



M. S. SWAMINATHAN RESEARCH FOUNDATION, POOMPUR

Science, Service and the Seas

Ten years of

FISH FOR ALL RESEARCH AND TRAINING CENTRE

An institution for increasing resilience capacity of small-scale fishing and farming communities



Marking 15 years of the Indian Ocean Tsunami

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Message from the Founder

This publication brings out clearly the power of partnership. The tragedy of the tsunami has been converted into a wake-up call to work for the greater resilience of the coastal community through this programme. The aim of this partnership is 'Fish for All and Forever' for sustainable development.

I hope that all those who read this report will emulate the example set up by this unique Fish for All Research and Training Centre. These activities were carried out with generous support extended by Tata Trusts, Microsoft Tsunami, Qualcomm Wireless Reach, Indian National Centre for Ocean Information Services (INCOIS), National Bank for Agriculture and Rural Development (NABARD), Tamil Nadu Fisheries Department, Puducherry Fisheries department, Blue sensus, Germany, and we wish to express our sincere thanks to them. We also thank our network partners and all the coastal communities for enabling a fruitful partnership.

I congratulate DrVelvizhi and all her colleagues on the significant research milestones from the centre and wish continued efforts to ensure improved lives and livelihood of coastal communities through the work of this centre.

PROF M S SWAMINATHAN
Founder,MSSRF

Message from the Executive Director

While we observe 15 years of the Indian Ocean tsunami disaster on 26th of December 2019, it is also an occasion to remember the lessons we have learnt, on actions for disaster management and vulnerability reduction. The best long-term preparedness is capacity development of local women and men to enable them to avoid risk and protect themselves from natural calamities.

MSSRF, with this objective as the central focus, started the "Fish for All Centre" (FFA) in 2009 with initial funding support from the Tata Trusts. On the 26th of December, 2019 we complete our first 10-year milestone with many notable results that improved community resilience and reduced their risks. This booklet captures highlights of our journey over these years in achieving the Sustainable Development Goals (SDGs), and we hope the information given would help replicate the successes gained in newer areas of concern.

The FFA Centre has so far trained over 10,000 fishermen and women by conducting a range of skill development trainings, focusing on sustainable livelihood development, fishery resource enhancement, coastal farming and food system improvement. It also has launched six certificate courses for fishers and students which benefited more than 1,000 individuals. Our demonstrations on livelihood interventions to increase income of coastal communities received wider attention from the Govt. of Tamil Nadu and Puducherry states. The Fisher Friend Mobile Application (FFMA), one of the flagship interventions of the Centre reached over 60,000 fisher folk covering 576 landing centres of 59 coastal districts in 9 states.

The Fish for All Centre also functions as a platform that brings together key stakeholders in coastal system research and development. The Zero Hunger goal of the SDGs underpins all the activities we do, and we believe this Centre can play a pivotal role in helping the country achieve SDGs 1, 2 & 14 in particular in the state of Tamil Nadu.

Dr N Anil Kumar
Executive Director, MSSRF

Message from our valued partners

TATA Trusts

At the establishment of the Fish for All Research and Training Centre, the plaque notes "Dedicated to the Fisher Families and Coastal Communities of India on the commemoration of the 5th Anniversary of Tsunami 26th December 2009. This facility has been established with the generous support from Jamsetji TATA Trust, TATA Education Trust." The Foundation is grateful for this spontaneous and generous support.

Mr. Anirban Mukerji, Senior Manager, Wireless Reach, Qualcomm

The Wireless Reach program of Qualcomm, demonstrates pioneering uses of Qualcomm's mobile innovations to help drive human and economic progress in underserved areas globally. Qualcomm Wireless Reach in partnership with the Fish for All Centre of MSSRF and INCOIS has provided a transformative mobile service, Fisher Friend to artisanal marine fishing communities which is both improving safety in the open seas and increasing their income. I congratulate the Centre for completing a decade in their mission of supporting the vulnerable community of marine fishers, the most dangerous primary producer occupation.

Dr. Balakrishnan Nair TM, Scientist G & Head Ocean Science & Information Services Group Indian National Centre for Ocean Information Services (INCOIS)

The fruits of science need to reach appropriate stakeholders and there is a need that every stakeholder who is far away from technological advancements and dependent on traditional knowledge, is touched, fed and made adaptive to the scientific or technological breakthroughs, in order to harvest the fruits. Fish for All program stood as a great hope to bridge this gap between the labs and land. It took the ocean information services to the fingertips of fishing communities through continuous interactive and focussed interventions which is commendable.

Dr. Sameeran IAS., Director, Department of Fisheries, Government of Tamil Nadu

It is with great pleasure, that I learnt about the activities of "Fish for All Centre" especially their need-based approach to fisher communities in terms of livelihood, rehabilitation, education and extending their hand of support to orphans after the Tsunami. The centre's approach in fishery resource management, disaster response, sustainable fishing, good aquaculture practices in fish farming, capacity building and modern technological approaches like fisher friend mobile application are commendable. I once again appreciate "Fish for All Centre" being developed as one of the pioneering centres in India, under MSSRF in offering services to Socio-economically backward communities. I wish "Fish for All Centre" success in their future endeavors.



1. GENESIS OF THE PROGRAMME

December, 26, 2004 was the most distress day in the modern history of human lives and natural calamity in the Indian Ocean region. The earthquake that struck on that day with an estimated magnitude of 9.1 Richter scale in Sumatra region caused the strongest tsunami since March 28, 1964. According to the National Centre for Environmental Statistics 2,27,898 people were killed or listed as missing and presumed dead by the Indian Ocean tsunami. Devastation was massive as waves measuring 10-40 feet in height struck the shores and surged up beaches, buildings, and entire villages before waning back into the ocean. All the 13 coastal districts of Tamil Nadu were affected, but the worst losses were recorded in Nagapattinam where 6,065 people were killed. An estimated 85% of people affected by tsunami came from the

fishing community; it left them with great shock, fear and trauma and they had to struggle to adapt to the post-tsunami situation and rebuild their livelihoods. Ever since the devastating event, disaster risk reduction and preparedness became part of the development plans and policies of almost all coastal nations of the Indian Ocean coast.

M.S. Swaminathan Research Foundation (MSSRF), in response to the disaster had undertaken a range of field level activities to build the resilience of the coastal communities in Tamil Nadu, Puducherry and Andhra Pradesh. On December 26, 2009 MSSRF with funding support from the TATA trusts, inaugurated community research and training centre named Fish for All Research and Training Centre in Poompohar Nagapattinam district of Tamil Nadu with the purpose of spearheading a coordinated effort in promoting sustainable development practices.



2. FISH FOR ALL RESEARCH AND TRAINING CENTRE (FFARTC)

This centre was conceptualized based on the felt needs expressed during the post-tsunami interactions with the coastal communities as part of addressing a long-term strategy to bring a collective and holistic approach in fish resource management, sustainable livelihood options, disaster preparedness and management. This centre functions as training cum demonstration space, to strengthen and diversify livelihoods and identify alternative economic activity for coastal communities to add value to the process chain- capture/ culture, commercialization and consumption- by adopting a participatory approach involving all the associated stakeholders and institutions.

The centre's main focus is taking appropriate actions to build the adaptive capacity of fishers and make them resilient to the changing climate. This is carried out through participatory research, creating awareness on adaptation, importance of sustainable fishing and environmental practices; diversifying livelihood options; evolve a network of fishers for strengthening the coastal and marine biodiversity; enable access to key relevant and real time based

scientific information; and providing early warning alerts by using affordable and energy efficient communication technologies, besides working towards enhanced security in maritime borderline, risk zones and safeguarding coastal and marine biodiversity.

3. BROAD OBJECTIVES OF FFARTC

The broad objectives of the FFARTC are:

- To evolve a management model of livelihoods and wherever possible increase the long term productivity of fisheries and aquaculture through sustainable use of aquatic resources and application of environmentally sound technologies
- To assess the vulnerability and enhance adaptive capacity to climate change in coastal fisheries
- To ensure adoption of responsible and sustainable fishery practices marine fisheries and introducing a code of conduct for this purpose
- To develop social marketing techniques, to ensure availability of good quality aquatic products to consumers, thus helping both resource-poor producers and resource-poor consumers through self help groups

- To strengthen food security of rural poor and their socio-economic development through improved access of fish products to domestic, regional and international markets
- To enable a self-replicating process by developing community organizations capable of tapping both internal and external resources and for advocating their own agenda relating to regional issues, capacity building, financial and credit management

The centre applies various adaptive measures to build resilience of coastal communities through its projects and programmes focusing four major thematic areas

1. Capture fisheries resource management and enhancement
2. Post-harvesting technologies and livelihood promotion
3. Culture fisheries resource management and enhancement
4. Training and institution building

4. KEY ACTIVITIES

4.1 Capture Fisheries Resource Management and Enhancement

Small-scale fisheries constitute 81% of total fisheries in India. From the 1990s, small-scale fishers have seen income from fishing, fluctuating widely mainly due to uncertain fish catches, over exploitation of resources, a decline in several commercial species, competition



and conflicts for fishing grounds and fishery resources at sea. All severely affect the sustainability of marine resources and livelihoods of small-scale fishers. These fishers are also highly vulnerable to natural disasters and increasingly impacted by climate change. Erratic weather patterns, increasing temperatures, and rising ocean levels threaten the people who live there. This demands a need for an integrated approach for maintaining capture fisheries resource enhancement and management with an aim of long-term sustainability of small-scale fisheries development.

4.1.1 Community-based Artificial Reef Programme

This programme was initiated in the Nagapattinam and Karaikal coastal waters, to enhance fishery resources to ensure livelihood security of small-scale fishers. This programme is being implemented with active participation of



the traditional fishing community. At the ground level, Village Marine Council has been constituted with the representation from different resource user groups for the management of the artificial reef in the targeted villages. At the district level, an advisory committee has been constituted with involvement of the Indian Coast Guard, Fisheries Department, NABARD and district administration to provide necessary guidance and support for effective management of the artificial reefs. Three artificial reef modules, two for commercially valuable fishes such as Grouper and Lobster and one for small fishes were selected, fabricated and deployed. The effects of the artificial reef on fishery production in the area are clear and fisherfolk are satisfied with fishery production in the AR area. The centre has received number of requests from the villagers to deploy more such artificial reefs across the coast to increase the fishery production.

4.1.2. Promoting sustainable fishing practices

In collaboration with the Tamil Nadu Fisheries Department, Central Institute of Fisheries Technology, Cochin and Central Marine Fisheries Institute, Mandapam has started a flower shrimp fishery improvement programme in Palk bay region to help the fishing communities to preserve fish stocks over the long term but also improve the global marketability of their catch given the increasingly high demand for sustainably caught seafood in global export markets.

To empower fisher folk on sustainable fishing practices capacity building campaign on marine conservation and fish quality control measures were started, in partnership with Network for Fish Quality Management and Sustainable Fishing (NETFISH). Totally 36,420 fishermen and 13,567 fisherwomen from 504 fishing villages from seven districts have been trained on sustainable fisheries techniques. The trainees were taught about conservation, sustainability, implementation of mesh sizes, ecosystem conservation, and government regulations. Continuous demonstration and promotion of sustainable fishing practices facilitated the fishers to realize the importance of by-catch reduction measures, growth of juvenile, brooder fishes and other marine organisms that are not commercially important to fishermen. Now, fishers show interest

and willingness to use square mesh in the caudal end of trawl nets. Consequent to the training, handling of ice for fish preservation has improved in all the selected harbours, and fishers are icing the fish at 1:1 ratio. The bamboo basket has been completely removed, and only plastic baskets are used for fish handling in Nagapattinam and Karaikal fishing harbours.

4.1.3 Co-management of fishery resources for sustainable livelihoods

The centre promotes participatory management of fishery resources involving resource user's community for promoting sustainable livelihood and disaster risk reduction. It is implementing the Fisheries Management for Sustainable Livelihoods (FIMSUL) project that aims to reduce vulnerability of coastal fishing communities by involving them in the decision-making process for participatory management (co-management) of fishery resources with the Government of Puducherry. 1527 fisherfolk from 27 fishing villages were sensitized regarding co-management concepts using structured training programmes. Co-management committees have been constituted and strengthened in the 16 fishing villages. In order to strengthen the livelihood options for fisherfolk, a village specific livelihood assessment study was conducted in the 27 fishing villages of

Karaikal and Puducherry districts using the 'Five Capitals' (natural, human, social, financial and physical) based sustainable livelihood approach.



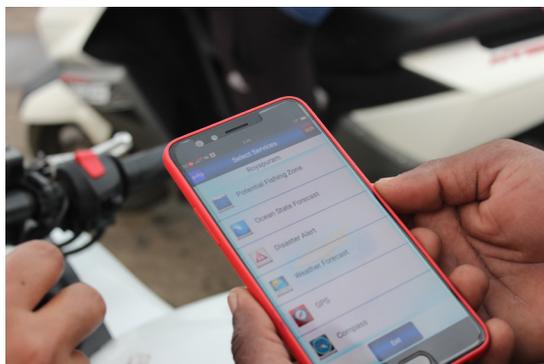
4.1.4 Conservation program for protecting endangered marine turtles

Fish for All Centre in association with Forest Department has been involved in educating fisher population in conservation of turtles; Awareness on importance of turtle conservation is created involving the Panchayat leaders, youth, college students and SHG women in Poompuhar, Vanagiri and surrounding villages covering 114 fishers. With the participation of Forest department and local community 11003 turtle eggs were collected nearer Poompuhar and Vanagiri villages and incubated in hatchery established by forest department at Vanagiri. So far about 4,173 hatchlings were released into the sea.

4.1.5 Wave Rider Buoys for forecasting ocean early warning information

The Centre is responsible for functioning and management of the wave rider buoy in three locations of Tamil Nadu and Puducherry deployed by the Indian National Centre for Ocean Information Services (INCOIS) to forecast surface and sub-surface ocean parameters. The receiver shore station in Panithittu, Colachel and Tharuvaikulam villages receives real time data on ocean waves based on which ocean state advisories are generated and communicated by INCOIS. A community based monitoring mechanism has been evolved to safeguard and monitor the WRB. A community-based monitoring mechanism has been evolved to safeguard and monitor the WRB buoys. About 55,615 fisherfolk from 632 villages have registered with MSSRF across the states of Tamil Nadu, Puducherry, and Andhra Pradesh and receive information (ocean state forecasts, high wave alerts and potential fishing zones) daily through mobile based Information Communication Technology (ICT) applications. Over 99,486 fisherfolk accessed the INCOIS–MSSRF 24/7 helpline facility, available in both Tamil and Telugu, for relevant information. Traditional knowledge and practices of fisherfolk have been documented with regard to oceanographic parameters (weather, wind, rainfall, cyclone, water current- and identification of fish shoal)

through interactions, discussions and informal interviews. This data will be used to strengthen marine fishery advisories issued through this system.



4.1.6 Fisher Friend Mobile Application (FFMA) - a decision making tool for small scale fishers in India

The Fisher Friend Mobile Application (FFMA) is a mobile app developed by MSSRF in collaboration with Qualcomm and INCOIS which is a unique single window solution to address all the knowledge needs of the fishing community. Fishermen access the advisories on wind speeds and wave heights and this enables fishers to decide on whether it is safe to venture into the sea for fishing. Usage of the mobile app is tracked using Google Analytics and during the Gaja cyclone which hit the coastal state of Tamil Nadu, fishers used "Disaster Alert feature" of the mobile app and understood warnings by not venturing into the sea for fishing. The application works in nine languages to provide access to artisanal marine

fishermen in their native language through scientific advisories of Ocean State Forecast and Potential Fishing Zone provided by Indian National Centre for Ocean Information Services (INCOIS).

Participatory approach involving fishing communities and other key stakeholders was used at every stage in the development and evolution of FFMA which became a decision support system and enhanced its user-friendliness besides accuracy of the information. A total of 1,026 fisherfolks across three states Tamil Nadu, Puducherry and Andhra Pradesh took part in the pilot phase. The critical feedbacks from the users in the last four years enabled the FFMA to evolve through 45 revisions as a PAN-India application and upscale its benefit to fisher folk across coastal India. FFMA is now available with latest technology interface in the Google play store. Currently 55,000 fisher folks are accessing FFMA from 576 landing centers of 59 coastal districts in nine states of India. Over 500 users have been interviewed about the benefits of the application and numerous fishermen have applauded the initiative in saving their lives and property through the information they have received from the mobile application. The study undertaken among the users revealed that 90% of fisherfolks found it important for decision-making in times of critical situations and undertaking informed fishing. This has resulted in risk reduction evading fishermen from livelihood asset

loss in the events of disasters, increased income between INR 20,000 and INR 3,00,000/- per catch, and resource saving of fuel, and reduced number of fishing days per trip.



4.1.7 Navigational aids to small scale fishers for safe fishing

As part of the livelihood enhancement programme, 100 Global Positioning Systems (GPS) were distributed to small scale fishers of which 50% cost was shared by the community. GPS, an important navigational aid for fishers help to locate fishing grounds, track fishing routes and store the traditional fishing grounds for their future reference. The initial post assessment study conducted from 20% of fishers who received GPS revealed that the navigational aid along with Potential Fishing Zone (PFZ) information from the centre helped them not only increase fishing efficiency in terms of reaching underexplored fishing grounds but straight away reduced search time and diesel cost as well as get an assured catch, yielding good income.

4.2 Fisheries Post-Harvest Management

Both men and women in the fishing community are vulnerable to uncertainty in incomes through capture fisheries. Specifically, fisher women have become more vulnerable in recent years due to changing situations. Previously women were involved in small-scale marketing including fish vending, processing and fish marketing. They are also employed in processing work including in cleaning, peeling and related activities. In recent times, due to entry of large-scale players in fish processing and marketing, the fishing sector is shifting towards being more commercial and export-oriented. As a result, women are totally marginalized in fish marketing and processing and the bulk of benefits are siphoned off by middle agents. Therefore, it is imperative to build capacities of fisherwomen to make them successful entrepreneurs through technological

and knowledge empowerment and compete in the markets. This calls for empowering them in processing, value addition, improvement in quality of raw fishes, entrepreneurial skills to manage enterprises and establishing forward and backward linkages for sustaining the business.

4.2.1 Community-based fish processing unit

The HACCP standard Fish Processing Unit (FPU) with the processing capacity of 5 tonne set up at the Fish for All Research and Training Centre continued its mandated work to educate, train and develop skills among the fishers, to maintain the standard practices of hygienic pre-processing of local fish, and to prepare value-added items and help market them. The unit is equipped with laboratory, packaging and storage unit, back up chill room, effluent treatment plant etc. The fish processing



and packaging section is equipped with necessary machineries and utensils to prepare marinated fish products. Quality of raw fishes is properly analyzed by sensory evaluation methods to ensure only quality fishes enter into the processing unit. HACCP standards have been maintained in all process of ready to eat and cook material preparation. It helps the fishers to avoid distress sale of fish and prevent loss of income, also arrest the spoilage of fish in ambient temperature.

The centre focused on developing entrepreneurs who can produce and market value-added fish items using the facilities of FPU and using the services of trained women fishers. FFA Centre entered into a Memorandum of Understanding with two marketing companies for purposes such as to create regular employment opportunities for fisherwomen, produce ready-to-cook and eat fish products from low value fishes, dry fishes and increase the availability, accessibility and consumption of nutrient rich fish to urban consumers at an affordable cost. Fish Chain is developing strategic partnerships with retailers in urban locations for marketing.



4.2.2 Quality dry fish production using Tunnel Solar Dryer

Two Tunnel Solar dryers with a total production capacity of 600 kg were established at the Fish for All Centre to help fisherwomen produce good quality dry fishes. It is simple, easily manageable and environmentally friendly technique with a number of advantages (i) drying is much faster than open space, (ii) protection of fish from dust, insects, flies, birds and animals, (iii) better quality and nutritious dry fish, (iv) simple methods and easily adoptable by women. Nearly 10 tonnes of fishes such as anchovies, ribbon fish, mackerels, silver bellies and lesser sardines were processed in the solar dryer by over period of four years. Due to better quality of dry fish, the women who used solar dryer for dry fish production earned an additional income of INR 100 - 150 per kg than open sundried fish. Steps have been taken to improve the flavor of dry fishes and retain its quality for longer period. A research study was undertaken with two varieties of dry fishes by adding different flavors like chilies, pepper and turmeric.

Microbial growth was measured and biochemical analysis was performed for both open and solar drying fishes.

4.2.3 Literacy on FAO code of practice on fish and fishery products standards

The literacy on code of practice for fish and fishery products is intended for fisher men, women, and processing workers engaged in fishing, fish handling, storage, processing and auctioneers, and traders marketing fish and fishery products. To improve the standards of fish products, a series of training and demonstration programmes were conducted in association with Fisheries department, MPEDA and Fisher associations on fish quality management in the fish processing unit, at landing centres and at selected fishing harbors in Nagapattinam, Cuddalore, Ramanathapuram and Kanyakumari districts. Over 7,097 fishermen and 5,768 women from 112 villages underwent training. Due to this continuous education, bamboo baskets are no longer used for fish handling; only plastic baskets are used. Also, handling of ice has been improved. The fishers shifted to the safer practice of using 1:1 ratio of ice for fish processing which retains quality. Onboard and personal hygiene improved among fishers engaged in marine fishing.

4.3 Culture Fisheries Resource Management and Enhancement

Inland aquaculture has emerged as a fast-growing enterprise and a viable alternative to the declining capture fisheries in India. Due to continuous failure of monsoon and drought in recent years, the small and marginal farmers in this region are under stress due to poor or no return from agriculture. One of the options for addressing the issue is integrating aquaculture with farming system and promoting low input sustainable fish culture techniques among small holding farmers.

4.3.1 Integrated Fish Farming System (IFFS)

Integrated fish farming is one of the major activities implemented and promoted by Fish for All Centre. This is a low input fish farming system and seeks to optimize the management and use of internal production inputs (i.e. on farm resources) and to minimize the use of external production inputs. Over a period of 10 years, the centre has successfully facilitated fish farmers to integrate more than ten components centering on fish pond including poultry, vegetable crops, Azolla, vermiculture, apiculture, dairy, goat farming, tree crops, fruit crops, fodder crops. Farmers adopting IFFS get regular income throughout the year from any one of the sub-components.



The Centre focused on developing a fish farmers federation with 6 farmer clubs, with total 200 farmers belonging to Sirkazhi and Sembanarkovil blocks. Work towards mobilizing an additional 200 farmers is in progress. In order to provide technological support and scientific skill to farmers practising the integrated farming system, constant interaction with 30 IFS farmers is continuing. Regular meetings were conducted and assistance were provided to get quality seeds and subsidy for pond preparation from the government. Soil samples were collected from 900 farmers and analysed and based on that soil health cards were distributed. High efficiency low cost, fuel-saving concrete pedal pumps were fabricated and distributed to 200 small and marginal famers. A group of masons were trained and employed to fabricate these pumps.

For the collective action a federation

named Kaveri Integrated Fish Farmers Association was formed. The centre facilitated farmers to go for collective harvest and linked the farmers with fish market for the whole sale. The farmers collectively harvested and collectively sold the fishes and earned better income. Even during severe drought and water scarcity experienced farmers who are involved in integrated fish farming get an income per year ranging between Rs 40,000 and Rs 62,000 without much difficulty. This has motivated 52 small farmers living in and around Poompuhar region to approach Fish for All Centre for technical guidance of converting their small fish pond into integrated fish farming system.

4.3.2 Inland fish culture

Under this programme, initiatives to provide technological support/ skill development through training to enhance



fish production/ species diversification and conservation of natural resources. The Centre facilitated and technically supported 174 fish farmers from 54 villages and successfully managed the community pond fish culture over 10 years. One farmer cluster was formed. Help was given to farmers in the procurement of carp seeds, in getting licences from the Coastal Aquaculture Authority. The successful demonstration of community pond fish culture in Thenpathi Village by involving women Self Help Group (SHG) members motivated SHGs and farmers from other villages to do the same in their village community ponds. As they approached the centre for technical guidance, 184 underutilised farm ponds, covering an area of 119.38 acres in 54 villages in and around Poompuhar were identified to promote fish culture.

4.3.3 Ornamental fish culture

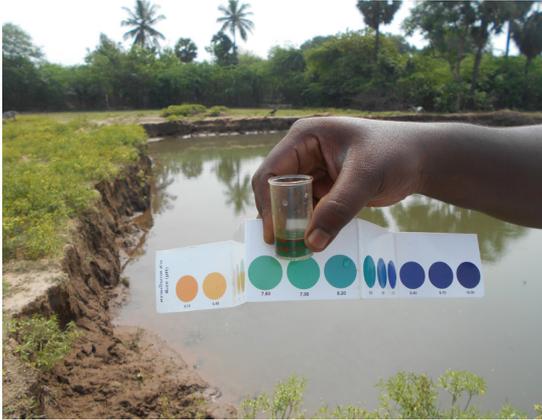
A fresh water ornamental fish culture unit was established as one of the livelihood support programmes for fisher women. Fresh water ornamental brood stock Guppies, Batch Koi, Milky



Koi, Widow tetra and Albino tin tail were introduced in fibre glass and cement tanks. Regular training were arranged for the fisherwomen on ornamental fish culture techniques, tank maintenance, water recycling, and disease and feed management practices. Linkages were established with ornamental fish traders for marketing of young ones. The women, trained on ornamental fish culture are now actively involved in ornamental farm management and they have acted as local experts for aquarium tank establishment, feed distribution and maintenance of tanks to those who bought the tank from them and earned an additional monthly income of INR 3,000-4,000. Efforts were also taken to minimize disease outbreak such as fin rot, dropsy, ulcerations, gill rot, and cottonwool due to bacteria, fungus and copepods infections.

4.3.4 Water testing laboratory

A mini water-testing laboratory was set up during September 2017 in the premises of Fish for All Centre to address the need expressed by fish and shrimp farmers in and around Poompuhar region.



The lab is capable of measuring different water quality parameters like salinity, pH, alkalinity, hardness, dissolved oxygen and ammonia. The Centre also created awareness on the collection of water samples and its transportation to the laboratory. Based on the results necessary recommendations are being provided, and the farmers are linked with Central Institute of Brackish water Aquaculture (CIBA) and Fisheries Institute of Technology (FIT), Chennai using ICT platforms for getting expert opinion for fish and shrimp culture practices and disease management. 540 fish farmers from 14 villages availed the facility, and 856 water samples were analysed so far.

4.4. Training and Capacity Building

The Fish for All Training centre facilitates necessary knowledge, training and capacity building to promote sustainable fisheries and provide a platform for convergence of various stakeholders in building partnership for effective management and utilization of the coastal

resources. The centre train fishermen, women, artisan, nontraditional fishermen, fish vendors, fishing laborers and fisher women to add value to the chain from Capture/culture – consumption through multiple training modes inclusive of ICT.

4.4.1 Training Centre

The training component of the Centre is gradually and steadily getting recognition from various stakeholders. This is evident from increasing requests for both residential and regular training programmes from fishing community, NGOs, colleges, bankers and fisheries department officials across the states of Tamil Nadu and Puducherry. Based on the need and requests 377 training programs were conducted in which about 17,351 fishers from 14 coastal districts of Tamil Nadu and Puducherry participated. Preliminary feedback of participants has shown that the training was helpful to learn in depth and realise the issues related to fish quality management, sustainable fisheries and fish based livelihood programmes.



Officials from fisheries department often approach the Centre for various capacity building programmes. Efforts are also being undertaken for registration of the centre under Tamil Nadu Skill Development Council (TNSDC) and Tamil Nadu Fisheries University for expanding the programme in a sustainable manner with the recognition and support from the government.

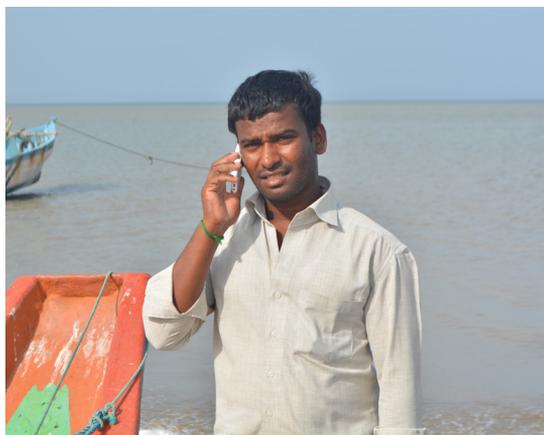
4.4.2 Certificate course on fish processing and post-harvest technology

Fish for All Research and Training Centre has signed a MoU with three colleges in Nagapattinam and Karaikal districts under the UGC Institute Industrial Collaboration Programme to train students in fish processing and post harvesting technology. The aim of the initiative is to translate theoretical knowledge into practice and to create entrepreneurial avenues for students. Different methodologies such as field visits, workshops, involving in data collection process and hands-on training are used so that they can understand the various practical issues and the process



related to the training. This resulted in 892 students and 32 faculty members from three colleges getting enrolled and completing the certificate course on fish processing and post harvesting technology. Requests from colleges in other districts like Cuddalore and Kanyakumari are increasing for such kind of programme and courses.

4.4.3 ICT-based Village Resource Centre and Village Knowledge Centres



Three Village Resource Centres (VRC) and four Village Knowledge Centres (VKC) are operational in the coastal districts of Nagapattinam, Ramanathapuram and Puducherry under the umbrella of Fish for All Centre. Overall, 192 villages across coastal districts of Tamil Nadu, Puducherry and Andhra Pradesh also connected with fish for all centre through virtual VKC mode. The VKC and virtual VKCs have been established along the coast in order to give timely information on weather and wave heights, location of fish shoals, fish market information, value

addition, sustainable fishing technologies etc. Mobile telephony has proved to be of particular value in communicating the right information at the right time and place and to the right persons. Regular audio and mobile messaging advisories are sent out reaching about 15,000 fishers. A 24/7 hour helpline is also in operation. Such information has helped artisanal fishermen to go into the ocean with courage and confidence and return with a good harvest.

5. SIGNIFICANT ACHIEVEMENT OF FFARTC

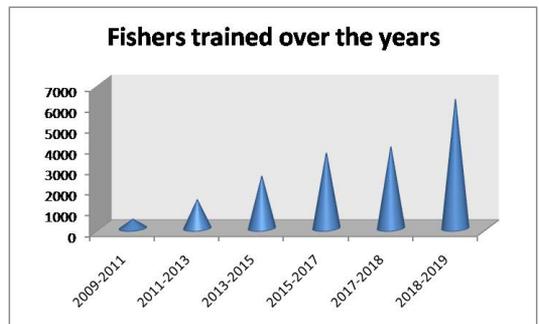
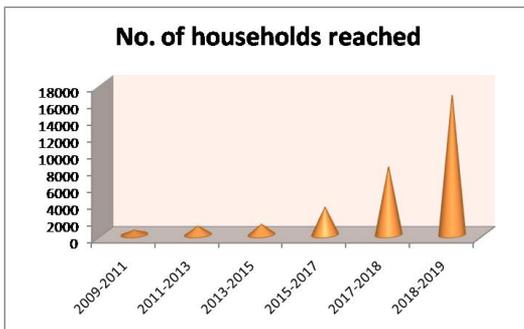
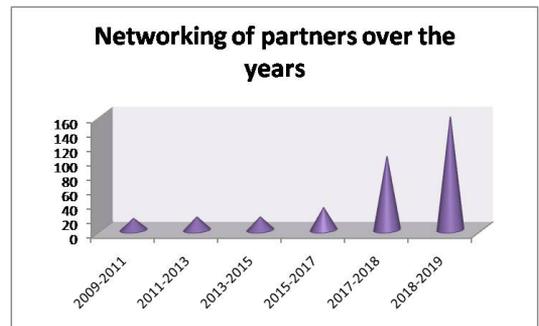
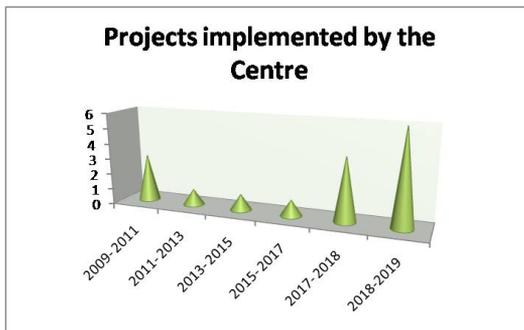
Over 10 years, the centre achieved several mile stones to ensure sustainable fisheries and promote sustainable livelihoods of small scale fishing and farming communities of the region. Some key milestones of the centre are listed here.

1. The participatory management or co-management efforts initiated by the centre in promoting sustainable fisheries and managing marine resources yielded encouraging results. Over 16 village-level co-management committees were formed involving different marine resource user groups in two districts to develop village-level participatory planning for managing marine resources.
2. The community based Hazard Analysis Critical Control Point (HACCP) standard fish processing unit of the centre to promote knowledge and skills on fish processing and post harvesting technologies acting as a training-cum-demonstration centre for processing and value addition. It helps women on collective action for hygienic fish processing, value addition, improvement in quality of raw fish, entrepreneurial skills to manage enterprises and establish forward and backward linkages to sustain the business.
3. 152 skilled fisher women trained by Fish for All Centre from Winmeen Fish and Fish Producer Association have been engaged in this endeavour for 10-15 days per month on a rotational basis. So far, 40 tonnes of fishes and prawns were processed at the centre and 4,568 human days were involved in processing. In total the women earned INR 6,83,700 - as additional income from the processing work and on an average each one earned an income of INR 3,000 to 3,500 per month.
4. In order to augment coastal productivity, a community-based artificial reef programme has been initiated with participation of local fishing communities of Nagapattinam and Karaikal districts to improve income of local fishers by creating more fish habitats and enhancing resilience to natural disasters.

5. Diversification into off-farm livelihoods with location-specific enterprises, based on natural resource base such as collective fish trade, crab fattening, fish pre-processing, quality dry fish production, fish culture, ornamental fish culture, value added fish products, compost making from fish waste, and collective farming covering about 922 households.
6. PAN-India Fisher Friend Mobile Application (FFMA) is available with state-specific features. Timely information through 'Fisher Friend' resulted in increased economic benefits and reduced risks for fishermen. Saved 527 fishermen lives during the cyclones – Hudhud, Phailin, NADA, Vardha, Okhi and Gaja with timely intimation given to Indian Coast guard and coastal security police. Continuous monitoring of coastal waves through Wave Rider Buoys in Colachel, Tharuvaikulam and Puducherry led to charting of developing and communicating location-specific advisories by INCOIS
7. Over 113,756 users were reached from 66 coastal districts using multiple ICT tools for disseminating ocean state and potential fishing zone services. The adoption of Potential Fishing Zone (PFZ) by small craft fisher folk was found to be significant, since most of them began to explore the PFZ beyond theirs
8. traditional fishing areas. They also saved travel time, energy and fuel. Fishermen from the state of Andhra Pradesh pointed out that availability of species-specific information helps them carry appropriate net
9. This centre promoted more than 152 integrated fish farming systems (IFFS) to increase income and farm sustainability of small holding farmers. It successfully facilitated fish farmers to integrate more than ten components centring on fish pond and farmers adopting IFFS to get regular income throughout the year from any one of the sub-components
10. Enhanced knowledge and skill of 25,660 individuals through 556 trainings in livelihood, sustainable fisheries and coastal farming practices.
11. Nurtured 47 self help groups, two federations and two village Institutions for building social capital for livelihood enhancement.

6.GROWTH PATTERN OF THE FFARTC OVER 10 YEARS

The centre slowly and steadily growing over period of 10 years for achieving the sustainable development of coastal fishing and farming communities with the active participation and support of the key stakeholders



7. VOICES FROM THE COMMUNITY MEMBERS



Name : Ms Kanaka
 Occupation : Head, KadalMadha SHG
 Village : Poompuhar
 District : Nagapattinam



"My husband is a fisherman. Before I came into contact with Fish for All Centre I was mostly engaged in household activities. Encouraged by one of my neighbours, ten of us, mostly from a poor economic background, formed a Self Help Group (named KadalMadha) during 2015, with the support from Fish for All Research and Training Centre.

Initially we found it little difficult to manage the group's activities. It was something new for the women in our village. Gradually we got accustomed to the work related to the group and our group took on the work of dry fish production. We began our activity after getting training from the Fish for All Research and Training Centre. We were trained on production of dry fish with and without salt, masala dry fish using tunnel solar dryer and packaging of the produce.

In the beginning we faced certain difficulties in carrying out our activities due to shortage of funds; our SHG became a member of Winmeen Federation an apex body of SHGs. Our group borrowed INR 10,000 from Winmeen federation. This helped us begin our work in fish processing sector. Initially we purchased fish from the market as well as from the landing centres. After procuring the fish it was brought to the processing unit and we cleaned the fish using a standardized methodology. We are careful in handling fish resources in a hygienic manner. Hands-on training really gave us confidence to carry out work efficiently.

In the initial period marketing of the product was difficult because people were not aware of the quality of the product. We only got INR 50 as our earnings per day. However, we did not give up our effort in marketing the dry fish product. With the help of FFARTC, we conducted awareness meetings and camps to make the villagers understand the quality of the fish products produced and its nutritive value. We also have taken efforts to promote marketing of the fish through advertisement, displaying posters and banners. Gradually we won the confidence of the local people and our earnings

started improving. The dry fish produced using tunnel solar driers has better quality and fetched us an additional income of INR 100 - 150 per kg than the open sundried fish.

The earnings earned through marketing of dry fish products help us to take care of some of the household expenses- medical expenses, school fees, buying milk and nutrient rich food for children. The exposure we gained through our association with the activities of the Fish for All Centre has certainly helped us to improve our lives and livelihood. Most importantly, it has enhanced our self esteem. My oratory abilities have improved and I can lend a helping hand in conducting meetings. I can meet any government official without hesitation on behalf of our group on any issue related to our lives. Our group members are also happy that they are able to earn through dry food production and marketing of the same. We are immensely thankful to MSSRF and we wish to continue our economic activity with the facilitation of Fish for All Centre of MSSRF.



Name :Ms Nandhini
 Occupation :President, Winmeen Federation
 Village :Poompuhar, Nagapattinam district



I am the President of Winmeen federation, a fish product producers group started in November, 2015 with facilitation of Fish for All Centre of MSSRF in Poompuhar, Tamil Nadu. The main objective of the formation of this federation was to improve lives and livelihood of fisherwomen, through training and capacity building. The Winmeen federation was started with the main objective of helping fisher women earn a better livelihood. Through this federation, approximately 200 women from our village and neighbouring fishing villages got benefitted by participating in the training and workshops conducted by the Fish for All Centre. We have been trained in specific livelihood enterprises such as fish pre-processing, hygienic handling of fish, quality dry fish production, value added fish products and compost making from fish waste. We were made aware that processing of fish in a hygienic way is very important for daily household consumption and marketing of the product. The fish value added products which we prepare are mainly 'ready to cook and ready to eat' type; our products include various kinds of snacks and eatables like fish pakora, prawn pakora, prawn omelette, fish cutlet, fish pickle, dry fish pickle etc. We prepare the above mentioned items in our home also and it is well received by our family members and

neighbours. We feel encouraged when we are appreciated by relatives and friends. I would like to mention here that around 200 skilled fisher women have been trained by Fish for All Centre from Winmeen Fish and Fish Producer Association. They have been engaged in this endeavour for 10-15 days per month on a rotational basis. So far, 15 tonnes of fishes and prawns were processed at the centre through our federation and 809 human days were involved in processing. In total the women earned INR 6,20,000 as additional income from processing and on an average each one earned an income of Rs. 3,000 to 3,500 per month.

Being part of the federation, many women in our area improved socially and economically. I personally have benefitted a lot; I am able to handle household and outside activities without much dependence on my husband. By selling the value added fish products and other fish items we get additional income at least for six months in a year. These earnings help us to take care of certain household expenditure (grocery, paying electricity bill, giving gifts to our friends); we are able to buy something for our children (school note books for children, paying their school fees) without depending much on the men. Proximity of the training centre helped us to complete our household chores and participate in the activities conducted by them. We felt secure going to the Centre; the working condition is safe.

I can confidently say that due to the exposure provided by MSSRF we are capable of handling different activities and approach any government officials and banks. We are extremely indebted to this foundation.



Name : Mr Arumugam
Occupation : Fisherman (motorised boat)
Village : Kasimedu, Chennai district



I am Arumugam from Kasimedu village in Chennai, Tamil Nadu. I have been fishing for the past 30 years. I used to go for fishing in my motorised boat that has a capacity of 4 tonnes and very recently I bought a mechanised boat in partnership with my brother that has a capacity of 20 tonnes with latest features.

I started using the Fish for All Centre helpline services since November 2013. I was introduced to Fisher Friend in February 2014. The Fish for All team gave me an android phone loaded with Fisher Friend. I had never used an android phone before in my life.

Initially, I used to refer to the PFZ information provided by Fisher Friend. It used to give us PFZ information from Srikakulam to Kanchipuram. This feature helped us to move in the right direction, saving us time and resources. On most occasions, I had a good catch, and I remember once we had a catch of 10 tonnes of tuna species with a wider range like yellowfin tuna, skyjack, ray, hilsa, gur fish, etc. We earned up to INR 8,00,000 with the PFZ information.

In December 2014, we navigated to the provided PFZ location only to confront high waves and wind speed. We panicked and rushed to the shore. We incurred significant loss that day and that was when one of the fishermen mentioned the importance of checking Ocean State Forecast (OSF) in Fisher Friend before venturing into the sea. From that day onwards, I check the OSF information first and then the PFZ location.

Once I was in deep sea and my Garmin GPS failed to work because of the cloudy weather; then I opened the GPS feature of Fisher Friend. It helped me navigate to the landing centre. By adding the shore points in Fisher Friend, I was able to calculate the distance and direction.

With Fisher Friend, there has been significant reduction in the loss of fishermen lives after the widespread use among the fishermen in my area. I thank MSSRF, Qualcomm and INCOIS for this novel app.



Name : Mr C Radhakrishnan
 Occupation : Integrated Fish Farmer
 Village : Valluvagudi, Nagapattinam district



I am Radhakrishnan, a marginal farmer from Valluvagudi Village of Nagapattinam district, Tamilnadu. I own 1.5 acres of wet land and a borewell; there has been gradual increase of salinity in the water. I found agriculture not remunerative and faced losses. Few farmer friends and I decided to harvest rainwater by digging water ponds in our respective farm lands, with financial support from the Department of Agriculture under the farm pond scheme during 2005. I became a member of a farmer club namely Vivekananda Farmers Club formed in June, 2011, in Valluvagudi village, facilitated by the FFARTC of MSSRF. I gained theoretical/

technical knowledge and practical training by participating in various training sessions on the Integrated Fish Farming systems conducted at Fish for All Centre.

My participation in the training motivated me to take up integrated fish farming in my farm land by digging a proper pond. I followed necessary steps in preparation of the pond before initiating the fish culture and thereafter in maintaining it and integrated other components. Now available components within our farm include a fish pond, dairy animals, two sheds, poultry, fruit and timber yielding trees, vegetables and various bean varieties are cultivated on the bunds during July to September and January to March. With guidance from Fish for All Centre, I purchased fingerlings from good fish hatcheries. Our farmers club followed proper management practices based on the protocol and it was awarded as a Best Farmers Club on March 8, 2012. Also, our farmers club's work encouraged Nagapattinam district fisheries department in the formation of Nagapattinam District Fish Farmer Development Agency.

My income from the Integrated Fish Farming increased year by year. I understand the concept of integrated fish farming thoroughly now. It gives year-around income from different components. Not only that, my household gets vegetables and milk for consumption taking care of the nutrient requirement at least to an extent. Most important, the tree crops and vegetables prevent soil erosion. I am thankful to MSSRF and Fish for All Centre that gave me necessary scientific and technical guidance to improve my knowledge on integrated fish farming and also improve my income.



8. WAY FORWARD

Looking ahead, the Fish for All Research and Training Centre is targeting enhanced and sustainable livelihood opportunities for small scale fishing and coastal farming communities is steadily building to scale. Some specific targets are highlighted for next 5 years,

1. Efforts to network with national and international organizations and fishing cooperatives to address policy-related issues on small scale fisheries management and immediate community issues
2. Enhanced adoption of responsible and sustainable fishing practices by coastal communities
3. Enhanced productivity through adoption of eco-friendly aquaculture technologies and replication of IIFS in fresh water aqua culture ponds intensively in the coastal villages
4. Improved economic returns by strengthening and diversification of livelihoods of resource poor fishing and farming families
5. Enhanced stakeholder participation through networking and sharing of resources for sustainable livelihoods and policy changes. Specific efforts are directed to pursue greater participatory fisheries management, which would include the capacity building and strengthening of institutional mechanisms.

These activities were carried out with the generous support extended by Tata Trust, Microsoft Tsunami, Qualcomm, INCOIS, NABARD, Tamil Nadu and Puducherry Fisheries department, Blue sensus, Germany, and wish to express our sincere thanks to them. We also thank all our strategic partners and the coastal communities for having fruitful partnership. We are also grateful to all our former colleagues who have contributed towards this journey.

9. PARTNERS WHO HAVE SUPPORTED OVER PERIOD OF 10 YEARS

S.No	Year	Supported Partners
1	2009- 2011	Tata Trust Microsoft Water for third world, Switzerland
2	2011- 2013	Tata Trust American Indian Foundation
	2013- 2015	Tata Trust. American Indian Foundation
3	2015- 2017	NABARD, Puducherry , Tata Trust
4	2016- 2018	NABARD, Chennai Government of Puducherry INCOIS, Hyderabad Qualcomm, USA, Tata trust
5	2018-2019	NABARD, Chennai Government of Puducherry INCOIS, Hyderabad Qualcomm, USA Blue Sensus, Germany TNFDC, Chennai, Tata Trust

10. PUBLICATIONS

1. Papers/Articles published

Velvizhi S., V.S. Chandrasekaran 2019. Workshop to understand the impact of climate change on Indian Seafood Industries at Chennai (Report); Aquaculture Spectrum – The Indian Aquaculture Magazine ISSN 2581 – 7892 – Volume 2, Issue No. 11/November 2019

Velvizhi S., Nancy Anabel and E. Thamizhazhagan 2018. A Fisher Friendly mobile application for Nagapattinam. IN CTA 2018. Experience Capitalization: Fighting rural poverty in India, Nepal and Bhutan, Experience Capitalization Series 6. Wageningen. CTA: 32-36

Nancy J Anabel, S. Velvizhi, D. Suvitha 2018. Fisher Friend Mobile Application a decision support system for small scale fishers in India: Springer Special Edition on ICT, CSIT (Volume) 6: 257-267

Velvizhi S., A Gopalakrishnan 2017. Occupational Health Hazards among Irular tribal Fisherwomen fishing in Pichavaram Mangrove Waters: Journal of Fisheries and Life Sciences, (2017) Volume 2, Issue 1: 20-25

Julia M. Novak Colwell, Mark Axelrod, Shyam S. Salim, S. Velvizhi 2017. A Gendered Analysis of Fisher folk's Livelihood Adaptation and Coping Responses in the Face of a Seasonal Fishing Ban in Tamil Nadu & Puducherry, India: World Development, 0305-750X/_ 2017 Elsevier publication

Selvaganapathy,E and Dr.L.Krishnan 2015. Production of fish value added items helping on livelihood enhancement of fisher women of PoompuharSirkali Taluk, Nagapattinam district in Tamil Nadu,India. Research Journal of Animal Veterinary and Fishery Science. 3 (6):1-4.

Velvizhi, S., A. Gopalakrishnan, P. Murugesan and D. Kannan. 2013."A case study on polychaete fishery by the Irular tribal fishing community on the Tamil Nadu coast". Aquaculture Asia 18(4): 1-20.

T.Selvarasu and Dr.L.Krishnan. Jaladhi Book -2012. Aquaculture Based Integrated Farming System in Coastal Region of Nagapattinam District. Central Institute of Fisheries Technology at Cochin. Page No.40-45

Chinnaraja S Gopalakrishnan AHemavathy MP Rengalakshmi R Sanjeeviraj G Selvarasu T Senthil Kumar V Shanthi Duraisamy Sudha Nair Thamizoli P. Crab fattening livelihoods for fisherwomen 2009. Monograph no.22. M. S. Swaminathan Research Foundation, Chennai. 13pp.

2.Training Manuals published (Tamil)

- o Training manual on fish value added products for fisherwomen, Vol. I and II
- o Training manual on Hygienic handling of fish products
- o Training manual on Fish processing technologies
- o Training manual on dry fish production using tunnel solar dryer
- o Training manual integrated fish farming system
- o Training manual on fish culture
- o Training manual on Diesel Engine Mechanism

11. RECOGNITION/AWARDS

SPARK Recognition

Dr. S. Velvizhi, Head, Fish for All Centre was given the SPARK Pancharatna Women Achiever; member for Puducherry Disaster Management Authority by Department of Revenue and Disaster Management, Government of Puducherry;



mBillionth Award South Asia

MSSRF wins the mBillionth award - South Asia for a mobile application (FFMA) designed for communicating information on weather, schemes, potential catch and borders for fisher folks.



Mobile for Good Award

FFMA was one of the four finalists among 245 nominations for the Mobile for Good (M4G) Award-2014, instituted by NASSCOM Foundation, in partnership with Vodafone Foundation.



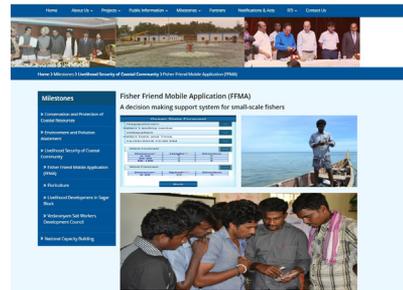
Global Mini Innovation Challenge Award 2019 (GRP)

Fisher Friend Mobile Application (FFMA) recognized as a novel solution for building climate resilience for marginalized community and awarded GRP Mini Innovation Challenge Award by Global Resilience Partnership, Kenya.



Fisher Friend Recognized in Indian Government Website

Fisher Friend finds place in the web site (under livelihood of coastal security) of Society of Integrated Coastal Management .Ministry of Environment, Forest & Climate Change, Government of India



HUFFPOST Recognition

This Mobile App Is A Real Catch For Tamil Nadu Fisherfolk. Huffington post, 21 November 2016 Fisher Friend helps boost yields and provides safety alerts.

THE BLOG This Mobile App Is A Real Catch For Tamil Nadu Fisherfolk

Fisher-Friendly Mobile Application (FMA) helps boost yields and provides safety alerts.

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