



हर कदम, हर डगर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद

Agrisearch with a human touch

IN THIS ISSUE

- [Research Highlights](#)
- [Success Stories](#)
- [Schedule Tribe Component](#)
- [Important Events Held](#)
- [HRD](#)
- [Awards/ Honours/ Recognitions](#)
- [Trainings/ Meetings/ Campaigns](#)
- [Publications](#)
- [Commercialization of Technology](#)
- [Participation in Scientific Events](#)
- [New Projects/ Initiatives](#)
- [Infrastructure Development](#)
- [Personnel](#)

RESEARCH SPOTLIGHT

Aquatic Animal Diseases

Cinnamomum

Flower

Pandanus

Noni

Rainfall Prediction

Teresa Buck

Underutilized Fruit

From the Director's Desk

The Andaman and Nicobar Islands is amongst the 22 agro-biodiversity hotspots of our country. These Islands are home to diversified and unique underutilized species of pomological significance. While some of the species viz. *Garcinia andamanica*, *G. dhanikhariensis*, *Mangifera andamanica*, etc. are endemic in nature, species such as *Semecarpus kurzii*, *Microcos calophylla* etc. are not found in the mainland India. These species serve as source of nutrition, medicine, timber, and a number of other utilities for the native tribes of our islands. Apart from the native tribes, a large number of migrants from various parts of India and other countries have also settled in the islands. Some of the exotic fruits such as acerola, passion fruit and mangosteen have also been popularized in the islands due to the presence of favourable agro-climatic conditions. This cultural landscape of the islands has favoured the diversification and conservation of underutilized fruit species in the homesteads as well as community gardens. Though a number of underutilized species are yet to be explored for their potential, ICAR-CIARI, Port Blair has been doing pioneering work on collection, conservation and unravelling the potential of a number of wild fruits/ wild relatives of cultivated fruits as new crops, new sources of desirable traits or as potential rootstocks. Propagation protocols have been developed for several native underutilized fruit species and wild relatives of fruit crops. Many of these species such as *Semecarpus kurzii*, *Annona glabra*, *Morinda citrifolia* etc. have been registered with ICAR-NBPGR, New Delhi for their specific traits. Superior types have been identified in Andaman kokum, Malabar tamarind and blood fruit. Bioprospection of blood fruit, *Garcinia* spp. etc. has resulted in identification of these species as novel sources of bioactive compounds. Systematic studies on the diversity of these species in the islands and their multifarious uses would have implications in striking a fine balance between economic as well as ecological aspects of the fragile island ecosystem.



Dr. E.B. Chakurkar

Research Highlights

Identification and characterization of superior germplasm of cinnamon, tejpat and long pepper under Bay Islands condition

Ajit Arun Waman and Pooja Bohra

Studies in *Cinnamomum* species - Oleoresin and volatile oil content in the leaf samples of 24 cinnamon collections were determined, which showed considerable variability among these collections. The oleoresin content varied between 8.75% - 17.46%, while essential oil content in leaves varied between 0.84% - 2.80%. These variations suggest the potential

of superior germplasm for further use in crop improvement. These collections along with two checks were multiplied through air layering and planted in the field conditions. Further, six identified collections of tejpat were also multiplied through air layering and planted in the experimental field for evaluation.

CSS-MIDH (NHM) Project on Spices

Ajit Arun Waman

Production of quality planting material

- During the period, planting material of cinnamon (290 air layers), woody pepper (186 rooted cuttings), black pepper (150 rooted cuttings), long pepper rooted cuttings (536 nos.). Additionally, planting material of black pepper,

woody pepper and clove was supplied to the farm section for planting in the agro-tourism block. Slips (400 nos.) of lemongrass (OD-19) were supplied for planting to NRM division. Twenty-four farmers visited to procure the planting material of spices during the period.

Conservation, bio-prospection and utilization of selected underutilized fruit species of Bay Islands

Pooja Bohra and Ajit Arun Waman

Establishment of field gene bank of *Garcinia dhanikhariensis* and *G. gummi-gutta*

- Grafts of identified two elite collections of Malabar tamarind i.e. GG-01 and GG-05 were planted for serving as a mother block for production of grafts. Eight collections of endemic *G. dhanikhariensis* were planted in the field gene bank for conservation and evaluation.

parameters over the other substrates studied. Seed germination studies were also conducted in *Flacourtia montana*. Among various treatments, germination percentage varied from 32.0 % to 75.5 %. Pre-sowing treatment of seeds with 500 mg/L of GA₃ for 24 h resulted in the highest germination percentage.

Germination studies in underutilized fruits

- Study on effect of substrates on germination in Surinam cherry (*Eugenia uniflora*) was completed. Based on the data for two years, coir pith compost showed superiority for the germination percentage and seedling growth

Production of planting material of underutilized fruits

- During the period, planting material of *Baccaurea ramiflora* (873 nos.), Malayan rose apple (210 nos.), jackfruit (72 nos.), *Garcinia* species (740 nos.) and Surinam cherry (150 nos.) was produced for sale.

Extraction of wood dye from Noni (*Morinda citrifolia* L.)

I. Jaisankar

Optimization of dyeing conditions - To establish the best dyeing parameters for cotton using *Morinda citrifolia* L., optimization studies with different dyeing conditions were carried out for wood dye extract. The UV-Vis spectrophotometer was used to evaluate the absorbance values of the extracted natural dye. The maximum absorption value (λ_{max}) of 1.972

λ_{max} at 60 °C in 40g/1000ml of the extracted natural dye was observed at 435 nm. It was observed that mordanted natural dye solutions with 4 % of each mordant at 60 °C for a period of 60 minutes 1.893 λ_{max} more than the other quantities.

Dye uptake - The percentage of dye uptake in cotton was determined by measuring the

difference in dye bath concentration before and after dyeing with a UV-Vis spectrophotometer. Various dyed cotton fabrics employ various dyeing procedures such as direct dyeing, pre-mordanting, simultaneous mordanting, and post-mordanting dyeing methods. The dye uptake was calculated using a standard method.

Color variations - The dye showed light yellowish - brown color from the Greyish Brown group, 199, as per Royal Horticultural Society (RHS) colour chart. Different color variations were observed using pre-mordant, simultaneous mordant and post-mordant methods. Significant

It was observed that pre-mordanting and dyeing with ferrous sulphate resulted in 34.43 % dye uptake on cotton fibers at 60 °C for 60 minutes. As a result, 60 minutes of dyeing time is an appropriate dyeing period that delivers the largest quantity of dye uptake on cotton fabrics compared to the other dyeing timings .

changes of color were noted in all types of mordant methods respective to different metallic mordants except with alum, which possessed almost the same color in all the mordanting methods.

Phytochemical properties and antioxidant activities of *Pandanus* species

I. Jaisankar

The phytochemical and antioxidant activities of *Pandanus amaryllifolius* showed the good concentration of carbohydrates (608.7 mg glucose/ g), phenols (46.7 mg GAE/g), flavonoids (20.85 mg QE/g), with notable TSS (4.8 °Brix), chlorophyll (7.28 µg/g) and carotenoid (9.67 µg/g) content in the leaves. *Pandanus lerum* fruit pulp had good carbohydrates (77.91 ± 0.94 %), protein (24.02 ± 0.07 %), ascorbic acid (0.53 ± 0.004 %), phenols (3.56 ± 0.04 %), tannins (14.19 ± 0.15 %), saponins (6.65 ± 0.05 %), flavonoids (6.60 ± 0.01 %), oxalate (0.19 ± 0.005 %) and TSS (5.67 ± 0.04 °Brix) content added with splendid DPPH (70.81 ± 1.62 %) activity. In addition, the seed and seed oil also reserved high hydroxyl RSA (75.37 ± 1.05 %) and superoxide RSA (74.16 ± 0.31 %) respectively as well as notable FRAP activity (1150.01 µM (TE)/g DW)) in seed. Nutritional and anti nutritional activities of raw and cooked pulp and seeds of *Pandanus lerum*

were analysed and the results revealed 41 % carbohydrate content in the raw pulp, while it was 31 % in the cooked pulp. Further, protein content of 4.38 % was recorded in cooked pulp, while it was 2.72 % in raw pulp. The highest anti nutritional activities were recorded in the raw pulp and cooked seeds.

Growth parameters of *Pandanus* species - The growth observation of various *Pandanus* species were recorded after one year of the planting. The height of the *Pandanus lerum* ranged from 90 to 100 cm, *P. tectorius* was 112 to 200 cm and *P. odorifer* was 100 to 105 cm.

Germplasm Registration - A germplasm of Andaman Dwarf Arecanut was registered at the ICAR-NBPGR, New Delhi bearing registration number INGR23064 (B. Augustine Jerard, V. Damodaran, Jaisankar, I., V. Niral and N. R. Nagaraj).

Breeding studies in Torch Ginger (*Etilingera elatior*)

V. Baskaran and K. Abirami



Plate 1. Parental lines of torch ginger use in the study

Plate 2. Seedling germination from the cross TG-2 × TG-3

Six combinations of crosses were done in torch ginger in three different accessions with variant flower colour like red (TG-1), pink (TG-2) and light pink (TG-3). Maximum seed set percentage was observed in the cross TG-2 × TG-3 (82.6

%). Seed germination was also maximum in the cross TG-2 × TG-3 (71.8 %) followed by TG-1 × TG-2 (62.4 %). The seedlings are transplanted in nursery polybags to observe variations in the crosses done.

Evaluation of gerbera varieties

V. Baskaran and K. Abirami

Six varieties of gerbera were evaluated for their growth and yield performance. Variety Srividhya showed early flowering (71.2 days after planting) followed by Petali (78.4 days

after planting). Maximum number of flowers per plant was observed in variety Srividhya (3.8 no. of flowers/week).

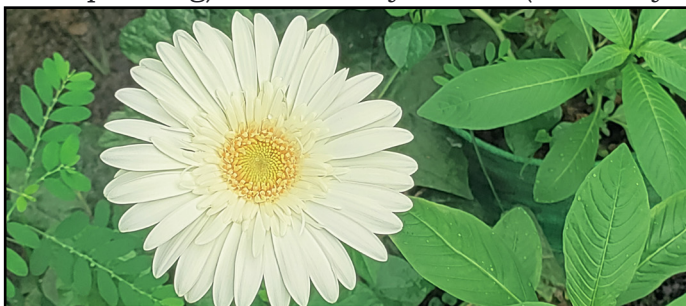


Plate 3. Srividhya and Petali-Best performing gerbera varieties

Performance evaluation of statice (*Limonium sinuatum*)

V. Baskaran and K. Abirami

Statice is an important flower crop suited to use as filler in flower arrangements and other value added products. Statice is grown in region where mild winter exists and the crop is of high value due to its attractive flowers. Tissue culture derived plants of Statice were procured and evaluated for their growth and yield performance in the island conditions.

Flower bud initiation occurred 6 months after planting and the spike length of flower is ranged from 55.5 cm to 72.0 cm and flower spread from 56.4 cm to 62.8 cm. As the crop comes to flowering in tropical humid climatic condition



Plate 4. *Limonium sinuatum* in bloom

of Andaman and Nicobar Islands, statice can be well integrated as one of the components in floriculture field.

New addition to speciality flower germplasm

V. Baskaran and K. Abirami

Speciality flower accessions *Stromanthe*, *Aplinia purpurata* cv. Pink, *Aplinia purpurata* cv. White

and *Heliconia chartacea* cv. Meyana added to the germplasm collection showed flowering.



Plate 5. *H.chartacea* cv. Meyana, *Stromanthe* and *Aplinia* cv. Pink



Prediction of annual one day maximum rainfall for Andaman & Nicobar Islands

Sirisha Adamala

Rainfall is the primary source of water in the Andaman and Nicobar Islands. Prior information about the expected rainfall in Islands is required in designing various hydraulic, hydrologic, and soil water conservation structures. This study focused on the frequency analysis of annual one day maximum rainfall in these Islands. The daily rainfall data of 53 years (1970-2022) was used to evaluate the designed value of expected rainfall using different probability distribution models. A total of five different probability distributions (normal, log-normal, Pearson type-

III, log-Pearson type-III, and Gumbel extreme value) were used to design the maximum daily rainfall. The Log-normal distribution provided the best-fit probability distribution with the least score for the test. Based on the best fit probability distribution, the minimum rainfall of 49.369 mm in a day can be expected to occur with 99 % probability and one year return period and maximum of 422.044 mm rainfall can be received with 1 % probability and 100-year return period.

Table 1. Magnitude of expected maximum one day rainfall for various return periods

Return period (Years)	Observed Rainfall (mm)	Expected Rainfall (mm)
	Weibull	Log Normal
1	96.11	49.369
2	136.71	144.471
5	190.37	212.888
10	230.96	260.764
20	271.56	308.303
25	284.62	323.714
50	325.22	372.231
75	348.96	401.191
100	365.81	422.044

Effect of *Tinospora cordifolia* on reproductive parameters in Teresa buck

P. Perumal, Jai Sunder, A. K. De, R. R. Alyethodi and D. Bhattacharya

Effect of stem extract of *T. cordifolia* (Giloy or Guduchi) in semen extender on semen quality parameters, leakage of intracellular enzymes, oxidative stress markers and cholesterol efflux in semen of Teresa buck was studied. Spermatozoa of 150×10^6 were incubated in 100, 300 and 500 μg of stem extract of Guduchi and measured the parameters at different hours of incubation of liquid storage. Semen treated with 300 μg stem extract / 150×10^6 spermatozoa had significantly ($p < 0.05$) higher motility, viability, plasma membrane integrity, acrosomal integrity, total antioxidant capacity, reduced glutathione, superoxide dismutase and catalase and had significantly ($p < 0.05$) lower total sperm abnormality, aspartate aminotransferase; AST

and alanine aminotransferase, malondialdehyde and cholesterol efflux compared to those in control, 100, and 500 μg treated groups at different hours of liquid storage. Further, these semen quality parameters and antioxidants were showing increasing trend and sperm abnormality and malondialdehyde, leakage of intra-cellular enzymes and cholesterol efflux were showing decreasing trend from 0 to 300 μg and then opposite trends from 300 μg to 500 μg at different hours of liquid storage. The study concluded that *T. cordifolia* stem extract 300 $\mu\text{g}/150 \times 10^6$ spermatozoa in the liquid semen extender can be effectively utilized to reduce the oxidative stress and improve the semen quality profiles in liquid storage in Teresa buck.

National Surveillance Programme for Aquatic Animal Diseases (NSPAAD)

K. Saravanan, J. Praveenraj and R. Kiruba Sankar

Altogether, six numbers of disease cases have been reported due to bacterial infection, parasitic infestation (*Octolasmis* spp.) and water quality issues from the freshwater and brackish water fish farms located at Tirur, Chouldari, Wandoor and Mayabunder villages of South Andaman and North and Middle Andaman districts. Isopod parasite, *Ryukyua globosa* was recorded from the gills of *Amblygaster sirm* collected from the South Andaman Islands. Both ovigerous female and male parasites were collected from

the branchial cavity *Amblygaster sirm*. Baseline data has been collected with geo-reference details from a total of 5 fish farms located at Tirur, Ograbraj, Mithakhari and Tushnabad villages of South Andaman. Popularized the 'Report Fish Disease' app developed under the project for the benefit of fish farmers in Andaman Islands. Awareness programmes were conducted at Namunaghar and Brindaban villages in which 58 farmers participated.

Research, development and extension activities of Regional Station, Minicoy

Y. Gladston, S.M. Ajina, S.K. Zamir Ahmed and E.B. Chakurkar

Exploration of fishery, biology and market potential of tuna resources of Minicoy

The socio-economic surveys were conducted in Minicoy, Androth and Kalpeni Islands through structured interview schedule. The live bait fishery of Minicoy Island was surveyed and documented. 12 live bait species were recorded during the period, sprats being the common bait. The biological analysis of two tuna species i.e., skipjack and yellow fin tuna was carried out. The ichthyofaunal diversity surveys were conducted in the Minicoy reef area and Viringili islets and identified 30 species of fishes and 5 species of shellfishes.

Integrated farming systems for enhancing sustainable livelihood of rural tribal community of Minicoy

The monthly growth data of Konkan Kanyal goats, Sasso chicken and Charachempalli ducks

were recorded. Gramasree poultry brought and incubated. An eighty-five percentage of hatch rate obtained for the breed. The villages of Minicoy surveyed and recorded diversity of freshwater ornamental fish and identified Arapaima, Arowana, Crocodile gar, Malabar snake head, gold fishes and koi carp from household and community ponds.

Farm Development

- In the existing coconut garden of 5.02 ha at Regional station various field activities were undertaken to evaluate the performance of technologies for translating to farmer's fields. This include performance evaluation of varieties of local chilly, broad dhaniya, Red Napier grass, galangal, *Curcuma aromatica*, tapioca, yam, taro, brinjal, cabbage and cauliflower under Minicoy conditions.

Success Stories

Success Story of a Young fishermen

Fisherman's profile

Name	Shri. Shahid Kunnuge
Address	Kunnuge, South Pandaram, Minicoy Island
Village	South Pandaram
Family size	Living with his wife, one daughter and parents.
Total land area	400 sqm
Activities	Fishery + Poultry + cattle + Vegetables and fruits
Crop area	80 sqm

Situation analysis

Shri. Shahid Kunnuge, aged 29 a young fisherman from Minicoy lives in the Pandaramarea with his parents, wife and daughter. He started his fishing career long back along with his father. He started open deep sea fishing started at the age of 13 years when he was in 8th standard. Moreover, books were not good companions when compared to ocean for him. After schooling he has undergone an open water diving course which adds more confidence and exploring mind set.

He loves to be with the marine world. Rigorous hard work and dedication was always constant within him. His level of curiosity to learn new practices/technologies in fisheries as well as in agriculture was very high enough. Seer Fish-Wahoo, Yellow fin tuna and shark are the major highlights of his catch. Wahoo and Yellow fin are sold on spot to the public and hotels, whereas Shark being exported to mainland. A revenue of Rs. 3,50,000/- he used to fetch annually. Therefore, in the year 2019, when the scientific team visited him and found there is high potential to escalate his livelihood, team encouraged him to attend ICAR CIARI, Regional Station, Minicoy and got exposed with many scientific activities related to fisheries, scientific poultry farming and organic agriculture. Scientific team ICAR-CIARI, Regional Station, Minicoy has provided him with inputs like Snorkle Kit, Bamboo pole, Cast net, hook and line under STC for fishing and other allied activities.

Technology Interventions

Scientists of the ICAR-CIARI encouraged him to integrate vegetable cultivation and poultry by

providing all the necessary technical guidance regarding scientific practices including pest management practices, usage of Cast net, preparation of fish amino acids, marketing strategies of raw materials, responsible fishing practices, market potential and value added fishery products etc.

Impact / Outcome of technology adoption

With the technical support of the ICAR-CIARI, helped him to acquire sufficient knowledge regarding fishery activities and through know how with marketing strategies which was a lacking factor to boost his income generation to next level.

Income generation

ICAR-CIARI, Regional Station, Minicoy, helped him in a befitting manner to upgrade his annual revenue generation to approximately to Rs. 4,00,000/-

Contributors

Dr. Gladston Y., Dr. Ajina S.M., Dr. S.K. Zamir Ahmed and Dr. E.B. Chakurkar, Shri. Sharefuddeen Hassan Kararngothi and Shri. Arif M.I.



Plate 6. Shri. Shahid Kunnuge

Scaling up the initiatives on sea turtle conservation with the indigenous tribal fishermen of Car Nicobar Island

Fisherman's profile

Name	Shri. Aziz Ahmed
Category (SC/ ST/ OBC/ General)	Scheduled Tribe (ST), Aboriginal Nicobarese tribe
Business/ Fisheries activity	Small-scale fisheries
Funding agency (if any)	Department of Science and Technology (DST), New Delhi
Subsidy amount (if any) and Total project cost	Nil

Scheme's name	Best practices Followed
Technological intervention	Conservation of sea turtle nesting habitats in Car Nicobar Island
Employment generated	Conservation and sustainable resource management in a remote Island

Mr. Aziz Ahmed, 50 a resident of Car Nicobar Island belongs to the tribal community of Nicobar Island whose primary occupation was marine fishing in the inshore waters of Car Nicobar Island (Plate 7). Being a native to the remotely located Car Nicobar Island, he has vast



experience in marine fishing and was aware of sensitive marine faunal groups like sea turtles, dolphins, corals, etc. Still, he was seldom aware of the conservation value of those vulnerable marine fauna in the changing climatic scenario. Considering the remote location, lack of information on vulnerable marine fauna, and the critical need for such information towards establishing conservation measures, ICAR-CIARI took the initiative through the DST-SEED funded project on the Coastal Fisheries Information Hub for Nicobarese tribes of Car Nicobar Island. Considering the information gap on sea turtle nesting data in Car Nicobar, we started organizing awareness camps in the month of May, November 2022, and January 2023 at Car Nicobar Island. We sensitized the Nicobarese tribes on the importance of sea turtle nesting and informed them to pass prompt information upon sighting of sea turtle nesting in Car Nicobar Island. Mr Aziz Ahmed, a tribal fisherman from Teetop fishing village alerted their family upon sighting the sea turtle nest in Teetop Fish Landing Center beach on the wee hours of 11 April 2023. He saw few baby sea turtles emerging from the sandy nest and started protecting them against the dogs and pigs in the surroundings. He immediately alerted our team who was stationed at Car Nicobar Island about the sea turtle nest, and we rushed to the spot. Based on his early observations, more than 50

sea turtle hatchlings migrated to the sea. Based on his photos and videos we identified the turtle as an Olive Ridley turtle (*Lepidochelys olivacea*). Our team along with tribal fishers protected another batch of turtles from the nest on the same day and approximately more than 70 sea turtles started their journey to the sea. Our awareness and sensitization initiatives have led to the knowledge of the importance of sea turtles to the coastal ecosystems. The efforts of this conservation initiative are paying off as more than 150 fishermen from Car Nicobar have volunteered and agreed to participate in future conservation projects. We promptly submitted a report on turtle nesting to the Department of Environment, Forests and Climate Change, Andaman and Nicobar Administration for coastal land use and policy-level planning in the future. These success stories prove that the local tribal communities working with the researchers can minimize the threats that sea turtles face and could bring these species back from the brink in a small remote island like Car Nicobar.

Contributors

Dr. R. Kiruba Sankar, Dr. K. Saravanan, Dr. J. Praveenraj, Dr. Sirisha Adamala, Dr. S.K. Zamir Ahmed, Shri. D. Karunakaran, and Shri. Mohamed Sarief.



Plate 7. Mr. Aziz Ahmed

Interventions on guided fishing practices to the tribal fisherman of Car Nicobar Island

Fisherman's profile

Name of Beneficiary	Mr. Junaid
Category (SC/ST/OBC/ General)	Scheduled Tribe (ST), Aboriginal Nicobarese tribe
Business/ Fisheries activity	Marine capture fisheries
Funding agency (if any)	Department of Science and Technology (DST), New Delhi

Subsidy amount (if any) and Total project cost	Nil
Scheme's name	Guided fishing practices
Technological intervention	Navigation and sea-safety in marine fishing practices
Employment generated	Marine fishing activities

Mr. Junaid, 39 a resident of Teetop fishing village, Car Nicobar Island is an active fisherman who undertakes fishing in the inshore waters of Car Nicobar. Often, he explores deep-sea fishing grounds and there were reported incidences of himself being lost in finding his way back to their fishing village due to his limited knowledge of navigation using GPS. This gap was understood and addressed by ICAR-CIARI during the field surveys in November 2022 through the DST-SEED, New Delhi-funded project on establishing a coastal fisheries information hub at Car Nicobar Island. In the month of January 2023, a one-day exposure was given to Mr. Junaid on the use of GPS for navigation and marking the waypoints. To support his fishing activities, a new GPS was provided to Mr. Junaid as a fishing input to enhance his confidence and to explore the distantly located fishing grounds. A few field trails were also undertaken in their fishing trips to demonstrate the use of GPS in navigating and returning to the marked

location. After receiving the exposure and a new GPS, Mr. Junaid gained confidence and started exploring the offshore fishing grounds. Prior to the intervention he usually sets long line fishing gear near his fishing village in inshore waters. After our intervention, he started exploring distant offshore fishing grounds which has led to a diversification in his fish catches. High-valued fish like Seer fishes and Marlins were now caught by Mr. Junaid which has led to an increase in 20-30% of his weekly income when compared with the previous catches in inshore waters. This handheld GPS helps him to navigate safely to reach fishing grounds which also significantly reduces the fuel cost and time spent in fishing activities.

Contributors

Dr. R. Kiruba Sankar, Dr. K. Saravanan, Dr. J. Praveenraj, Dr. S. Adamala, Shri. D. Karunakaran, Dr. S. K. Zamir Ahmed and Shri. Mohamed Sarief.



Plate 8. Mr. Junaid



Plate 9. Handing over of GPS to the beneficiary



Plate 10. Mr. Junaid with his fish catches post-intervention

Tri-model therapeutic methodology (Gau Maa Humpsore Rakshak) to treat humpsore

Situation analysis

Mr. P. Suresh Kumar, aged 40 years, is a progressive, innovative and scientific dairy farmer from Guptapara Village, South Andaman. He initiated with 2 cows and presently has 40 dairy cattle of different crossbreds. In his farm, 10 - 12 animals are in milking stage at anytime and he despatches 100 - 120 L of milk per day with revenue generation of Rs.1.40 - 1.50 lakh per month and net profit is 30,000/- to 40,000/- per month. He follows all scientific managemental practices for dairy cattle development. However, he suffered production and reproduction losses due to humpsore in dairy cattle. Almost 35 % of cattle suffered with humpsore and the size varies from few cm to more than 20 cm. Age of affected animals were

1.5 - 15 years and persisted the humpsore for more than 1.5 - 13 years. He attempted to treat the humpsore with various treatment protocols but not succeed fully. Finally he approached ICAR-CIARI, Port Blair for treatment with combination of medicines for 45 days.

Technology Interventions:

ICAR-CIARI scientists capacitated his knowledge on aetiology, pathophysiology, clinical symptoms, treatment and control measures to control and prevent the humpsore. The treatment protocol was followed for 45 days. The sore healed at 15th to 30th day of treatment depending upon the size of the sore.

Impact / Outcome of technology adoption:

With technical support and therapeutic

management of humpsore with this tri-model therapy, he improved health, production and reproduction performances of dairy farm. The cure rate of the treatment was 100 %. Milk yield was increased in 85 - 86 % of treated animals at the rate of 15 - 20 %. Induction or bring to heat was observed in 75 - 78% animals and conceived in the first attempt. Further he observed that nuisance due to rubbing on the wall, pillars, trees or fences was stopped completely. The ugly looking skin on animals was disappeared and value of the animals has been increased. The growth rate especially in young calves and heifers was improved significantly. The heifers attained puberty at earlier age than untreated

animals. Tri-model treated animals were active and alert and feed intake has been increased significantly.

Income generation:

The revenue has been increased from Rs. 1.50 – 1.75 lakh per month with profit from Rs. 40,000/- to 50,000/- per month in the dairy farm after treatment. In addition, he has reduced the expenditure for treatment of infertility as humpsore treatment has enhanced the cyclicity and conception rate.

Contributors:

Dr. P. Perumal, Dr. A. K. De, Dr. D. Bhattacharya and Dr. Jai Sunder

Adoption of best management practices in ornamental fish business

Name of Beneficiary	C. Arjun
Category (SC/ST/OBC/ General)	General
Business/ Fisheries activity	Ornamental fish retail unit
Name of Establishment (If any)	SSM Aquarium, Port Blair
Year of establishment	2021
Funding agency (if any)	Self (Rs. 2,00,000/-)
Technological intervention	Quarantine, best management practices, disease treatment and breeding of ornamental fishes
Annual production (pls mention FY)	1,20,000 fishes
Annual turnover (pls mention FY)	Rs. 8,40,000/-
Employment generated	2 nos.

The beneficiary Mr. C. Arjun who is a resident of Port Blair, Andaman Islands started the first retail shop dealing with 50 varieties of ornamental fishes in the year 2021. He imported fishes from Chennai market and sold the fishes from his retail shop. During his initial phase of the start-up, the imported fish stock faced 70 – 80 % mortality due to improper management practices, lack of quarantine and knowledge on disease prevention and treatment. Team of scientists namely Mr. J. Praveenraj, Dr. K. Saravanan and Dr. R. Kiruba Sankar provided technical knowledge on the quarantine of new

fishes, preparation of aquarium water, disease diagnosis and treatment. After following the technical advice, Mr. C. Arjun could save 95 % of the newly imported stock from mortality which occurred to stress and disease. Mr. C. Arjun also started aquarium fish breeding by the training offered by ICAR-CIARI, and now he could produce live bearers and Betta fishes, which further strengthens his income status. Through the funding of NABARD, Port Blair, a hatchery was also established at ICAR-CIARI, Port Blair, which served as a back bone for C. Arjun in providing quality broodstocks for his fish breeding activity. His adoption of proper quarantining and best management practices provides healthy and disease free fishes to the aquarium hobbyists which greatly encourages and promotes new people in the Indian ornamental fish trade. Mr. C. Arjun also received Best Aquaculture Practitioner Award from ICAR-CIARI.

Contributors

Dr. J. Praveenraj, Dr. K. Saravanan, Dr. R. Kiruba Sankar, Dr. S.K. Zamir Ahmed and Shri. D. Karunakaran.



Plate 11. Mr. C. Arjun at his ornamental fish unit

Schedule Tribe Component

Programme	Number	No of beneficiaries
Trainings	4	88
Demonstrations	6	321
Input distribution	1746	265



Plate 12. Glimpses of trainings

Important events held

World Coconut Day-2023

To celebrate World Coconut Day-2023, an awareness programme on ‘Growing Coconut for a Better Future and Life’ conducted at the Government Senior Secondary School, Rangachang under AICRP on Palms project on September 2, 2023 with 24 participants (14 male and 10 female). Dr. Ajit Arun Waman, PI, AICRP on Palms sensitized the students on the importance of coconut for the islands and in the life of the island dwellers.



Plate 13. Awareness programme on ‘Growing coconut for a better future and life’

ICAR-CIARI celebrates 77th Independence Day

Institute celebrated 77th Independence Day at its main campus with fervor and gaiety. The 77th Independence Day celebrations started with the hoisting of the National Flag by Dr. Eaknath B. Chakurkar, Director, ICAR-CIARI followed by singing of the National Anthem. In his address, Director appreciated the efforts of all the staff members and lauded good work rendered during this year. He highlighted the

contributions made by the institute viz. ICAR certified technologies during foundation day i.e Dweep tickure, Nursery protocol for endemic wild banana, Concept of Mini incubator for rural poultry production and Dweep Gau Maa Rakshak for Humpsore treatment. Institute also filed 3 patents namely Blood collection method from pig, extraction of calcium alginate from sea weed and Industrial Design for parasite egg



Plate 14. 77th Independence Day celebrated

separation. Institute started new initiatives *viz.* Mother block of coconut varieties, *Garcinia* spp., *Pandanus* gene bank and Integrated Farming System model established at Regional Station, Minicoy. Institute also registered germplasm of Noni genotype CIARI Samridhi (TRA-1) During this year, Krishi Vigyan Kendra

organized Kisan Mela and tableau depicting CIARI technologies and travelled from Port Blair to Diglipur. Women athletes brought laurels to our Institute during zonal sports meet of ICAR. Regional Station, Minicoy of ICAR-CIARI Port Blair also celebrated the Independence Day.

Kisan Goshthi on “Enhancing Farmers Income through Advance Agriculture”

Prasar Bharati Akashvani, Port Blair & ICAR-CIARI celebrated India’s G-20 Presidency at Dr. T.R. Dutta Conference Hall, on 30th August 2023. Dr. E.B. Chakurkar, Director, ICAR-CIARI and Dr. Naveen, Director AH & VS were the special invitees.

The highlight of the programme were deliberations by the expert team of CIARI on the topics namely Agro Eco Tourism by Dr. E.B. Chakurkar, Role of Livestock in Enhancing income by Dr. Jai Sunder, Importance of healthcare in economy of livestock production by Dr. Debasis Bhattacharya, Integrated farming for better sustainability by Dr. P.K. Singh, Agriculture Technologies and Start-ups by Dr.

S.K. Zamir Ahmed, Role of KVK in Transfer of technology by Dr. Y. Ramakrishna, Fresh water Fish Farming by Dr. R. Kiruba Sankar, and Spice and its value addition for enhancing farmers income by Dr. Ajit Arun Waman.

Progressive farmers/ entrepreneur representing different sector of agriculture along with scientists and SMS of KVK participated and got benefitted. Dr. Pooja Bohra, coordinated the programme.

The overall coordination of the programme was done jointly by Dr. S.K. Zamir Ahmed and Smti. Meena Prakash, Programme Head, Akashvani under the plan and guidance of Dr. E.B. Chakurkar.



Plate 15. Celebrated India’s G-20 Presidency

Second International Conference (ICFPLS-2023) by PISRF & ASA

Second International Conference on “Prospects and challenges of environment and biological sciences in food production system for livelihood security of farmers (ICFPLS-2023)” was jointly organized by Pragati International Scientific Research Foundation (PISRF), Meerut, UP and Andaman Science Association (ASA), Port Blair in collaboration with ICAR-Central Island Agricultural Research Institute, Port Blair and Sardar Vallabhbhai Patel University of Agriculture and Technology, (SVPUAT), Meerut, from September 18-20, 2023 at ICAR-CIARI, Port Blair. More than 200 delegates from 24 states and 2 UTs participated in the event. During the inaugural session, the Chief Guest

Shri. Swatantra Dev Singh, Cabinet Minister of Water Resources, Uttar Pradesh expressed his happiness on the conduct of this for the betterment of the farming community. He shared his experience of translating many water management work at Bundelkand, Uttar Pradesh which has increased the productivity of the farming area. Beside he urged to reach to the last level of the ladder and assess the percolation of the technologies for making it a successful one for which the youth can play a mega role.

He gave away awards to the scientists for their outstanding contribution and farmers who have adopted the technology in agriculture



and allied field and become role model in their respective areas. Dr. P.L. Patil, Vice Chancellor of the University of Agricultural Sciences (UAS), Dharwad, Karnataka in his address stressed on farming system approach, market driven technology and Dharwad Model of Seed production involving FPOs. Shri. Rajeev Choudhary, Director of Agricultural Engineering, Government of Madhya Pradesh shared his experience on farm mechanization technology like Yantra Dooth, Custom Hiring, Online platform and Skill training with private partners.

Dr. E.B. Chakurkar, Director of ICAR- CIARI, Port Blair, emphasized on balanced approach in every component of Agriculture for increasing income of the farmers. Dr. Gaya Prasad, Chairman ICFPLS 2023 and former Vice Chancellor of SVPUAT, Meerut, UP said that technologies are reaping good harvest in the terms of production, productivity and enhancing the income of the farmers and expressed his gratefulness to the farmers. At the outset Dr. Jai Sunder, Local Organizing Secretary welcomed the august gathering and Dr. V.P. Chaudhary, Organizing Secretary proposed vote of thanks.



Plate 16. Glimpses of ICFPLS- 2023

10th Research Advisory Committee (RAC) Meeting of ICAR-CIARI

The first meeting of the 10th Research Advisory Committee was held at ICAR-CIARI, Port Blair, under the Chairmanship of Dr. Anil Kumar Singh, former DDG (NRM), ICAR, New Delhi on September 22nd – 23rd, 2023. The following officials were present in this meeting:

- Dr. S.K. Singh, Former Director, NBSS, LUP, Nagpur and Member, RAC
- Dr. N.P. Sahu, Joint Director, ICAR-CIFE, Mumbai and Member, RAC
- Dr. R.R.B. Singh, Vice Chancellor, VCKV, Durg and Member, RAC
- Dr. J. Rema, Former Director, ICAR-IISR, Kozhikode and Member, RAC
- Dr. Vishwa Bandhu Patel, ADG (Fruits and

Plantation Crops), ICAR, New Delhi and Ex-Officio Member, RAC.

- Dr. Eaknath B. Chakurkar, Director, ICAR-CIARI, Port Blair and Ex-Officio Member, RAC
- Dr. Nitu Sindhu, Agro Entrepreneur, Mahalasa Agro Products, Progressive farmer and Member, RAC
- Shri. Ravindra Das, Progressive farmer, Khudirampur, Diglipur and Member, RAC
- Dr. P.K. Singh, Head (I/c), Division of Horticulture and Crop Improvement, ICAR-CIARI, Port Blair and Member Secretary, RAC



Plate 17. 10th Research Advisory Committee

HRD

- Dr. Ajit A. Waman attended one-day training programme on Hi-tech farming techniques (vertical farming, hydroponics, aeroponics, aquaponics) in horticultural crops organized by ICAR-IIHR, Bengaluru (virtual mode) on 25/07/2023.

Awards/ Honours/ Recognitions

Date	Name	Achievement/Recognition	Event
16 th July 2023	Dr. Pooja Bohra	ICAR Technology Certificate for the technology - Nursery protocol for endemic wild banana <i>Musa sabuana</i> (syn. <i>M. indandamanensis</i>)	ICAR Foundation day
15 th August 2023	Dr. R. Kiruba Sankar	Honourable Lieutenant Governor's Commendation Medal and Certificate	Independence Day event at Port Blair, Andaman and Nicobar Islands
22 nd August 2023	Dr. R. Kiruba Sankar	Letter of appreciation from Honourable Member of Parliament, Andaman and Nicobar Islands, Shri. Kuldeep Rai Sharma	Port Blair, Andaman and Nicobar Islands
23 rd to 28 th August, 2023	Dr. Ajit Arun Waman	Exam Coordinator	Recruitment Examination of Agriculture Assistant and Agriculture Officer in the UT Department of Agriculture
31 st August, 2023	Dr. Pooja Bohra	Coordinator of the Seminar	Seminar on Agriculture organized by All India Radio
18 th September, 2023	Dr. R. Kiruba Sankar	Best Oral Presentation Award for two papers	2 nd International Conference on ICFPLS-2023 at ICAR-CIARI, Port Blair
	Dr. V. Baskaran, Dr. K. Abirami, Dr. Augustine B. Jerard and Dr. T. Subramani	Second Best Oral Presentation Award	
	Dr. Zamir Ahmed	Best Oral Presentation Award	
	Dr. Sirisha Adamala	Best Oral Presentation Award	
	Dr. Pooja Bohra	Best Oral Presentation Award Young Scientist Award (Fruit Science) from PISRF, Meerut	
July to August, 2023	Dr. K. Saravanan	Reviewer for the journals	Frontiers in Immunology Journal and Journal of Andaman Science Association
July to August, 2023	Dr. J. Praveenraj	Reviewer for the journals	Zootaxa, Check List and Journal of Fish Biology
July to September 2023	Dr. Pooja Bohra	Reviewer for the journals	Plant Methods, Springer Nature and Frontiers in Horticulture

Trainings/ Meetings/Campaigns conducted

Training programme on spices for economic prosperity

A three days training programme on “Scientific Cultivation of Spices for Economic Prosperity” was organized under CSS-MIDH (NHM) Project on Spices and All India Coordinated Research Project on Palms project during 1st -3rd August, 2023. The programme was inaugurated by Dr. E.B. Chakurkar, who graced the occasion as the Chief Guest in the presence of Dr. P.K. Singh, Head, Division of Horticulture and Crop Improvement. Technical session started with an online lecture on ‘Long pepper and lemon grass as potential crops for income diversification’ by Dr. G.R. Smitha, ICAR-Indian Institute of Horticultural Research, Bengaluru. Dr. Ajit A. Waman, Scientist (SS) and Organizer of the event, gave theoretical background of the topic and oriented the participants on various scientific aspects of these crops. This was followed by the practical session on postharvest management and processing of cinnamon and Malabar tamarind using mechanical dryers.

On second day, trainees visited Horticultural Plants Propagation Unit of the Institute and were provided hands-on exposure to application of various vegetative propagation methods in different spice crops. Trainees were also taken to the Horticulture Research Farm, Sippighat of the Institute. It was followed by a demonstration on vermicomposting and organic inputs preparation by Dr. T. Subramani. A lecture on processing and marketing prospects of spices from the islands was delivered by Dr. Pooja Bohra, co-organizer of the event. Processed products prepared from the spices at ICAR-CIARI and those available in the markets were also showcased to the participants. Planting material of clove, long pepper, lemon grass and woody pepper was provided to the participants which was facilitated by Ms. Karthika Devi. A total of 25 trainees including educated youth, farmers and students attended the event.



Plate 18. Training programme on “Scientific cultivation of spices for economic prosperity”

ICAR-CIARI organises training cum animal health camp at Rangat

A training programme on “Scientific Livestock and Poultry Production” was organised by ICAR-Central Island Agricultural Research Institute, Port Blair, at Dasrathpur, Rangat, in collaboration with the Veterinary Hospital, Rangat, on 17th August, 2023. Dr. P.A. Bala

and Dr. Arun Kumar De, Senior Scientists from ICAR-CIARI, along with Dr. Sathish, Senior Veterinary Officer, Veterinary Hospital Rangat, Department of Animal Husbandry and Veterinary Services, coordinated the programme. A total of 40 farmers attended the programme.



Plate 19. Animal health camp



Mr. Biswanath Mondal, Up-Pradhan, graced the occasion. Dr. Bala emphasised the scientific rearing of backyard and commercial broiler poultry farming.

He also explained the importance of balanced feeding for livestock and poultry and scientific strategies to increase milk and production of cattle and poultry, respectively, with proper management. Dr. De explained in detail about scientific pig rearing, control of ecto- and endo-parasites, and control of neonatal piglet

anaemia. Dr. Satish highlighted the importance of sustainable goat rearing, pinpointing seasonal diseases and proper nutritive care for the goats. Farmers were also distributed inputs of feed supplements and medicines. On the same day, three health camps were also organized, and inputs of feed supplements and medicines were distributed. The health camps were organised at Chitrakut, Amkunj, and Sabari villages, where more than 100 goats, 50 cattle, and 100 poultries were attended.

Training programme on “Production and post-harvest technology of dragon fruit for enhanced income generation”

The production technology of dragon fruit is standardized for Island condition by ICAR-CIARI using concrete pillars as support. To popularize the technology among the farmers, the demonstration of dragon fruit is done at the field of farmer, Shri. Mahadev Majji at Collinpur in collaboration with NABARD, Port Blair. The first crop started flowering in second year after planting at Collinpur and to disseminate the technology to the other farmers of the village, a three days training programme on “Production and post-harvest technology of dragon fruit for enhanced income generation” was organized during 24th-26th August, 2023 in collaboration with NABARD, Port Blair. In this training programme the course director Dr K. Abirami, Principal Scientist, ICAR –CIARI explained the farmers about the propagation techniques,

intercultural operations like training, pruning and hand pollination technology in dragon fruit cultivation. Course co-ordinators Dr. V. Baskaran, Principal Scientist and Dr. T. Subramani. Senior Scientist explained in detail about the organic production system and demonstrated the preparation and use of organic formulations which are effective for both crop production and protection. Dr. Pooja Kapoor briefed the farmers about the preparation of value added products from dragon fruit that can be utilized during off season for nutritional security and enhanced income generation by using small sized fruits. About 40 farmers attended the three days training programme and the planting material of dragon fruit, marigold and speciality flowers were distributed to the beneficiaries.



Plate 20. Training programme on “Production and post-harvest technology of dragon fruit

Awareness on aquatic animal disease surveillance conducted by ICAR-CIARI

ICAR-Central Island Agricultural Research Institute organized awareness programs on the “National Surveillance Programme for Aquatic Animal Diseases (NSPAAD)” in two villages of South Andaman.

Namunaghar Village (21st July, 2023): A total of 28 farmers attended, engaging in interactive sessions covering fish disease diagnosis,

reporting systems, disease management in aquatic animals, and better aquaculture practices. Queries raised by farmers were addressed by the scientific team, including Dr. S.K. Zamir Ahmed, Dr. R. Kiruba Sankar, Dr. K. Saravanan, Dr. J. Praveenraj, and Shri. D. Karunakaran.



Brindaban Village (18th August, 2023): A total of 30 farmers participated, engaging in interactive sessions covering fish disease diagnosis, reporting systems, disease management, better aquaculture practices, and a demonstration

on the Report Fish Disease app. Queries raised by farmers were addressed by the scientific team, consisting of Dr. S.K. Zamir Ahmed, Dr. R. Kiruba Sankar, Dr. K. Saravanan, Dr. J. Praveenraj, and Shri. D. Karunakaran.

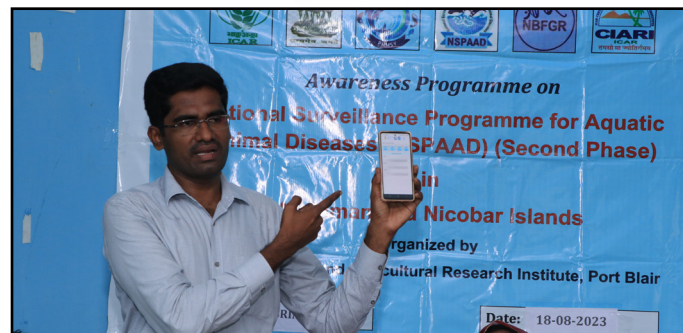


Plate 21. Awareness on aquatic animal disease surveillance

Awareness programme at Regional Station, Minicoy, Lakshadweep

Regional Station, Minicoy of ICAR-CIARI Port Blair, conducted “Awareness program on “Sustainable model for food security for the tribal communities of Lakshadweep” on 22nd September 2023. A total of 18 participants including farmers from Fallessary, Sedivalu, South Bandaram, Kendiparty, Funhilol village attended.

Hassan, Senior Technical Assistant and Shri. Arif M.I., Senior Technician of the programme informed about the technical know-how and do how to the participants in ‘Mahl’ (the local language). On the occasion, 36 cuttings of annual moringa and 36 saplings of sesbania plants were distributed to the farmers.

Dr. Ajina S. M. interacted with the farmers and impressed upon the health and nutrition, nutrition garden as a sustainable model for food security, Organic farming and non-communicable diseases. Shri. Shareefuddeen

Dr. Gladston Y., Convener and Co-Conveners Dr. Ajina S.M., Coordinator, Shri . Shareefuddeen Hassan and Shri. Arif M.I., Dr. S.K. Zamir Ahmed, Nodal Officer, Lakshadweep coordinated the overall conduct of programme.



Plate 22. Awareness programme for farmers of Lakshadweep islands

Awareness campaign on Foot and Mouth Disease in livestock

An awareness campaign was organised by Division of Animal Science, ICAR-CIARI, Port Blair from 1 September to 18 September, 2023. In the Andaman and Nicobar Islands, the 3rd round of FMD vaccination (NADCP) has started as of September 1, 2023. As an expert, Dr. Jai Sunder, PI of the project attended the launch of the vaccination drive and also delivered a talk on FMD control to the senior veterinary officers and paravet staff in the presence of the

Secretary, Animal Husbandry and Veterinary Services, A & N Administration. FMD awareness programme started with giving awareness to island the farmers Islands through Doordarshan in a live phone-in programme. On September 15, two awareness programmes were conducted at Bachrapahar village at Burmanalla village. A total of 53 farmers attended the programme.



Plate 23. Awareness programmes on foot and mouth disease

Field day

Field Day cum demonstration on “Speciality flower cultivation – a potential commercial venture in the Island”

The climatic condition of the Island is highly conducive to grow speciality flowers especially the *Heliconias*, *Calatheas*, *Etilingera* and *Alpinias*. These speciality flowers are high value cut flowers crops with versatile utilities like bouquets, flower arrangements and hall decorations. As part of the NABARD funded project, planting material of 20 species of heliconias and four species of speciality flowers were planted in the field of Mr. Jagdish Halder at Namunagar village of South Andaman in an area of 1200 m² as demonstration and for popularization of the same for commercial cultivation. The field day cum demonstration was attended by 20 farmers and SHG members along with the Pradhan of the village, in which the cultivation aspects and the value addition was briefed by the scientists of ICAR-CIARI, Dr. V. Baskaran, Principal Scientist and Dr.

K. Abirami, Principal Scientist. The General Manager NABARD and team explained the different schemes available to extend the cultivation of speciality flowers by the SHG members on a cluster basis and the marketing opportunities as it is highly suitable for commercial exploitation as an income earning venture.



Plate 24. Field Day cum demonstration on “Speciality flower cultivation”

Demonstration

Demonstration of Heliconia at South Andaman

Under NABARD funded project, planting material of 20 accessions of *Heliconia* germplasm are distributed to farmers Shri. Jagdish Haldar. Namunagar, Smt. Chellammal, Rangachang

and Smt. Shanti at Beodnabad. The different accessions are planted at spacing of 1.5m × 1.5 m and the crop is in vegetative stage.



Plate 25. Demonstration on speciality flower cultivation at Namunagar, Rangachang and Beodnabad

Publications

Research Articles

- Adamala, S., Velmurugan, A., Subramani, T., Jayakumara, Varadan, R. and Biswas, T.K. (2023). Prediction of annual one day maximum rainfall for Andaman and Nicobar Islands. *Journal of Andaman Science Association*, **27**(1): 8-12.
- Halder, N., De, A.K., Vijaykumar, S., Sujatha, T., Sunder, J., Bhattacharya, D. and Joardar, S.N. (2023). Seasonal variation affects biochemical and immunological traits of various rural backyard poultry under tropical climatic conditions of Andaman and Nicobar Islands, India. *Biological Rhythm Research*, **54**(5-8): 489-506.
- Jaisankar, I., Srividhya, S., Jayakumara, Varadan, R. and Manasseh, Ezekiel, Moses. (2023). Screening Andaman Padauk (*Pterocarpus dalbergioides*) for drought tolerance. *Indian Journal of Agroforestry*, **25**(1): 102-109.
- Jaisankar, I., Jerard, B.A., Manasseh, Moses., E. and Simhachalam, P. (2023). Genetic diversity of *Pterocarpus dalbergioides* (Andaman Padauk) accessions of Andaman and Nicobar Islands. *Journal of Andaman Science Association*, **28**(1): 31-39.
- Sujatha, T., De, A.K., Sunder, J., Samaddar, G., Ponraj, P., Sawhney, S., Bhattacharya, D. and Chakurkar, E.B. (2023). Circulation of A2 subclade of Avipoxvirus in pigeons of the Andaman and Nicobar Islands, India. *Current Science*, **125**(8): 896-900.
- Subramani, T., Swarnam, T.P., Adamala, S. and Jaisankar, I. (2023). Management of moisture stress in okra under tropical island ecosystem. *The Pharma Innovation Journal*, **12**(8): 2700-2704.
- Subramani, T., Velmurugan, A., Bommayasamy, N., Manoj, K., Ramakrishna, Y. and Swarnam, T.P. (2023). Effect of Nano Urea (liquid) on yield and fertilizer saving in rice under island ecosystem. *Ecology, Environment and Conservation*, **29**(Special Issue): S377-S383.
- Wable, P., Jha, M.K., Adamala, S., Tiwari, M.K. and Biswal, S. (2023). Application of hybrid ANN techniques for drought forecasting in semi-arid region of India. *Environmental Monitoring and Assessment*. **195**:1090.

Abstracts

- Adamala, S., Velmurugan, A., Subramani, T., Swarnam, T.P. and Jaisankar, I. (2023). Estimation of Soil Moisture using Sentinel-1's C-band SAR data in South Andaman. In: V.P. Chaudhary *et al.* (Eds.) *Souvenir-cum-Abstracts book of 2nd International conference on "Prospects and Challenges of Environment and Biological Sciences in Food Production System for Livelihood Security of Farmers (ICFPLS-2023)"* during September 18-20, 2023 at ICAR-CIARI, Port Blair, Andaman Nicobar Islands, India, p.:131.
- Karunakaran, D., Kiruba, Sankar, R., Gladston, Y., Zamir, Ahmed, S.K. and Jaya, Kumaravaradan, R. (2023). Mobile Application for real-time marine fish catches system for Andaman and Nicobar Islands (A & N Fish). In: V.P. Chaudhary *et al.* (Eds.) *Souvenir-cum-Abstracts book of 2nd International conference on "Prospects and Challenges of Environment and Biological Sciences in Food Production System for Livelihood Security of Farmers (ICFPLS-2023)"* during September 18-20, 2023 at ICAR-

- CIARI, Port Blair, Andaman Nicobar Islands, India, p.:131.
- Hari, Nivas, Asokan., Jaisankar, I., and Nikhil, lele. (2023). Assessment and Mapping of Mangroves in Andaman and Nicobar Islands using Satellite Imagery. In: V.P. Chaudhary *et al.* (Eds.) *Souvenir-cum-Abstracts book of 2nd International conference on “Prospects and Challenges of Environment and Biological Sciences in Food Production System for Livelihood Security of Farmers (ICFPLS-2023)”* during September 18-20, 2023 at ICAR-CIARI, Port Blair, Andaman Nicobar Islands, India, pp.: 1-288.
- Jaisankar, I., Jerard, B.A., Velmurugan, A., Jaya, Kumaravaradan, R., Rajkumar, M., and Blesy, G.M., (2023). Fruits of *Pandanus* species - A potential nutrient supplement in Andaman and Nicobar Islands. In: V.P. Chaudhary *et al.* (Eds.) *Souvenir-cum-Abstracts book of 2nd International conference on “Prospects and Challenges of Environment and Biological Sciences in Food Production System for Livelihood Security of Farmers (ICFPLS-2023)”* during September 18-20, 2023 at ICAR-CIARI, Port Blair, Andaman Nicobar Islands, India, pp.: 1-288.
- Jaisankar, I., Jerard, B.A., Swarnam, T.P., Chakurkar, E.B. and Subramani, T. (2023). Enriching coconut plantations of Andaman and Nicobar Islands through augmentation of indigenous multipurpose tree resources. In: *Souvenir: International Conference on Coconut as an Economic & Ecological security in Indian Coastal Management (CEESICM-2K23)*, organized by Finura Agro Tech LLP, Coastal Peace & Development (CPD) on September 14-15, 2023. p.: 62-63.
- Jaisankar, I., Blesy, G.M., Darathi, Fathima, M.A., Adamala, Sirisha. and Subramani, T. (2023). Chemical constituents in *Pandanus amaryllifolius* of Andaman and Nicobar Islands, India. In:V.P. Chaudhary *et al.* (Eds.) *Souvenir-cum-Abstracts book of 2nd International conference on “Prospects and Challenges of Environment and Biological Sciences in Food Production System for Livelihood Security of Farmers (ICFPLS-2023)”* during September 18-20, 2023 at ICAR-CIARI, Port Blair, Andaman Nicobar Islands, India, pp.: 1-288.
- Jaisankar. I., Jerard, B.A., Chakurkar, E.B. and Subramani, T. (2023). Coconut leaf cup: An alternate for plastic nursery containers in horticulture nursery. In: *Souvenir: International Conference on Coconut as an Economic & Ecological security in Indian Coastal Management (CEESICM-2K23)* held at Rohini College of Engineering and Technology, Kanyakumari District, Tamilnadu, organized by Finura Agro Tech LLP, Coastal Peace & Development (CPD) & Rohini College of Engineering and Technology on September 14-15, 2023.
- Manasseh, Moses, E., Lakshmanan, Prabu, S. and Jaisankar, I. (2023). Extraction of wood dye from Noni (*Morinda citrifolia* L.): A potential natural dye. In: V.P. Chaudhary *et al.* (Eds.) *Souvenir-cum-Abstracts book of 2nd International conference on “Prospects and Challenges of Environment and Biological Sciences in Food Production System for Livelihood Security of Farmers (ICFPLS-2023)”* during September 18-20, 2023 at ICAR-CIARI, Port Blair, Andaman Nicobar Islands, India, p.: 65.
- Lucinda, Meshack., Sundarapandian, S.M., Jaya, Kumaravaradan, R. and Jaisankar, I. (2023). Community valuation of mangrove ecosystem services in South Andaman district of Andaman & Nicobar Islands, India. In: V.P. Chaudhary *et al.* (Eds.) *Souvenir-cum-Abstracts book of 2nd International conference on “Prospects and Challenges of Environment and Biological Sciences in Food Production System for Livelihood Security of Farmers (ICFPLS-2023)”* during September 18-20, 2023 at ICAR-CIARI, Port Blair, Andaman Nicobar Islands, India, pp.: 1-288.
- Praveenraj, Jayasimhan., Kumari, Megha., Barman, Jessica., Biswas, Promith, Rajendran., Kiruba, Sankar, R., Kandhasamy, Saravanan. and Zamir Ahmed, S.K. (2023). Record of *Esomusdanrica*, Hamilton 1822 (Cyprinidae) from Ritchie’s Archipelago, Andaman Islands - a possible alien introduction. In: V.P. Chaudhary *et al.* (Eds.) *Souvenir-cum-Abstracts book of 2nd International conference on “Prospects and Challenges of Environment and Biological Sciences in Food Production System for Livelihood Security of Farmers*

(ICFPLS-2023)” during September 18-20, 2023 at ICAR-CIARI, Port Blair, Andaman Nicobar Islands, India, pp.: 1-288.

Zamir, Ahmed, S.K., Jaya, Kumaravaradan, R., Ramakrishna, Y., Karunakaran D. and Gladston, Y. (2023). Behavioral perspective of farmers’ attitude towards farming in Andaman & Nicobar Islands. In: V.P. Chaudhary *et al.* (Eds.) *Souvenir-*

cum-Abstracts book of 2nd International conference on “Prospects and Challenges of Environment and Biological Sciences in Food Production System for Livelihood Security of Farmers (ICFPLS-2023)” during September 18-20, 2023 at ICAR-CIARI, Port Blair, Andaman Nicobar Islands, India, pp.: 1-288.

Book

Chaudhary, V.P., Sunder, J., Verma, N, Nirmal, Bohra, P., Singh, P.K., Kumar, Vijay, Kumari, Sweeti., Katiyar, H.O., Chakurkar E.B. and Prasad G. (2023). *Souvenir-cum-Abstracts book of 2nd International conference on “Prospects*

and Challenges of Environment and Biological Sciences in Food Production System for Livelihood Security of Farmers (ICFPLS-2023)” during September 18-20, 2023 at ICAR-CIARI, Port Blair, Andaman Nicobar Islands, India, pp.: 1-288.

TOT including radio talks/ TV programme broadcast

- Dr. K. Saravanan participated as an expert in a live phone-in programme on the topic “Aquatic animal disease surveillance and fish health management measures” held at Doordarshan Kendra, Port Blair on September 28, 2023.
- Dr. Jai Sunder has participated in live phone in programme in Doordarshan Kendra Port Blair on control of Foot and Mouth Disease in livestock on September 14, 2023.

IPRs / Commercialization of Technology

Dweep Larval Rearing Technology for Fancy Guppy Fish

The Institute signed the Memorandum of Agreement (MoA) with Miss. Megha Ram, School Line, Port Blair, South Andaman on 7th July 2023 for the commercialization of Dweep Larval Rearing Technology for Fancy Guppy Fish. The technology was developed for the commercial production of fancy guppy fish through interventions in feeding protocols, culture water preparation, disease management, etc. The technology was developed Dr. J. Praveenraj, Dr. K. Saravanan, and Dr. R. Kiruba Sankar.



Plate 26. Commercialization of dweep larval rearing technology for fancy guppy fish

First Patent granted to ICAR-CIARI, Port Blair for developing Novel Acaricide

The Institute received its maiden patent for an invention entitled “Novel acaricide compositions for veterinary topical applications and the method of preparation thereof” under Patents Act, 1970 (Patent No: 455756) on 29th September, 2023. The invention is a process for developing oil based herbal topical formulation as an

acaricide to treat tick infestation in livestock. Tick infestation causes physical damage to livestock, irritation, unrest, paralysis or toxicosis and transmits blood borne protozoan diseases. Chemical acaricidal application is the common method of tick control. However, these chemicals are toxic and may cause accidental



poisoning especially in children, residue problem in meat and milk and environmental pollution. Development of resistance of ticks to these acaricides is always an emerging disadvantage of chemical acaricides. This herbal based formulation kills all stages of

ticks in cattle and goat with less lethal time, economically affordable to farmers and safe to use in pregnant and lactating animals.

The inventors were Dr. Jai Sunder, Dr. T. Sujatha, Dr. M.S. Kundu, Dr. A. Kundu and Dr. S.D. Roy

Participation in seminars/ symposia/ conferences/ workshop

Name	Programme	Details
Dr. S. K. Zamir Ahmed	National Apprenticeship Awareness Workshop	Organized by the Department of Training, Ministry of Skill Development and Entrepreneurship (MSDE), GoI at the Lemon Tree Hotel, Port Blair on 27 th July 2023
Dr. Ajit Arun Waman	Invited lecture during Seminar on Agriculture	Organized by All India Radio at ICAR-CIARI, Port Blair on 30 th August, 2023
Dr. Sirisha Adamala	Online Training Programme on "Data Science in Agriculture"	Organized by ICAR-IASRI, New Delhi during September 4 th to 15 th , 2023
Dr. Ajit Arun Waman	Annual Group Meeting of AICRP on Palms project	Organized by HRS, Kahikuchi, Assam during September 13 th to 15 th September, 2023
All staff of ICAR-CIARI	Workshop on Power of Silence to Deal with Challenges	ICAR-CIARI, Port Blair on 13 th September, 2023
Dr. V. Baskaran Dr. K. Abirami Dr. R. Kirubasankar Dr. J. Praveenraj Dr. K. Saravanan Dr. Ajit Arun Waman Dr. Pooja Bohra	Oral presentation during 2 nd International Conference on Prospects and Challenges of Environment and Biological Sciences in Food Production System for Livelihood Security of Farmers	Organized by PISRF, Uttar Pradesh and ASA, Port Blair at ICAR-CIARI, Port Blair during 15 th to 18 th , September, 2023.

New projects/ initiatives / infrastructure development

- Dr. Ajit Arun Waman received a competitive research grant for a project entitled 'Standardization of agro-techniques and nursery protocol for *Centratherrum anthelminticum* (L.) Kuntze ex Gamble' in collaboration with RRCA, Port Blair from CCRAS, Ministry of AYUSH, Government of India, New Delhi.
- At Sippighat farm, to facilitate agro-ecotourism activities, Dr. Ajit Arun Waman took various initiatives including creation of railing for two irrigation ponds and sidewalks,

establishment of ornamental rhizomatous species blocks, creation of three ponds for aquatic plants etc. were taken up. Further, to ensure self-sufficiency in irrigation and nutrient resources, two ponds were desilted apart from digging of two composting trenches. Rooted cuttings of long pepper species, *Piper colubrinum*, lemongrass, Malabar tamarind grafts, cinnamon layers were planted for establishing mother blocks to the Sippighat farm for planting material production.

Other information

- **Freshwater fish breeding:** Freshwater fish breeding at Garacharma farm was carried out by the team comprising of Dr. Chittaranjan Raul, Dr. S.K. Zamir Ahmed, Shri. J. Praveenraj, and Dr. R. Kiruba Sankar, . Matured brood fishes of Rohu were injected using hormone on 3rd July 2023 (approx. 5 litres egg produced) and thereafter on 5th July 2023, matured brood fish of Catla were injected and the result of induced breeding of Catla (3 females and 4 male) manifested 15 ltr eggs = 3.75 lakh eggs, with fertilisation rate of rate 70 to 75 %.
- **Setting up of Fish spa for Agro-tourism project:** *Garra* sp. were brought from Chennai for the purpose of setting up of Fish Spa as a part of Agro-eco tourism at ICAR-CIARI, Garacharma.

Personnel

Appointment:

- Dr. Abhilash, Scientist, Division of Natural Resource Management on 20th July, 2023.
- Shri. Prabhu P, Scientist, Division of Horticulture and Crop Improvement on 20th July, 2023.
- Shri. Sharath S. Yeligar, Scientist, Animal Science Division on 20th July, 2023
- Shri. Talaviya Harshangkumar, Scientist, Natural Resource Management on 20th July, 2023.
- Dr. V. Damodaran, Sr. Scientist & Head,

ICAR-CIARI-KVK, North & Middle Andaman on 20th September, 2023.

Transfer:

- Dr. T. P. Swarnam , Pr. Scientist transferred to ICAR-IIFSR, Modipuram, Meerut on 24th July, 2023.

Obituary

- Late Shri. Ganesh Bhagat, Skilled Supporting Staff, Animal Science Division on 16th August, 2023.



Published by	: Dr. Eaknath B. Chakurkar, Director
Compiled & Edited by	: Dr. Jai Sunder, Shri. D. Karunakaran and Dr. Ajit Arun Waman
Typesetting & Designing	: Mrs. Asma Bibi and Mrs. Nazneen Khan
Photo	: Mr. K. Ali Akbar
Address	: ICAR-Central Island Agricultural Research Institute Port Blair-744105, A & N Islands
Phone No	: 03192-250436
Website	: https://ciari.icar.gov.in/
E-mail	: director.ciari@icar.gov.in