply with the mandatory requirement of large pelagic data submission to the Indian Ocean Tuna Commission. Production estimation is a collaborative approach of NARA and the Department of Fisheries and Aquatic Resources (DFAR) and the Statistics Unit of Ministry of Fisheries and Aquatic Resources Development (MFARD). Sri Lanka was able to submit the required catch and effort data obtaining 69 % of compliance rate.

Demersal finfish fishery

Study of fisheries of demersal finfish fishery and their reproductive biological aspects from selected finfish species were carried out in Southern and Eastern Coast. The average Catch Per Unit Effort (CPUE) was estimated at 30.37 kg/boat/day demersal fishery in Kalmunai fisheries district. *Epinephelus undulosus and Lutjanus fulviflamma* are dominant in Southern coasts while *Lethrinus lentjan, Lethrinus olivaceus and Lethrinus microdon* are dominant in Eastern. Formulation of management plan to adapt the fishery into the sustainable is required after filling the gaps on reproductive biological aspects such as spawning season and the stock level.

Study of biology, fishery and population structure of common shark species

Negombo, Mirissa, Beruwala and Valachchenei fishery harbours have been visited from February to April 2021. During the field surveys fisheries data including catch details, fishing location, fishing gear details were collected. Length, weight parameters, sex and maturity related parameters were also measured. In addition, tissue samples were collected from silky sharks, blue sharks and scalloped hammerhead sharks for the genetic study. Shark fin export statistics during last 10 years were collected from the Department of Fisheries and shark fin exporters. Data entering and analysis has been started. Field visits were not carried out in May, June, July and August due to the COVID 19 pandemic situation

Sea urchin fishery development

Export potential for sea urchins is vital to be explore as foreign exchange earning avenue, considering the high demand exist in Japan, China and USA export market. Available resources are being assessing to provide exploration recommendations, to define best management practices and strategies to sustain the proposed sea urchin industry with development of aquaculture techniques for sea urchin culture.

Figure 01: Sea urchin species (Stomopneustes variolaris Lamark, 1816) in western province

(a) …….. (b)

Figure 02: Sea urchin Species recorded in Northern region; (a) Salmacis virgulata L. Agassiz in L. Agassiz & Desor, 1846; (b) S. bicolor L. Agassiz in L. Agassiz & Desor, 1846

Present status of the sea cucumber fishery:

Present status of the sea cucumber fishery and the stocks of the dominant species in North (Jaffna) and North-western (Mannar and Puttalam) are being assessed. During that underwater survey it was estimated that the density of the S. naso in the deeper fishing ground (60-80 m deep) was at 8 individuals/m2. Scuba divers engaged in sea cucumber fishing are involved in other alternate source of income like diving for finfish fishing as result of ban of sea cucumber fishery for scuba divers.

Divers had engaged in fin fish fishery in Mannar

Underwater survey for Stichopus naso (one individual in the red circle)

Lobster fishery:

Conservation of the berried lobster females were launched in Polhena reef area with the Polhena fisheries committee establishes under the CENARA project. Within the first three months of the year except February (Closed season) about 30 female lobsters were kept in the cage. Average number of larvae released to the sea is about (250000x25) 6250000. Spiny lobsters fattening is conducted at the sea in Dondra, Kaisawella.

Biological and fisheries data have been collected to review the existing management regulations to maintain the stock at a sustainable level. Based on the data collected a comprehensive report with recommendations was prepared with the technical support of World Bank.

A 

 **B**

 C

 D

Reductions of fishery depredation:

A growing issue in longline fishery is depredation, in which marine mammals remove valuable captured fish (mainly tuna species) from nets or lines. Depredation reduces the value of catch and may lead to a greater risk of entanglement and the potential for retaliatory measures taken by fishermen. According to the current study annual loss made by the whales due to depredation exceed Rs. 1500 million per year. To overcome this issue, it is planned to use depredation pingers in collaboration with long liners. The most suitable pinger type was selected and purchasing process is continuing. It is planned to implement the fishing trial with long liner before the end of the year

Survey in the Dikovita fisheries harbor, B. Selected dolphin deterrent Pinger

Straight and side view of the whale attacked yellow fin tuna head.
The rest of the body had been completely eaten up by the whale.

Strengthening marine fisheries data collection in Sri Lanka

The bilateral project between Norway and Sri Lanka was started in 2017 to improve the management of the marine fish resources of Sri Lanka. Phase one was accomplished through making a landing site registry including vessel composition, gear, type, and catch data and identifying the sampling effort of the particular site. The data collected under the newly implemented system was started in the main harbours from October 2020, and it was expanded to the small-scale landing sites in 2021.

The agreement on the Second phase of providing technical assistance to improve the management of fishery resources in Sri Lanka between the National Aquatic Resources Research and Development Agency (NARA), Sri Lanka and the Institute of Marine Research, Norway (IMR) was signed on 20th April 2021 at the Auditorium of the Ministry of Fisheries.

Hon. Minister Douglas Devananda, Ministry of Fisheries; Hon. Kanchana Wijesekara, State Minister of Ornamental Fish, Inland Fish & Prawn Farming, Fishery Harbour Development, Multiday Fishing Activities and Fish Exports; H.E. Trine Jøranli Eskedal, Ambassador of the Kingdom of Norway to Sri Lanka, H.E. Godfrey Cooray, Ambassador of Sri Lanka to Kingdom of Norway; Ms. Indu Ratnayake, Secretary to the Ministry of Fisheries; Mr. Jayantha Chandrasoma, Secretary to the State Ministry of Ornamental Fish, Officials of IMR, Officials of Norwegian Embassy, Director General Technical- Mr. Dhammika Ranatunga, Director General - State ministry of fisheries Mrs. L. Champika Hewage, Prof. Navaratnarajah, Chairman NARA; Dr. H.M.P. Kithsiri, Director General, NARA and Officials of Department of Fisheries, Ministry of Fisheries and NARA were present at the event.

The project is an application for a phase II of the project that started in 2017 and ended in 2019. The main objective of phase I of the project was to provide technical assistance to upgrade existing fisheries dependent data collection and technical assistance and training in conducting fisheries independent marine research surveys. The outcome of the above will be fundamental to formulate management plans for two selected coastal fisheries; small pelagic in the West Coast and demersal resources in the South East Coast.

The project is successfully continuing with the technical support of the Norwegian Fisheries Department. The project will support improving the fish landing data collection of small pelagic, large pelagic and demersal fisheries in Sri Lanka, which will benefit other fisheries projects that MBRD conducts during 2021.

Fisheries independent surveys in the coastal areas:

Sri Lanka's first scientific survey to measure the abundance of small pelagic fish has been carried out successfully. NARA's research vessel Samuddrika has been equipped with a scientific echosounder, and personnel have been trained in survey planning and methods for estimating fish abundance from echosounder measurements. NARA completed the first ordinary scientific survey to measure the abundance of small pelagic fish along the western and southern shelf of Sri Lanka. The successful survey represents a milestone since this is the first in a planned survey time series. Repeated annual scientific surveys and corresponding data on commercial landings of small pelagic fish, are both required for sustainable management of these important fishery resource. NARA is planning to carry out similar scientific surveying along the east coast during the south-west monsoon.

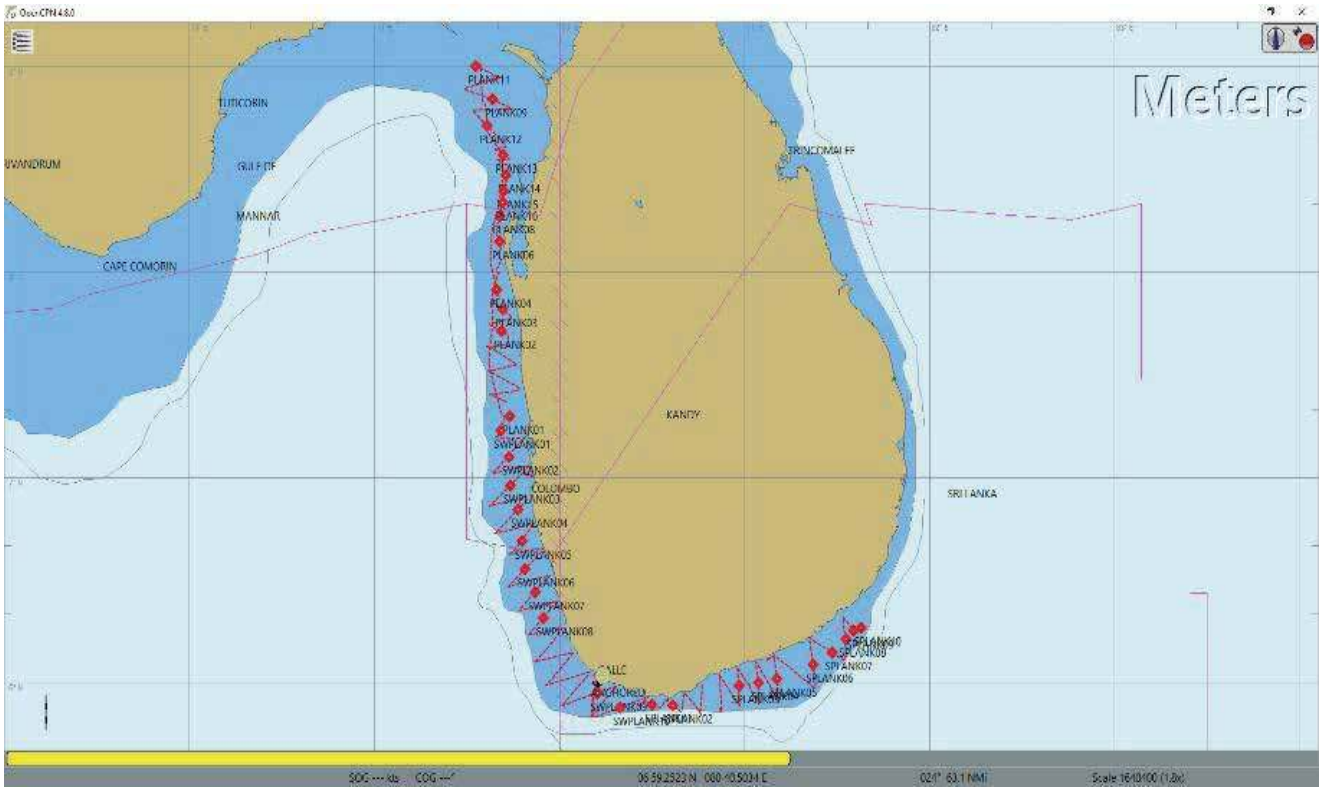


Figure 1. Survey track (red line) along the west and south coast of Sri Lanka. In addition to measuring fish abundance using scientific echosounder, plankton were sampled at selected positions along the survey track.

Identification of edible fish species through DNA Barcoding :

Traditional methods of identifying species and estimating biomass/abundance have inherent drawbacks which could be ameliorated by DNA marker-based approach. The DNA barcoding project involves the preserving and sequencing some common and commercially important marine fish species found in Sri Lankan waters. The sequences were analyzed to obtain the consensus sequences and were used for the molecular identification to the species level. The sequences obtained for each species will be the barcode for each species.

Lethrinus atkinsoni

Lethrinus nebulosus

Two species that were barcoded and identified to species level by DNA barcoding.

Mud Crab Fishery studies:

A case study on mud crab resources in Sri Lanka is being carried out to provide appropriate management recommendations based on best scientific evidence in order to amend the crab regulation hence to ensure the sustainability of the resource. At present data collection is in progress to understand the current stock status and to determine the length and weight at maturity estimations targeting size regulations.

Potential fishing zone forecasting for the multiday fishers:
Fishing ground forecasts were issued three times a week and disseminated to high sea fishermen via email, telephone and WhatsApp.

AQUACULTURE DEVELOPMENT

Growth performances of different carbon sources on growth of tilapia

(oreochromis niloticus) for biofloc production.

Biofloc technology is a promising modern approach to address the drawbacks associated with aquaculture to achieve sustainable development goals as a globally expanding industry. Since it is a novel approach further analysis are underway to provide data related to biofloc characterization, application and optimization. The present study was conducted to evaluate the characteristics of different carbon treated bioflocs, and their suitability in enhancing the growth performance of Oreochromis niloticus,

Culturing artemia in saltern ponds at palatupana saltern, lanka salt limited and improvement of quantity and quality collecting cysts in puttalam area.

Live food such as Artemia is considered to be an essential part of many crustacean and finfish hatcheries. Majority of the local requirement of Artemia is fulfilled by imported artemia cysts in vivid brands though there are naturally occurred brine shrimps in the local salterns. A canned 425 g of cysts cost is varying from 8500.00 LKR to 10,500.00 LKR. It directly affected on the ornamental production in the country. Reports revealed that there are 8000 ornamental fish farmers around the country. This was identified by the presidential task force for “Task Force for Economic Revival and Poverty Alleviation” and NARA was appointed to conduct research studies on farming Artemia. Goals of the study are to develop and improve culture techniques for locally available Artemia species and to encourage private and public owned salterns to the artemia culture. NARA entered in to the agreement with Lanka Salt Limited for beginning culture practices in Palatupana Saltern. A suitable site for culture practices has been identified and development of infrastructure facilities is being developed. The cyst collectors in the

salterns were trained to collect and process cysts correctly to get maximum hatchability out of collected cysts. Practical training workshop was conducted in Palatupana saltern 2020, July 16-17 for the 17 participants those who represents leading salterns in Northwestern, Northern and Eastern provinces (figure 1).

- Puttalam salt Ltd
- St Anne's salt Daluwa (pvt) Ltd
- Manthai Salt Ltd- Mannar Saltern and Elephantpass Saltern
- Raigam Group of Companies
- Puttalam Salt Producer's Welfare Association Limited

Progression of this effort could be seen in 2021 and it is positive because recent hatchability tests showed that it has increased from 25 % up to 85 % after starts these monitoring activities. On the other hand, maximum utilization of cysts could be increased and wastage of cysts could be minimized when hatching them at the end user's places.

Artemia Collection training at palatupana Saltern

Practical session at Puttalam

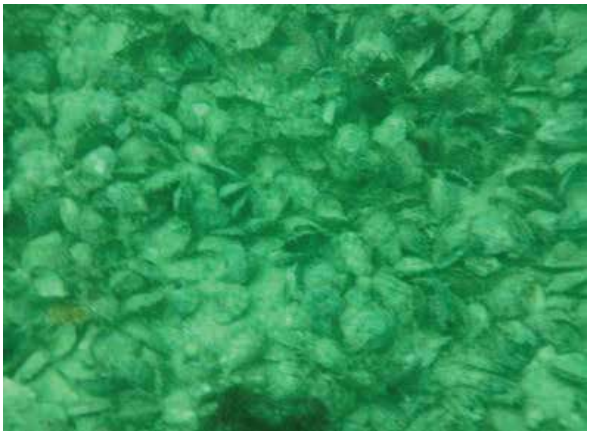
Hon. State Minister conducted a meeting on 11th January 2021
for higher management of salterns, Artemia collectors and sellers

Artemia collectors emphasized that they have no enough land plots for expanding farming Artemia. Hon. State Minister instructed NAQDA and NARA to find abandoned crowned lands with the potential of farming Artemia in Puttalam District and able to identify four land lots in Nachchikalliya, Musalpitiya (628) Grama Niladhari division in Kalpitiya DS area with existing abandoned ponds.

Development of culture techniques and identification of culture grounds for pearl oyster resources in north west and east coasts regard to regain the pearl industry .

According to the historic records, the pearl banks had been situated in the Gulf of Mannar and Puttalam (North West Sri Lanka Sea board) and in the Northern Sea area. Based on the information gathered from the fishermen and divers in Mannar area, Arripu to Silawathura sea area select to collect live specimens of pearl oysters.

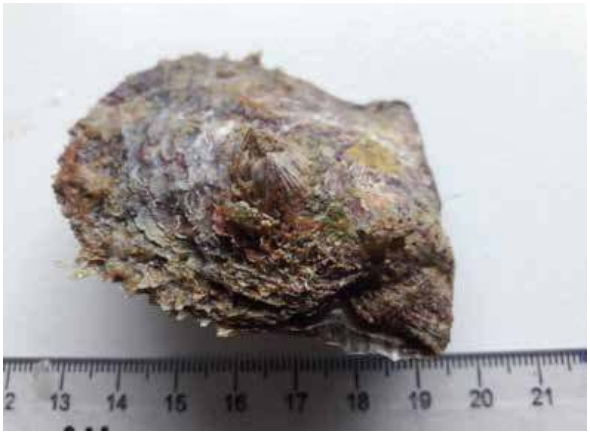
Two pearl oyster beds in and around Mannar and pearl banks were identified. Distance between two patches was 5km.

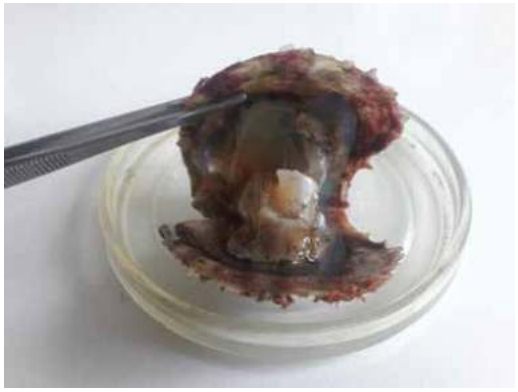
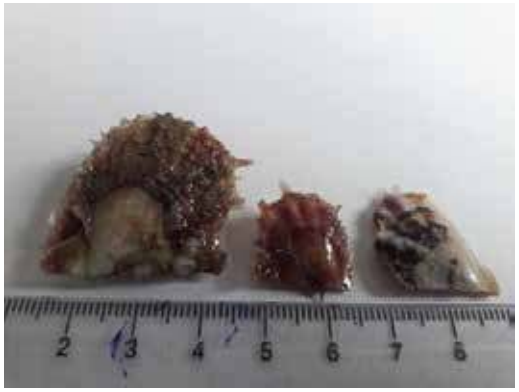


Underwater pearl oyster beds13 Km from Silawathura to deep sea,
Samples and underwater photographs were taken Underwater pearl oyster clumps

Mature pearl oyster samples were collected and stocked to attached cages to the rafts. The objective of the studies is to culture pearl oysters and to produce natural pearl

Laboratory analysis of pearl oysters



Laboratory analysis of pearl oysters


Possible culture sites identified in Walleippadu Prepared
pearl oyster rafts at Yard cove- Trincomalee sea area


Sample stocking in plastic crates


Sample preparation for Data collection


Pearl oyster spats

According to observation after five months due to Covid pandemic after five months 63.75% of pearl oyster's growth well compare with initial stock at Walleippadu and 99.66% in Trincomalee. The most important point observed was found of spats attached to mature oysters and culture structures. According to the instruction and guidance given by international pearl research group specially designed spat attachment materials designed and stocked at Kiranchi. Spats were carefully detached and stocked at plastic box structures for further growth under protection of external predators.

Disease monitoring and prevention for health management in shrimp aquaculture industry in Sri Lanka

L. vannamei can be cultured in high growth rate and stocking density, L. vannamei,a non-native shrimp species has been very recently introduced to our shrimp culture systems and imported SPF mother shrimp are used for the seed production. Close monitoring of L. vannamei culture in Sri Lanka is an urgent requirement for disease prevention and management in the culture system. To address this issue this study was conducted by collecting samples from shrimp culture farms in north western province. WSSV and IHHNV disease was identified among the samples collected. The areas that WSSV reported where farmers were informed immediately for presence of disease in respective grow out ponds and offered a management plan and corrective measures to prevent disease spread within/ among farm (s), zone (s) as well as upcoming culture rounds.

Strategies to increase survival of Macrobrachium rosenbergii stock in culture-based fisheries in two selected reservoirs in Hambantota district, Sri Lanka.

As a strategy to improve and expand the freshwater prawn production, NAQDA has launched free stocking program of M. rosenbergii in selected perennial and seasonal reservoirs. However, during the island-wide Culture Based Fisheries trial, there was no significant harvest of M. rosenbergii and contribution of M. rosenbergii yield to the total fish yield was 1.6% in major reservoirs and in medium reser-

voirs. Therefore, the project is designed to provides strategies to increase recapture rate of M. rosenbergii production in two perennial reservoirs, Kattakaduwa and Bandagiriya in Hambantota district that help to enhancement of income of rural communities for strengthening the rural economy that achieve food security and improved nutrition of rural communities.Following project activities were completed to increase recapture rate and production.

1) Increase stocking size: Three net pens (500m2) were installed in Kattakaduwa tank to stock PL-10 stage to rear another 45 days instead of stocking directly in to the tank.

2) Design alternative fishing gear: Fish traps (24 number) were introduced recently for two tanks. Harvest will be monitored continuously.

DEVELOPMENT OF POSTHARVEST TECHNOLOGY

Ensuring food security through minimizing post-harvest losses in fishery industry

Post-harvest losses in fisheries remain quite high; rough estimates indicating losses as high as 40% of the fish harvested. Therefore, efficient post-harvest handling of fish is of paramount importance not only in reducing post-harvest losses, but also in providing the people with a quality fish product at affordable prices. The process of mechanization of the fishing fleet has become one of the major contributing factors, as mechanization has led to multiday fishing and the landing of poor-quality fish, apart from its benefits in sailing longer distances, exploiting un-exploited or less-exploited resources and catching larger quantity of fish. Two Multi day boats which are in use today are devoid of proper refrigeration/freezing facilities, marking the main cause of post-harvest losses on-board. Most of multi-day boats owners still aim at higher quantities rather than quality of fish, hence only a small portion of the harvest meet the required quality standards. The Food and Agriculture Organization (FAO) is granting financial aids for the launching of the project where the highest percentage of funds has been allocated for the modification process. The project aims at introducing the modification to two multi-day boats as a pilot experiment, and an agreement with boat owner has been signed. The engineers of the National Engineering Research and Development Centre (NERDC), have commenced with the designing process of the refrigeration system.

Technical layout of the boat design

Introduction of improved technology for maldive fish and dried fish production in sri lanka

One of the greatest challenging issues in maldive fish and dried fish sector is technological stagnation. The industry has advanced significantly, and still use the age-old, conventional processing techniques. Technological interference to increase production efficient, targeting high quality dried fish production at affordable price for consumer is a requirement. Introduction of a model hybrid dryer for fish drying with controlled drying conditions is the main objective of the project. Under the guidance and supervision of the State Ministry of Ornamental Fish, Inland Fish & Prawn Farming, Fishery Harbour Development, Multi day Fishing Activities and Fish Exports, the National Aquatic Resources Research and Development Agency (NARA), Department of Fisheries and Aquatic Resources (DFAR) and National Engineering and Development Centre (NERDC) initiated the project and the progress achieved is summerised as follows .

* An innovative set of equipment have been developed for hygienic production of Maldive fish ensuring no impact on the traditional flavor and the quality of the final product using the expertise from National Aquatic Resources Research and Development Agency (NARA) and National Engineering Research and Development Centre (NERDC).

*A series of awareness programs have been conducted for 250 Maldive fish and dried fish producers in Dondra, Dikwella and Kottegoda areas of Southern Province on importance of hygienic preparation of dried fish and Maldive fish and basic guidelines of Agriculture Sector Modernization Project- Value Chain Development Programme.

*Initial screening guides have been prepared and the initial screening of interested Maldive fish and dried fish producers for the project has been conducted, where 136 applicants got passed the initial screening out of 184 applications

*Model Biomass dryer is being established at Kottegoda

*Selection of fourty applicants were completed based on their experience, availability of land, financial ability for contribution etc. Approval was granted by the World Bank funded. Agriculture Sector Modernization Project- Value Chain Development Programme for funding.

*Finalized comprehensive proposal and applications obtained from 40 community persons have been submitted and approved by Agriculture Sector Modernization Project- Value Chain Development Programme funded by the world bank.

Upgrading ISO/IEC 17025:2017 accreditation for the microbiology laboratory

Microbiology Unit of Institute of Post-Harvest Technology has the capacity to analyze seafood, food, water and ice samples for pathogenic bacteria, indicator organisms and fungus using conventional microbiological methods and molecular techniques.This capability of the laboratory is very much helpful to the seafood and ornamental fish exporters and government institutions like Department of fisheries, Coast Conservation Department, Marine Environment Protection Authority (MEPA), universities, etc., to analyze their samples and get a valid and reliable test report. Hence the laboratory has been accredited since 2003 to ISO/IEC 17025 to demonstrate its technical competency and to ensure the accuracy of the test results. ISO/IEC 17025 standard was revised in 2017 and currently the laboratory accreditation status has been upgraded to ISO/IEC 17025:2017 standard.

OCEANOGRAPHIC STUDIES

Offshore sand deposits to meet the demand of construction and other industries are explored off the eastern and southern coast. Suitable sand deposits with an appropriate grain size are identified off Galle and Weligama with a sediment layer thickness of 0.5 to 3 m and 0.5-4 m respectively.

Sea level monitoring station network is expanded. In addition to Colombo, Trincomalee, Mirissa sea level stations, construction of stations at Point Pedro and Krinda had been completed. Potential of the Puttalam Lagoon is assessed for economic development. Strong variation of environmental qualities; salinity, nutrient and productivity are mapped to define zones for possible aquaculture activities. Coastal stability of northwestern coast is assessed to identify beaches prone to erosion and protect them.

HYDROGRAPHIC SURVEYS

NARA provides Hydrographic services to ensure safe and efficient navigation in Sri Lankan waters. This is a mandatory requirement of full filling the obligation of Chapter 5 of Regulation 9 (Hydrographic Services) of International Convention for the Safety of Life at Sea (SOLAS). Accordingly charting areas are selected to ensure that hydrographic surveys are being carried out, as far as possible, adequate to the requirements of safe navigation where stakeholders and also being to prioritized. The other principal services are the provision of up dated and accurate bathymetric and topographic data for coastal zone management, environmental protection and maritime delimitation. The up-to-date hydrographic information coverage offers significant economic and commercial benefits through facilitating maritime trade and other marine activities.

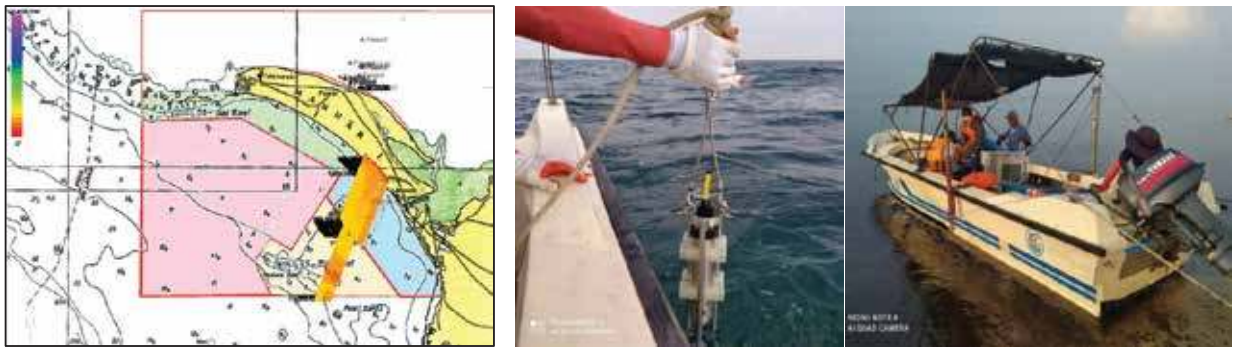
Following surveys and activities were conducted for the year 2021,

i. Nautical Chart for Lakvijaya Power Plant in Norochcholai

The nautical chart of “Approaches to Norochcholai” was produced as per the request of CEB and the chart shows the recommended channel for the coal transportation Barges which are operated from the anchor point to the pier of the power plant.

2. Nautical Chart Mannar Island.

The total area surveyed 27 sqkm for the Nautical Chart Mannar Island. This chart will be facilitated for aquaculture development and other ocean-based researches.



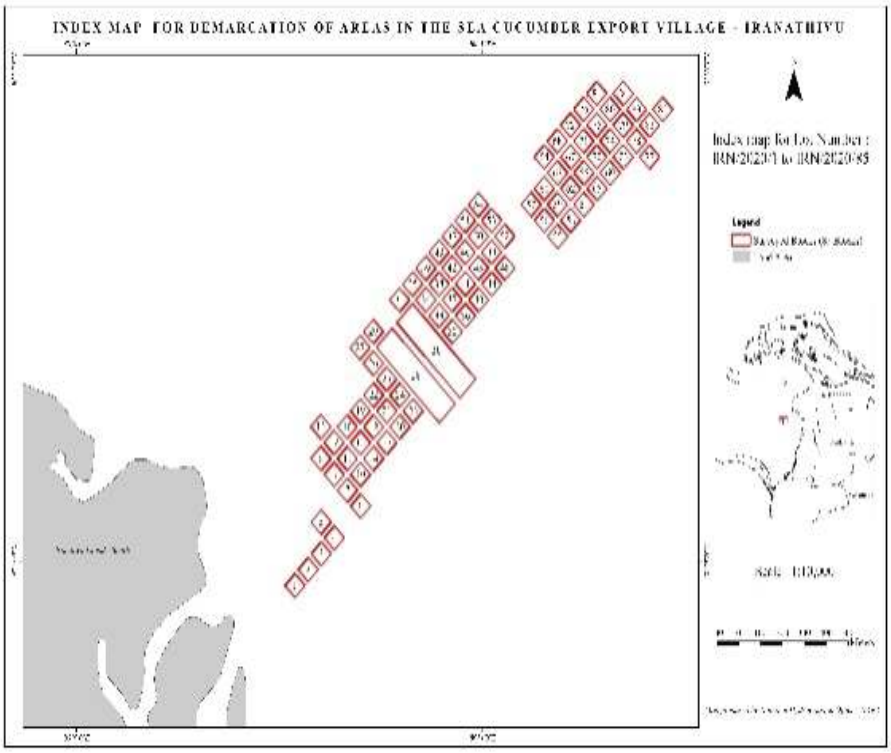
Nautical Chart of Mannar Island

3. Investigations of sand borrow area off Rathmalana.

Offshore sand borrow site of the Coast Conservation and Coastal Resources Management Department was reinvestigate to determine the sand volume after previous dredging took place. Bathymetric chart for the borrow site was prepared. The extractable sand volume is 10 million Cum from total volume of 14.22 Cu m million

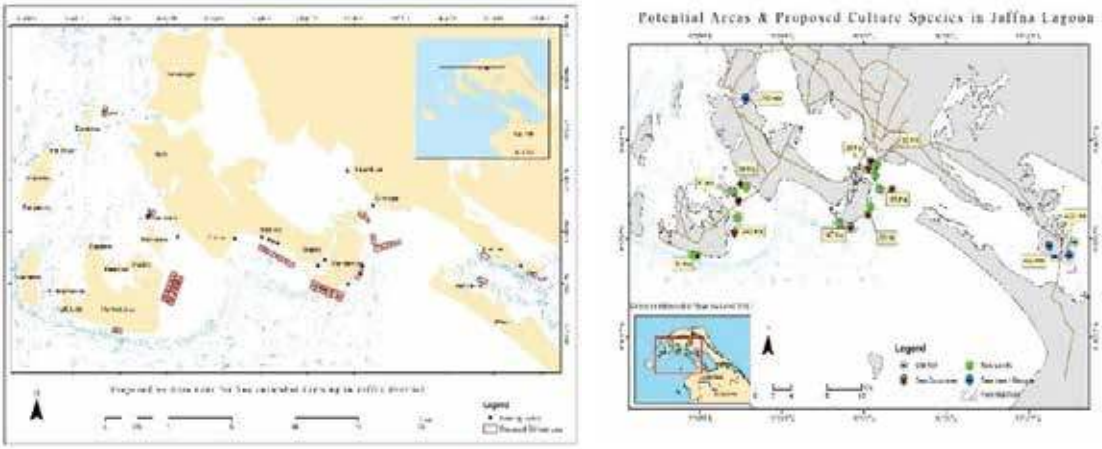
4. Mapping for demarcation of areas in the sea cucumber export village in Northern province for NAQDA

To encourage the sustainable agriculture and fishery ventures, the Jaffna district is selected for establishing a dedicated sea cucumber farming zone for overseas market. The National Aquaculture Development Authority (NAQDA) is awarded this project to demarcate the sea plots for sea cucumber farms. Surveys were carried out to demarcate of suitable plots for sea cucumber export village in sea area of Northern Province.



Maps of the Sea Cucumber export village in Northern Province

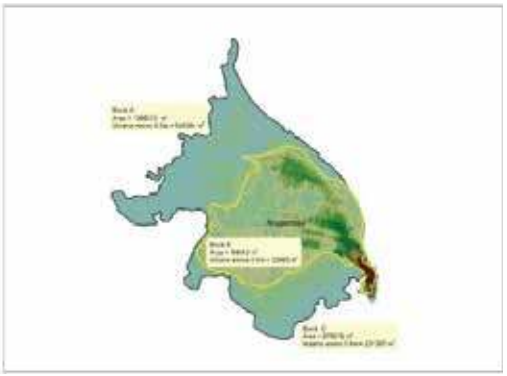
5. Mapping of Potential area for Mariculture in Jaffna Lagoon



Maps for the potential area for Mari culture in Jaffna Lagoon

6. Volumetric calculation of Nandikadal and Arugambay lagoons

Volume calculation was done for the Nandikadal and Arugambay lagoons for dredging purpose.

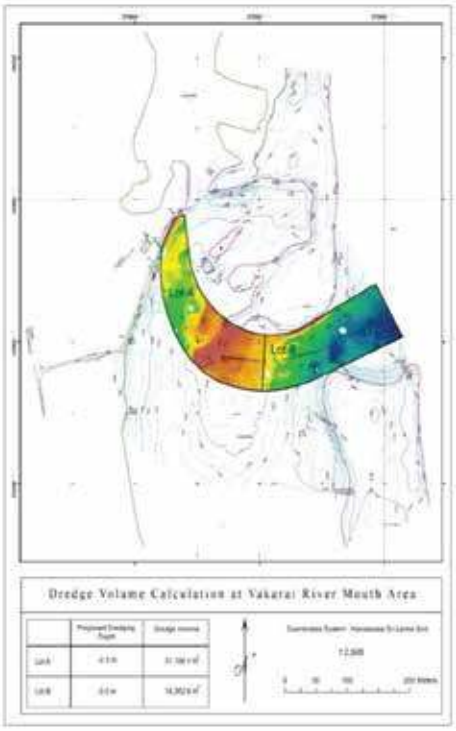


Arugambay lagoon

Nandikadal Lagoon

7. Dredge volume calculation at Vakarai River Mouth Area

Volume calculations were done at Vakarai River Mouth for dredging purposes.



volume calculation at Vakarai River Mouth Area

8. Bathymetric Survey for Volume Calculation – Upper Kotmale Reservoir

The bathymetric surveys carried out to provide ground contours to use of present silt quantity for preparing de silting contract of the resorvoir.

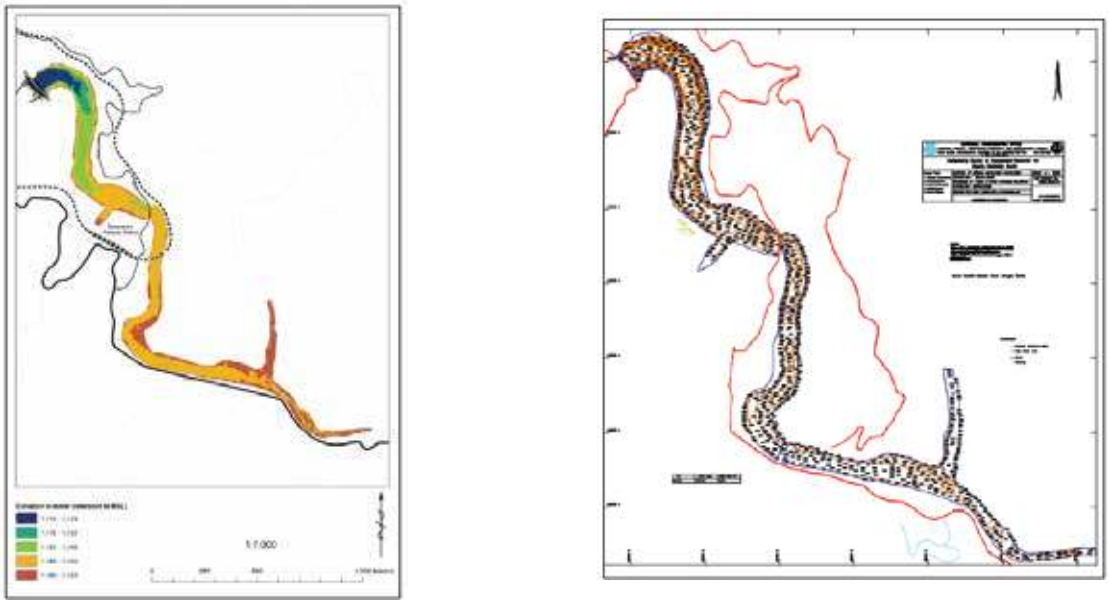
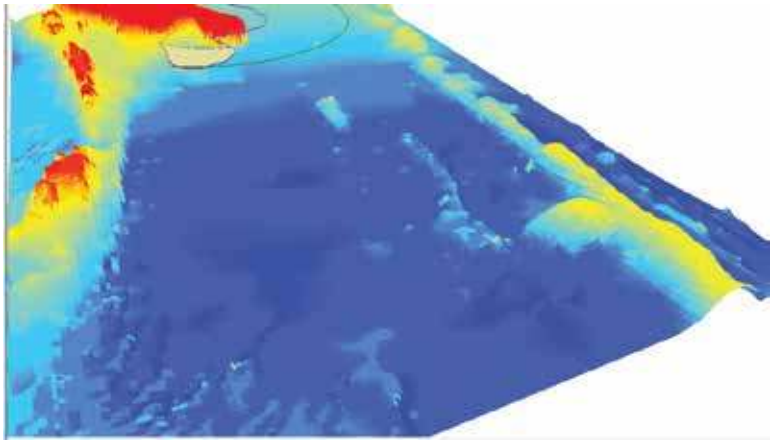


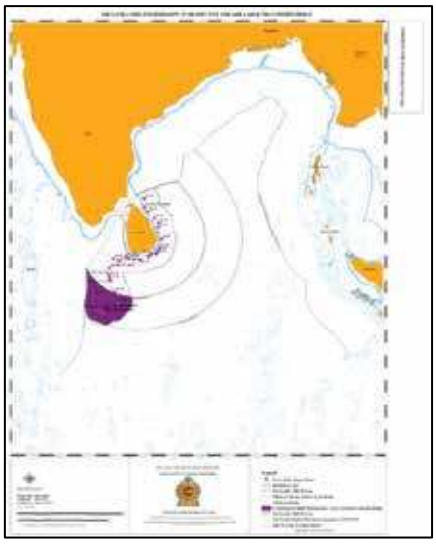
Fig 12: Bathymetric chart of the Upper Kotmale reservoir

Preparation of maps for "Continental shelf submission of Sri Lanka" in respect of the area around Comorin Ridge for National Ocean Affairs Committee (NOAC) , Ministry of Foreign Affairs.

Submission made in accordance with paragraph 8 of article 76 of the United Nations Convention on the Law of the Sea and article 3 of Annex II of the Convention in respect of the area around Comorin Ridge.

Claimed Area: 92,078.17 Sq km





Claimed area in respect of the area around Comorin Ridge

SOCIO ECONOMIC AND MARKETING STUDIES

The socioeconomics assessment of vulnerability and adaptation of the fishers on climate change in the marine fishery of Sri Lanka

The global climate change vulnerability index has ranked Sri Lanka as the second most vulnerable country for climate change. This study focuses the vulnerability of fishing community for climate change and possible adaptation strategies on impacts of climate change. The fishermen in Jaffna, Trincomalee, and Tangalle interviewed using pretested semi-structured questionnaire during the first six months of 2021. Results revealed that offshore fishers mentioned that an unexpected cyclone was the major climate disaster they faced during the last five years. The cyclone caused to increase cost of the fishing trip and postharvest losses. The lagoon fishers experienced salinity increased in the lagoon and reduced the production of fish. The beach erosion had caused negative impacts on coastal small-scale fisheries. The divers and fish collectors had experienced catch reduction due to the coral bleaching. Introduction of on time weather forecasting and warning system, tolerable designs for vessels, coastal vegetation and constructing wave breaking structures, remove sand and plastics waste deposited on coral reefs and coral replanting were remedial measures found to mitigate negative impacts of climate change.

Value chain analysis of export-oriented fisheries in Sri Lanka

The fisheries sector in Sri Lanka has been emerging as a dynamic export-oriented sector which needs to undertake value chain analysis to evaluate economic scenarios in the sector. The objectives of this study were to identify and assess the existing value chains of export oriented fisheries and propose potential development activities under the concept of value chain development.

Data were collected through direct interviews with boat owners/skippers, agents/wholesalers & processors/export companies in Negombo, Dikovita, Tangalle using semi structured questionnaires. High input cost (fuel, bait, ice, etc.), lower prices for fish, price volatility and poor bargaining power over the fish prices were the main issues faced by the fishers. Assemblers in the value chain did not have sufficient financial capacity to operate in their full capacity. The main constraints for fish exporters were lack of skilled laborers for processing, low quality of fish due to lack of new technology in catching fish, lack of safety equipment for fish processing and local fish supply is not enough to fulfill the orders when demand was high for fish at the international markets.

Assessment of Socio-economic status and Benefit - cost of farming systems of Penaeus monodon and Penaeus vannamei in Sri Lanka

Shrimp is considered as the second most important export item in terms of value among fish and fishery product export of Sri Lanka. There are two farming systems and investigation of socioeconomic aspects of these two systems; Penaeusmonodon and Penaeus vannamei will be beneficial for the sustainability of the farming systems. Assess socio-economic status of shrimp farmers and economic feasibility through benefit-cost analysis were main objectives.

Farmers in Ambakandawila, Thoduwawa, Udappuwa were participated to the questionnaire survey and in-depth interviews. As key findings following issues were identified in farming systems of Penaeus monodon and Penaeus vannamei. Initial cost was comparably high in P. Vannamei compare to P. monodon, small scale shrimp farmers (with 2-3 ponds) unable to shift for P. vannamei due to economics of scale, P. monodon had higher market price and demand than P. vannamei, and P. Vannamei was susceptible for white spot disease.

STUDIES ON MV X-PRESS PEARL BURNING INCIDENT

The X-Press Pearl cargo ship which carried 1,486 containers, with contents including 25 tons of nitric acid (which can be used in the manufacture of fertilizers and explosives), other chemicals, cosmetics and low-density polyethylene (LDPE) pellets, caught fire off the coast of Colombo, Sri Lanka on 20 May 2021.

NARA has been appointed to aquatic resources assessment committee and hold responsibility of providing qualitative and quantitative data and information on short term and long-term effects on the living organisms and aquatic environment from the ship accident. In the context of the X-Press Pearl accident, following two biomonitoring programs are conducted to improve knowledge of the effects of chemicals on living organisms and at the same time to increased protection of public health and

environment.

- Biomonitoring of the wreck itself to determine its hazardousness (does the wreck continue to release hazardous products into the environment);

- Environmental biomonitoring program to evaluate environmental consequences of MS X-Press Pearl incident and the extension of its effects both in space and in time.

NARA RECRUITED 36 NEW STAFF MEMBERS

Hon. Douglas Devananda, Minister of Fisheries, Hon. Kanchana Wijesekera, State Minister, Ministry of Ornamental Fish, Inland Fish and Prawn Farming, Fishery Harbour Development, Multiday Fishing Activities and Fish Exports Mrs. R.M.I. Rathnayake, Secretary, Ministry of Fisheries, Mr. Jayantha Chandrasoma, Secretary, State Ministry of Ornamental Fish, Inland Fish & Prawn Farming, Fishery Harbour Development, Multiday Fishing Activities and Fish Exports, Professor A. Navaratnerajah, Chairman/NARA and Dr. H.M.P. Kithsiri Director General/NARA, handed over letters of appointment to the newly recruited officers' on the 22nd of March 2021 at the NARA auditorium. Ministry officials, Head of Divisions and other key staff of NARA participated to the event.

STATE MINISTER VISITS NARA

State Minister of Ornamental Fish, Inland Fish & Prawn Farming, Fishery Harbour Development, Multi-day Fishing Activities and Fish Exports Hon. Kanchana Wijesekara and, Secretary to the State Ministry Mr. Jayantha Chandrasoma visited NARA on 01st of February, 2021. The purpose of the visit was to review the progress of the last year and to discuss the action plan for the year 2021. Minister and State Secretary also visited Research Divisions of NARA. Professor A.Navaratnerajah, Chairman/NARA and Dr.H.M.P. Kithsiri, Director General/NARA, participated to the event.

04.
Ceylon Fishery Harbours Corporation (CFHC)

Our vision

To be the fundamental resource of the fisheries Industry and the inspiration of the local fishing community whilst striving to become the top facilitator of the regions maritime enterprise.

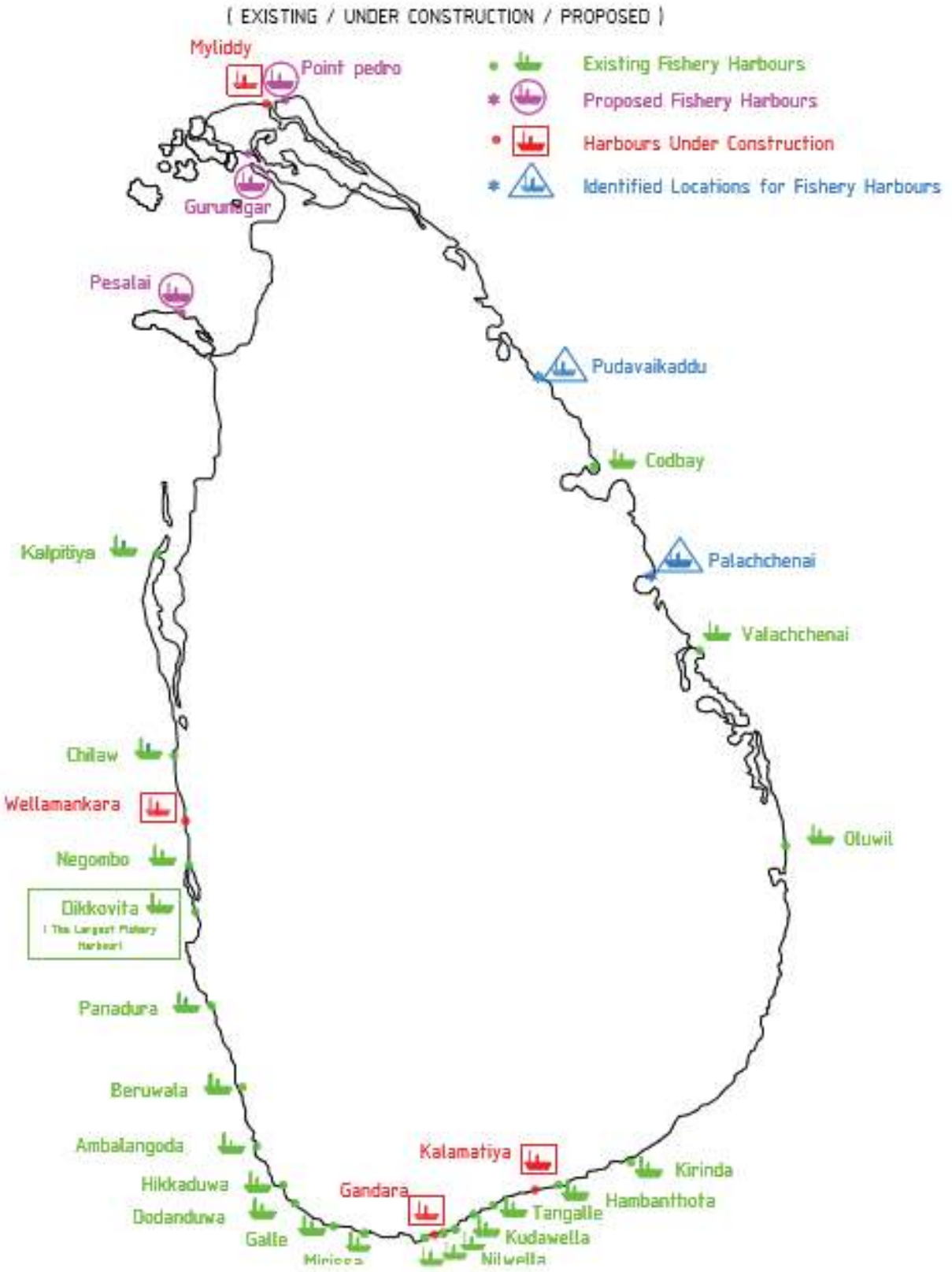
Our Mission

To deliver superior quality fishery harbour related services together with supporting infrastructure to provide all modern facilities to the fishing community, and achieve self-sustainability by upgrading the harbours through commercially viable ventures.

Functions

- Planning, designing and constructions of fishery harbours, anchorages, marine structures and other shore facilities,
- Establishment, operation, control and maintenance of Fishery Harbours, anchorages, marine structures and other shore facilities.
- Management of fishery harbours, anchorages, and other shore facilities.
- Provision of repairing and maintenance facilities for fishing crafts.
- Establishment, Operation and Maintenance of cold room, ice plants and other refrigeration facilities.
- Supply of water, fuel, lubricants, electricity, ice, cold room facilities and any other services and any other services incidental thereto for the purpose of fishery industry and fishermen.
- The provision of security to fishery harbours, anchorages, marine structures and other organizations within the Ministry of fisheries an
- Aquatic resource, and to recover charges, fees and any other payments on account of it
- The monitoring, control, surveillance of Sri Lanka's Exclusive Economic Zone (EEZ)

FISHERY HAROURS IN SRI LANKA



Ceylon Fisheries Harbor Corporation

According to the Prosperity Vision Policy Statements, all existing fishing harbors will be modernized and rebuilt as required to accommodate large and multi-day fishing vessels to enhance the deep sea fishing industry.

01. Construction of new fishing harbors

- Construction work is 100% complete as per the plan of Kalametiya Fisheries Harbor. Procurement is underway for identified additional functions. Construction of Vellamankara Fisheries Harbor is 99% complete

- Development of Gandara Fisheries Harbor began at the end of 2020 as the only harbor in the Southern Province that can serve large fishing boats. At present the construction progress is 12%. Construction is scheduled for completion in 2023.

- Construction of two anchorages at Rekawa and Mawella commenced at the end of 2020. The construction progress of Rekawa is 59% and the progress of Mawella is 23%. Rekawa construction work is scheduled to be completed in February 2022 and Mawella construction work in June 2023.
- The construction plans of the Balapitiya Fisheries Harbor have been completed and the Environmental Study Report has been opened to the public.
- Plans for the Point Pedro Fisheries Harbor have been finalized and discussions are underway with the Asian Development Bank and the Department of External Resources to obtain financial assistance for the project.

- Plans for the Kapparathota fishing harbor in the Matara District have been finalized and an environmental impact report is being prepared.

02. Modernization of existing fishing harbors

There are 22 existing fishing harbors under this institution. The major development activities being carried out in relation to these ports are as follows.

- The construction contract for the second phase of the development of the Myladdy fishing harbor has been awarded and construction is scheduled to begin in November.

- Engineering plans have been finalized to change the breakwaters at Hikkaduwa, Ambalangoda and Dodanduwa fishing harbors to prevent long-lasting sand filling. Procurement is done to select a consulting firm for the environmental assessment activities related to these ports.

- With the assistance of the French Government, the project report for the modernization of Beruwala, Galle, Puranawella and Kudawella Green Fisheries Harbors, the main fishing harbors in Sri Lanka, has been completed and social and environmental impact reports are being prepared.

- Feasibility studies are underway to construct a 300 m platform embankment to enhance the anchorage facilities at the Valachchenai Fisheries Harbor.

- Tenders have been prepared for the construction of breakwater and other development works for Kalpitiya, Tangalle and Kodbay fishing harbors. Construction is scheduled to begin in 2022.

- A project proposal has been submitted to develop the Mirissa Fisheries Harbor as a private public tax investment and its evaluation work is in progress.

- Procurement work is underway to select an advisory team to study whether coastal erosion has occurred in the Outer Harbor Basin as per the recommendations of the Coast Conservation Department to enable sand filling and safety vessel movement in the Hambantota Fisheries Harbor Basin.

02. 1. Calling for public-private partnerships in all fisheries harbors to implement projects related to fisheries areas (EOI) Improving port facilities.

The Fisheries Harbor Corporation is to implement private sector investment projects for the following projects by inviting aspirations related to the fisheries sector.

- **Solar Energy Project.**
  Under the initial phase, action has been taken to implement the solar energy project for the Kudawella Kalametiya fishing harbors and under the second phase it is proposed to implement the solar energy project for all fishing harbors. It is proposed to reduce the cost of electricity for the Ceylon Fisheries Harbor Corporation through this project.

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- **Establishment of Marine Mechanical Factories (Marine workshops).**
  Under the initial phase, it is proposed to construct mechanical workshops at Dickowita, Beruwala and Kudawella fishing harbors.

- **Construction of a boat dock.**
  A shipyard is to be built at the Dickowita fishing harbor to manufacture boats.

- **Construction of ice factories and cold storages.**
  Initially, new ice factories are being set up at Galle, Kodbe and Kalametiya fishing harbors.

- **Facilitate yachts, marinas and Sea Food restaurants.**
  In the initial phase, work is underway to build yachts, cruise liners and tourist restaurants at the ports of Panadura, Kalpitiya, Galle, Puranawella and Vellamankara, combining fisheries and tourism.

03. Waste Management in Fisheries Harbors

Preliminary work is being carried out to produce organic fertilizer liquid using daily discarded fish parts and fish waste in fishing harbors.

05.
Ceylon Fisheries Corporation (CFC)

Vision

To be the Leading Commercial Organization, Guiding and promoting fish production and trade for the benefit of the Consumer and the Producer.

Mission

the Leading Commercial Organization, Guiding and promoting fish production and trade fcccor the benefit of the Consumer and the Producer.

Objectives

- Facilitating strategic investments having analyzed expenditure and benefits
- Improving our service beyond the expectation levels of the customers
- Providing a reasonable price to the fishermen and providing good quality fish to the consumers at a reasonable price
- Performing as a national institute that is capable of maintaining a fixed price in open market
- Actively achieving export opportunities for selected fish varieties in Sri Lanka

Present status -

The approved staff of the Ceylon Fisheries Corporation is 724. The total staff consists of 669 employees, of which 213 employ in head office and 456 employees have attached to outlets and 120 on a daily basis. Of these, 31 are managers.

The Ceylon Fisheries Corporation has 23 District Offices and Divisions related to the purchase and sale of fish and it consists of 17 purchasing and Marketing Offices, 03 Purchasing Offices and 03 Marketing Offices at the Head Office. The Ceylon Fisheries Corporation also has 95 outlets islandwide.

CFC has earnedt and income of Rs. Million 2518.5 during January –September period in 2021, which is an increase of 11.3% , When compared to relevant period in2020.

Sales Outlet Island wide owned by CFC

Pruchasing centers	marketing centers	selling and purchasing centers
Trinco	Anuradhapuraya	Negombo
Pesale	athnapuraya	Beruwala
Kudawella	Kurunegala	Metro
Puranawella	Kandy	Galle
Kalmunai	Bandarawella	Hambanthota
		Tangalle
		Minneriya
		Point Peduru


SRI LANKA
91
outlets
Jaffna
Kilinochchi
Mullaitivu
Mannar
Vavuniya
Trincomalee
Anuradhapura
Puttalam
Polonnaruwa
Batticaloa
Kurunegala
Matale
Ampara
Kandy
Gampaha
Kegalla
Nuwara Eliya
Badulla
Colombo
Monaragala
Ratnapura
Kalutara
Galle
Matara
Hambantota

From January to September 2021, 07 new stores have been opened in the following areas.

1. Kandana
2. Gampaha Mega Store
3. Ja Ela
4. Narammala
5. Homagama
6. Ruwanwella
7. Hirimbura

Places to open new stores in the future

1. Establishment of 25 mega outlets in each district covering the entire island. Under this programme, a mega shop has been opened in the Gampaha district.

2. Opening of small shops at 16 selected locations throughout the island. Out of this, shops have already been opened in Kandana, Ja-Ela, Narammala, Homagama, Ruwanwella and Thirimbura.

   At present the Fisheries Corporation (usually) Around 400 Mt of fish are purchased monthly and the stalls spread all over the island. Monthly sales volume is 390 Mt

Key role played by the Ceylon Fisheries Corporation in the Covid 19 epidemic situation.

During the period when there were travel restrictions for the consumers during the Covid 19 epidemic situation, the Fisheries Corporation has been able to transport fish to their homes and provided quality fish at a very reasonable price

Also, fish stocks were procured directly from the Peliyagoda Fisheries Harbor to empower the fishing community when the stock purchasing centers island wide were inactive.

The Ceylon Fisheries Corporation (SLFC) expects to continue to minimize losses and reach the profit-margin by selling 500 MT.

Sales plan presented to increase sales from 390 MT to 500 MT.

following plans will be implemented.

1. Establishment of 25 mega outlets covering every district.
2. Establishment of 16 small stalls covering areas where fish are easily available.
3. Take steps to make non-updated marketing methods and brands with new technology and a competitive enterprise that is up to date..
4. The Ceylon fisheries Corporation is also working on its own online platform to carry out home deliveries islandwide.
5. Strengthening of transport network by adding more refrigerated vehicles the fleet for transport of fish maintaining good quality.
6. In addition to strengthening the main marketing potential of the Ceylon Fisheries Corporation for Fish Marketing and Ice Marketing, increasing the contribution of other assets to the Ceylon Fisheries Corporation by utilizing the financial and technical knowledge (The fish packing factory set up in the Galle Fisheries Corporation Complex has been leasing at a loss but so far it has been able to generate additional income by providing a monthly rent of Rs. 3 Mn

Cold rooms and Ice plants of CFC.

Expression of Interest (EOI's) have been called pre operation and management of existing cold rooms and ice plants under public – private partnership with the objective of providing optimum sevice for fisher community.

New fish stalls established in 2021.

Gothatuwa stall



Gampaha megastall



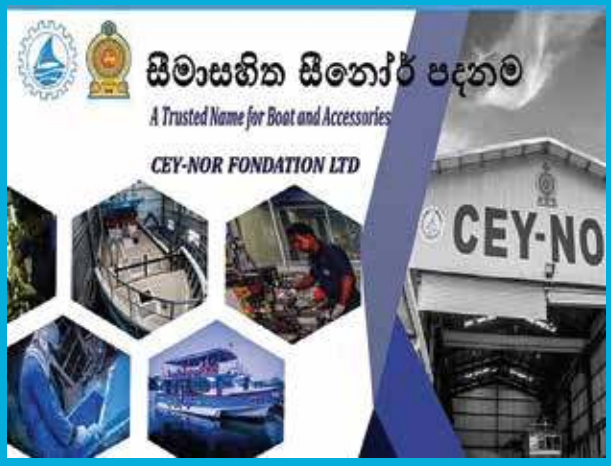
Narammala stall


Ruwanwella stall



Galle / Hiribura stall


Homagama stall

06.
CEY NOR FOUNDATION LIMITED

VISION

- To be the best in boat building & providing maritime services

MISSION

- To archive excellence with customer satisfaction through innovations in a sustainable environment

TARGETS

- To become a recognized exporter of fiberglass boats
- To become an internationally renowned fiberglass boat manufacturer.
- To become an investor in the manufacture of fiberglass boats in foreign countries.
- Supply of high quality fishing boats and fiber products.
- Be an excellent customer service provider.

DUTIES & SERVICES

- We are manufacturing and supplying Fiberglass fishing vessels, boats required by the local freshwater as well as freshwater fishing and other fiberglass related fishing gear.
- We are Providing maritime services and modern vessel production for the tourism industry
- We are focusing on the production of innovative & variety of fiberglass products.

SUMMARY OF THE ORDERS IN 2021

Processing Orders			
NAME OF CUSTOMER	DESCRIPTION	QTY	VALUE (RS.)
		Total	Total
World Food Program (WFP)	15.5 canoes with outriggers	60	4,664,835.90
	18.5 canoes with Outriggers	10	
Colette Blanche offshore, Mauritius	55 feet fishing boat	1	USD 185,000.00
Mr. Irfan, Dematagoda	Ice box 7ft x 3ft x 3ft	3	480419.13
Southern Provincial Council	Fish pallets	37	950,211.43
NAQDA	Hatchery Tanks	18	1,614,029.46
Ministry of Agriculture , Peradeniya	Sales Out lets	06	1,341,855.66
	Nets	295	1,241,600.00
	15.5 ft Fiberglass canoes & out triggers	10	429,779.68
CFHC	45 ft * 12 ft floating Pier	1	2,500,000.00
SL Navy Headquarters	18.5 ft Dinghy Boat	60	17,429,922.20

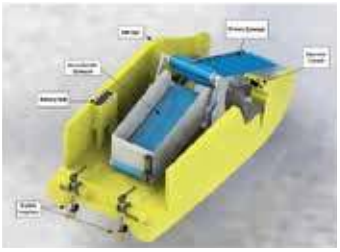
Completed Orders			
R. Indralojan, Hospital Rd, Kalmunai	59.5 feet Fishing Boat	1	29,900,000.00
NAQDA	Fiberglass Live fish transport Tank	1	2,095,244.13
Vishwa Parami Trust, Colombo	Manufacturing and Supply of Seemamalakaya	1	23,887,495.17
Provincial Department of education, Northern province, Nallur	Hand wash units	754	8,656,696.48
Mahaweli authority Welikanda	Net cages	50	4,426,000.00
Colombo Engineering	Gelcoat application work of cabin	1	139,345.61
NARA	Cement Tanks using fiberglass	16	1,844,179.20
Irfan	Ice Box 7' x 3' x 3'	3	480,419.13
World Food Program (WFP)	15.5 canoes with outriggers	60	4,664,835.90
NAQDA	Hatchery Jar	9	620558.25
Serandib Holding (Pvt) ltd	Security Hut	1	249184.18
Southern Provincial Council , Galle	Life Jackets	150	425,000.00
Mahaweli authority , Thambuththegama	Net cages	10	819,304.00
Ceylon Petroleum	repair of "Lanka 01" boat	1	261739.26
Ministry of Fisheries	Wash basin units	12	148,563.07
NAQDA	Fiberglass 15.5 Canoes	15	1,058,947.18
	Fiberglass 10.2 Outriggers	15	

SPECIAL PROJECTS IN 2021

- Manufacturing & distribution of Fiberglass wash basins
- Manufactured Floating Seemamalakaya for Vishwa Parami Trust
- Launched Eco friendly boat with Solar
- Manufacturing New inland canoes as per NAQDA guidelines & specifications

PROJECTS UNDER CONSIDERATION-2021

- Floating Restaurant , Aluthgama customer
- Fiberglass Roofing Sheet .Contractor : Roo Niwahana , Kandy
- Stainless steel Net cages structure
- Acquisition of land for boat building – crow island , Mattakuliya
- Garbage Collector – Electric Trash Skimming Device
- Build fiberglass Recycle plant in Mattakuliya Boat Yard
- 45 ft line handling boat for petroleum corporation
- Hygienic fish drying table
- Newly designed small boat for lagoon fishing Floating path to carry fish in lagoon (trincomalee)
- Fish selling kiosks with Solar powered freezer
- Solar greenhouse fish dryer



AREAS TO BE DEVELOPED

- ✓ Start Operations in Kareinagar Boat Yard
- Discussion of Indian Grant for Kareinagar Boatyard
- Discussion with Norwegian Company for Public- Private Partnership

- ✓ Investment in marketable moulds
  - 79 ft Boat
  - Clinker Boat

- ✓ Investments in new technical machineries & facilities
  - Larger fishing vessel (79 feet) building facilities (proposed to acquire crow island land)
  - Speed boat , leisure boat , building facilities
  - Developing latest Fiberglass composite boat construction and the vacuum infusion method

- ✓ HR Development
  - Hiring technical staff
  - Administrative guidelines which is suitable to business organization