



# ICAR-Central Island Agricultural Research Institute (CIARI) Port Blair, Andaman & Nicobar Islands AT A GLANCE



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## ICAR-Central Island Agricultural Research Institute (CIARI), Port Blair Andaman & Nicobar Islands: At a Glance

### Central Island Agricultural Research Institute (CIARI) formerly Central Agricultural Research Institute (CARI)

Central Island Agricultural Research Institute, Port Blair an ICAR unit for A & N Islands, is an unique Institute engaged in multidisciplinary research devoted to the cause of island agriculture and island ecosystem since its inception. It was established on 23<sup>rd</sup> June 1978 by merging different Regional Research Stations of the ICAR Institutes viz., Central Marine Fisheries Research Institute, Indian Veterinary Research Institute, Indian Agricultural Research Institute and Central Plantation Crops Research Institute.

CIARI caters to the specific needs of agricultural research and development and entrusted with the task of developing technologies for enhancing the productivity and production of crops, livestock and fishery through adoptive and basic research to bridge the gap between requirement and the local production. It has several accomplishments during the last thirty five years of its service despite various insurmountable constraints. The research activities are carried out under five divisions viz., Natural Resource Management, Horticulture & Forestry, Field Crops, Fisheries Science, Animal Science and

one Social Science Section. The Institute has its main campus located at Garacharma farm and is spread over 62 ha of land wherein research work related to field crops, horticulture, animal sciences and fresh water fisheries are being carried out. In addition, it has three Krishi Vigyan Kendras located one each at Sippighat, Car Nicobar and Nimbudera covering all the three districts of the Island, besides an Out Reach Centre supported by NABARD at Diglipur, North Andaman.

With the accumulated experience and expertise in Island agriculture, it is envisioned to make a major stride in coming years towards our cherished goal of emerging as the Institute of Excellence on Tropical Island Agriculture in the Asian countries. Accordingly, the Institute in this year of XII five year plan, has been re named as Central Island Agricultural Research Institute (CIARI) and it is high time we capitalize on our own research foundation and the cumulative strength as a member of NARS to be a model for tropical Island agriculture research to the South East Asian countries in short term and entire world, in long term.

Our primary focus for the 12<sup>th</sup> plan is to enhance productivity through characterization and conservation of Island genetic resources,



development of genetically superior varieties/breeds, systems approach in Island farming, development of climate resilient agricultural technologies suitable for the agro - ecological conditions of these Islands and effective management of post-harvest losses. The effective transfer of technologies would help to achieve self sufficiency in major food items, particularly the perishable commodities and to ensure nutritional and livelihood security to the Island farmers/fishers/farm women especially the tribal farmers of the Nicobar group of Islands. For socio-economic amelioration of the tribal communities and the farm women it is envisioned to provide livelihood opportunity through sustainable technological intervention and capacity building under Tribal and NEH Plan.

In order to utilize the financial resources optimally and in the light of the fact that CIARI is the only ICAR Research Institute in this region, it is planned to strengthen the state of the art centralized research

facilities for conducting research on impact of climate change, bio-prospecting of Island genetic resources, post harvest and pre harvest, animal and fish health, research on soil, water and tissue culture research. Integrated Agriculture System for Tropical Island is being taken up as the flagship programme of this Institute to enhance the adaptive capacity of the Island farmers and fishers in order to build disaster and climate resilient Islands through frontier research. The integrated approach will be promoted by developing location specific farming system models, including the wealth of the vast coastal and marine resources in the Islands, which can serve as unique models for Tropical Island ecosystems. The geographical location of Island confers freedom from various diseases, insect, pest, however, the unrestricted entry of unwanted bio- organisms pose a continual threat to the crop- animal - fish component of the Islands. In order to protect the precious flora and fauna diversity of the Islands, it is envisioned to develop facilities for Composite Bio-security and Quarantine Facility in the XII Plan.

## Mission



To provide decent livelihood to farm youth from agriculture in a fragile Island ecosystem on sustainable basis.

## Vision



“The Institute envisages developing the agri-horticulture, livestock and fisheries sector in a sustainable way through technological innovation in the changing climatic scenario to ensure decent livelihood in the fragile Island ecosystem.”

## Mandate

- To provide a research base to improve the productivity of important agri-horticulture, livestock and fisheries of A&N Islands through adaptive and basic research for attaining economic self sufficiency.
- To develop appropriate plans for conservation of natural resources and their sustainable use.
- To standardize technologies for animal health coverage and livestock production.
- To standardize techniques for capture and culture fishers including coastal aquaculture.
- First line transfer of technology and training to the relevant state departments.

## THRUST AREAS FOR XII PLAN

### Broad research programmes for the XII Plan are as under:

- Characterization and bio-prospecting of natural Island bio-resources
- Climate proofing Island agriculture for improving productivity
- Development of harvest - post-harvest management practices and value addition
- Policy support research for agriculture development in the Islands

### Beside three other programmes are:

- Flagship programme on integrated agriculture system for tropical Island
- Establishment of Composite bio-security & quarantine facility
- Tribal Sub Plan

## Most Salient Achievements

### Biodiversity Conservation

- A total of 238 germplasm of indigenous and exotic-horticultural crops viz. in Fruits: 53, Vegetables: 77, Flowers: 03, Tuber crops: 33, Plantation crops: 36 and Medicinal plants: 36 is maintained.
- Fifty seven traditional vegetables were documented from Islands and developed nutritional profile of 16 predominant Nicobari traditional vegetables which are rich in micronutrients like Fe, Ca Zn Cu Mn, Mg and also rich in phenolics, ascorbic acid and flavonoids.
- Two new leafy vegetables viz. *Mukia maderaspatana* (L.) M. Roem and *Limnophila chinensis* (Osbeck) Merr. and two tuber crops i.e. Pink fleshed greater yam and *Tacca leontopetaloides* were reported from Island.
- Forty eight species of medicinal plants were added to the gene garden from South Andaman.

- To strengthen the minicore collection of pulse germplasm, 19 mungbean, 23 urdbean and 27 accessions of pigeonpea landraces and advanced lines were collected and conserved. The wild relative of *Vigna* spp. namely, *Vigna marina* were collected from different parts of Islands are also maintained.
- One hundred forty Dahi nariyal (Macapuno) nuts were collected and three new dahi nariyal palms were identified at South Andaman for future collection of nuts.
- Fifty nine species of sponges were identified of which, 44 are reported for the first time from Andaman and Nicobar Islands, including 25 new distributional records for India. 54 Voucher specimens of identified sponges were registered and maintained at the A&N Regional Centre of ZSI.
- A total of 64 molluscan species were identified in situ from Nancowry group of Islands, whereas a total of 53 species distributed under 8 phyla viz., Cnidaria (30), Echinodermata (7), Mollusca (5), Vertebrata (Pisces) and Porifera (4 each) and Urochordata, Crustacea and Annelida representing 1 species each were recorded from Great Nicobar Islands. From Car Nicobar Islands, a total of 70 species distributed under 6 phyla viz., Vertebrata (Pisces) (33), Cnidaria (28), Mollusca and Porifera representing 3 species each, Crustacea (2) and Echinodermata (1) were recorded.
- Two Opisthobranchs viz., *Dolabrifera dolabrifera* (Cuvier, 1817) and *Herviella mietta* Marcus and Burch 1965 are new additions to the Molluscan fauna recorded from Car Nicobar Islands.
- Coral reef and mangrove biodiversity of the A & N Islands have been documented and a field guide for the identification of mangroves of A&N Islands has been prepared.
- One hundred forty two Actinomyces were isolated from the sediments and sea of Andaman coasts. Most of the isolates belongs to *Streptomyces* sp (70%) followed by *Micromonospora* sp (20%), *Streptoverticillium* sp and *Nocardia* sp (10%).
- Three new species of fruit fly, *Bactrocera zonata*, *B.*

*correcta* and *B. caudata* were identified as new records from Andaman Islands.

- *Bandicota bengalensis* was reported as new rodent species record from Andaman.
- Custodian farmers and communities of biodiversity conservation and utilization in Andaman & Nicobar Islands were identified for cultivar/ germplasm/ land races viz., Andaman Coconut, Nicobari Aloo, Khoon Phal, Blue mango, Noni, Khushbayya rice, Black Burma, Mushley, Nyawin, White Burma, Nicobari fowl, Nicobari pig and Teresa goat and recognized for the first time.

### Integrated Pest Management (IPM) Module

- Integrated disease and pest management modules for black pepper.
- IPM modules for *Spodoptera litura* in Tomato and *Leucinodes orbonalis* in Brinjal.
- IPM modules for the successful management of okra fruit and shoot borer and cucurbit fruit fly by using locally available leaf extracts.

### Technologies Developed/ Standardized

- Rice based cropping system with maize, sorghum and pulses.
- Plantation based multitier cropping system with spices as intercrop.
- Standardized total system of table purpose ground nut production with seed production technology in coconut plantations during wet season and package of practices for ICGS 76 variety in post rice dry season system
- Protected cultivation for high value crops (flowers and vegetables).
- Standardized 'raised bed technology' for leafy vegetables for multi-cutting.
- Integrated farming system in fresh and brackish water areas.
- Fodder cultivation on hill slopes through grasses and fodder trees.
- Management practices for indigenous cattle.

- Mud Crab culture in tide feed brackish water ponds.
- Standardized induced breeding of Tiger prawns and Cat fish.
- Standardized captive breeding of marine ornamental clown anemone fish.
- Cage culture of food fishes in bay / creeks.
- Low cost Coconut De-husker, Biomass Fired Dryer & Solar Dryer.
- Rain water management for water resource development at hill top and valleys.
- Three bacterial wilt resistant lines in brinjal (CARI B2, CARI B3 and CARI B4) have been identified, which have coloured fruits with cylindrical, round and oblong shapes.
- Dual purpose Nicobari fowl for higher egg production (184 No./annum) and higher body weight (1.92 kg at 4 months age).
- Dweepika (White Nicobari X Vanaraja) as a cross of Nicobari fowl suitable for back yard farming with higher egg production, 185 eggs/annum, and higher body weight of 1923.10 g at 16 weeks of age with better survivability.

### Variety/Strain Developed

- Ten varieties namely two rice varieties CARI Dhan - 6 & 7, one brinjal CARI-Brinjal-1, four coconut - CARI-Anapurna, CARI Surya, CARI-Omkar, CARI - Chandan, two sweet potato, CARI-SP-1 and SP-2 and CARI Poi-1 of Basella were released for the benefit of farmers and other stakeholders.
- Three varieties namely Ground orchid variety CARI Pretty Green Bay, Broad Dhaniya (*Eryngium foetidum* L.) variety CARI Broad Dhaniya and Greater Yam (*Dioscorea alata*) variety CARI DA-1 (Yamini) developed and recommended for release by the State Seed Sub Committee on Agriculture & Horticulture Crops in A & N Islands.
- CARI Poi Red of *Basella rubra* L., CARI AMA-Green and CARI-AMA-Red of *Amaranthus* were identified for higher yield.
- Four varieties of *Morinda citrifolia* L. namely CARI Sanjivini, CARI Samapada, CARI Samridhi and CARI Rakshak were developed for challenge situation.
- First time tissue culture of *Momordica cochinchinensis* was developed to provide desired plants in short period which is better than conventional method of propagation.
- Tissue culture protocol was standardized for *Piper longum*.
- Grafting technique for sapota using Poonphal (*Callophyllum inopylum*) and Sea mahua as rootstock for salinity tolerance has been standardized.

- Cross-bred goat by crossing Boer goat and local Andaman Black.
- Improved Nicobari crosses for backyard farming.

### Value Addition

- Two herbal based preparation for poultry i.e. Grommune for higher growth and immunity and Morical as a feed supplements for higher egg production and quality.
- Feeding of *Morinda citrifolia* @10 ml per day per bird + 200 mg Kalmegh (*Andrographis peniculata*) on alternate days showed immune modulator activity and growth promoter effect in Nicobari fowl and could be used as an alternative to commercial tonic.
- Supplementation of developed mineral mixture named as CARIMIN to basal diet significantly increased the incidence of oestrous (9.66%) pregnancy rate (16.67%) and farrowing rate (16.67%) of sows.
- Kalmegh feed supplementation at the rate of 3 g per bird per day for breeder fowl improved the humoral and cell mediated immunity of breeders and improved the immunity, improved the height and reduced the depth of duodenal villi of progeny.
- Herbal ointments prepared by using *Vitex trifolia* and *E. odoratum* plants were found to be efficient in acute wound healing in cows.
- Coating on noni fruits with edible *Aloe vera* gel increased the shelf life and reduced the changes in physico chemical parameters over the storage period of 7 days.

- Development of fortified food items from Broad Dhaniya (a high density source of micronutrients) for generating livelihood and increasing dietary intake of micronutrients.

### Technology Transferred

- Four identified technologies namely Broad Bed and Furrow System, Integrated Farming System, Tank cum Well System and Micro Irrigation System has been transferred to farmers field in participatory mode.
- Twenty five Homestead based Integrated Farming system model for tribal farmers of Nicobar district comprising Homegarden, goat and backyard poultry and Tuber crop with piggery and poultry as a livelihood options at Little Andaman.
- Need based integrated land improvement approach comprising of six different methods viz. broad bed and furrow, rice-fish, three tier farming, farm pond, paired bed and furrow and pond-nursery systems were implemented in degraded coastal areas covering 37.0 ha.
- Cost effective rain shelter for vegetable cultivation for rainy season.
- Organic ginger production under Coconut plantation in South Andaman.
- Tuber crops production in South, North and Middle Andaman and Car Nicobar.
- Round the year cauliflower cultivation technology.
- Comprehensive technology package for *Morinda citrifolia* (Noni).
- Seed village production of HYV of paddy was conducted in farmers participatory mode, wherein a total of 120 kg Nucleus, 465 kg Breeder seed and 3370 kg Truthfully Labelled Seed of five rice varieties was produced to address to the need of rice farmers of the island.
- Ridge and furrow cultivation, aerial vegetable cultivation for moisture conservation and to check soil erosion in hilly slope, fodder cultivation, composite fish culture, backyard poultry, nutritious kitchen garden and mulching in plantation and field crops for moisture conservation were the technologies intervened in the NICRA village for mitigation and adaptation due to climate change.
- Satellite Fish Nursery technique were transferred to meet the need of the quality fresh water fish seeds in collaboration with Department of Fisheries, A&N Administration.
- Composite Fish Culture technology was encapsulated with all the four major ingredients i.e. technology back up, input provider, good governance and the market making it a market led technology for the Islanders.
- Technology on rodent management in paddy in South and North Andaman.
- Improved Nicobari crosses for backyard farming.
- Pekin cross duck under backyard at North Andaman.
- Mini Dal Mill was introduced at Diglipur as one of the technological intervention to support livelihood of the SHG's and other stakeholders.
- Mini Incubator for rural poultry farming has been established for the first of its kind to this Island to alleviate the problem of less hatchability of desi eggs and help rural poultry farmers to be self sufficient in desi chicks availability.
- Through PFZ forecasts 34.35% increase in CPUE (Catch per unit effort) and reduction in scouting time for fishing grounds by 50% was achieved, beside a net profit of Rs. 45,000 while it was 16,000 in non PFZ, which is 2.8 times higher than non PFZ.
- Ninety three agromet bulletins in English and 64 in Hindi were issued through print and electronic media, for better crop planning & management in all the three districts.
- Krishi Vigyan Kendra, South Andaman, Middle & North and Nicobar alongwith Out Reach Centre, Diglipur have imparted a total of 276 training programmes in agriculture and allied field benefitting a total of 7544 beneficiaries representing all the three district during 2012-2014.



### Tribal Sub Plan & NEH component

- Tribal sub plan was implemented in Car Nicobar, Kamorta, Campbellbay and Hutbay of A&N Islands. Similarly under NEH component work was carried out at Assam, Meghalaya, Tripura, Arunachal Pradesh, Manipur and in Bali Islands of Sunderban, West Bengal. Under these components, a total of 64 training programmes in the field of fisheries, horticulture, field crops, Animal Husbandry, post harvest, crop protection and value addition were conducted in collaboration with State departments and KVKs, wherein a total of 3269 farmers were benefitted. Twenty three tribal farmers from Car Nicobar were given exposure on goat and breeder management and hatchery operation at CIARI, Port Blair and DAH&VS, A&N Administration.
- Inputs distributed to the beneficiaries were vegetable seed kit (1300Nos.), Banana, pine

apple, guava, mango, lime , (6750 Nos.), Tuber crops(4000 Nos.), coconut & arecanut (3155 Nos.), nutmeg, black pepper, clove (2400 Nos.), tuberose, Jasmine & gerbera (4400 Nos.), rice, maize & pulse ( 4219 kgs.) goat, pig & poultry (5186 Nos.), Cryocan (28 Nos.), Sprayer, Conoweeder(40 Nos.) Power tiller (3 Nos.), Water pumpset (10 Nos.), coconut climber (85 Nos.), Paddy thresher ( 10 Nos.), Fishing boat (6 Nos.) life jacket (104 Nos.), ice box (23 Nos.) and deep freezer (23 Nos.)

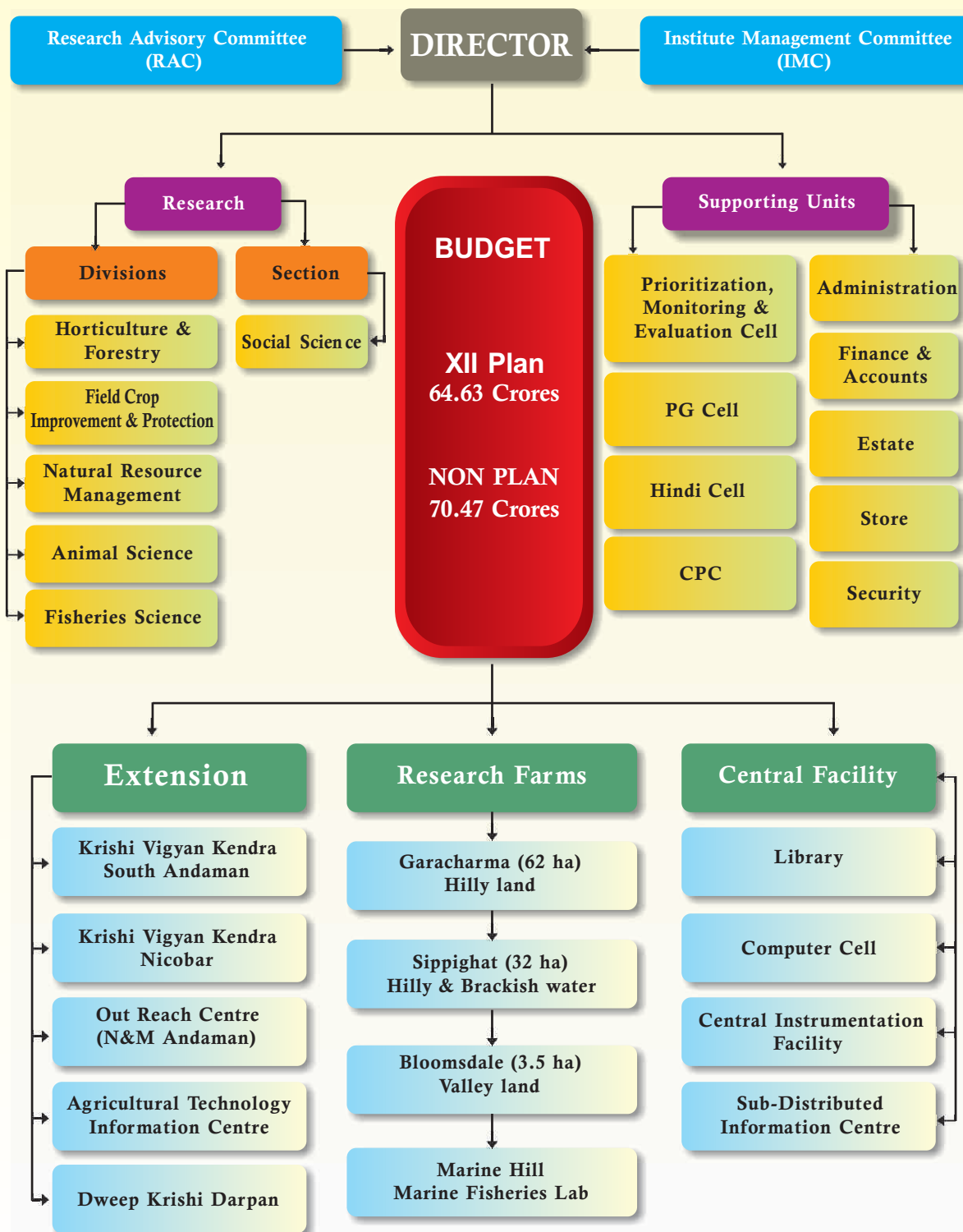
- Beside the assets were created at the community level as demonstration units for the benefit of tribal farming community viz., Developed home stead based IFS of 50 m<sup>2</sup> each for twenty five beneficiaries of seven villages, two low cost goat shed, three low cost poultry shed, four mini incubators for hatching of chicks and ten rain shelter for vegetable cultivation in off season.

## AWARDS and RECOGNITIONS

From the year 2000 till date the institute has been covered with eighteen ICAR, thirty one society, seven State, nine young scientist and twenty one miscellaneous awards/ recognitions. The Institute has also been awarded "Rajshri Tandon" by ICAR, New Delhi for the year 2011-12 & 2012-13 and Rajbhasha Karyanavayan evam Prashikshan Mission (RAKAMI) award for the year 2011-12 for superlative implementation of Rajbhasha in official use. Further, Town Official Language Implementation Committee, Port Blair under the Chairmanship of Director, CIARI has been awarded III prize for excellent implementation of official language policy in Andaman and Nicobar Islands for the year 2011-12 & 2012-13 by Govt. of India, Home Ministry, Dept. of Official Language. In addition, Indian Science Congress Association (ISCA) on its centenary year have recognized CIARI as Andaman Chapter.



# ORGANOGRAM







## ICAR-Central Island Agricultural Research Institute

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