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NEWSLETTER
भाकृअनुप – केंद्रीय तटीय कृषि अनुसंधान संस्थान
(भारतीय कृषि अनुसंधान परिषद)
ICAR - Central Coastal Agricultural Research Institute
(Indian Council of Agricultural Research)

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

Agrisearch with a human touch

In this issue

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Goa imports essential agricultural commodities like rice, vegetables, flowers, milk, eggs, meat *etc.* from neighbouring states. The state has immense potential for production of paddy, plantation crops, fruits, vegetables, flowers, spices *etc.* harnessed with the integration of allied enterprises such as dairy, piggery, poultry, fishery *etc.* Integrated farming system (IFS) is an agricultural system that integrates crop production, livestock, and other locally suited farm enterprises.

The concept of IFS is more feasible for small and marginal farm holdings as it serves as a tool for linking allied agri-enterprises with the crop production, enhancing farm income, besides offering scope for environmental safety and conservation of agro-biodiversity. The *Kulagar* is a traditional farming system of Goa with major focus on cultivation of horticultural crops on uplands. In Goa, majority of the *Kulagar* systems are found in Ponda, Sattari, Bicholim, and Sanguem and also in some parts of Canacona and Quepem. The main objective of *Kulagar* is to meet out the food and nutritional requirement of the farm family and to generate year-round income. The major crops found in *Kulagar* are arecanut, coconut, banana, and spices. In *Kulagar*, each arecanut tree is holding a mounting creeper of either pepper or betel leaf and nutmeg is intercropped in the system. Besides, variety of other fruit-bearing plants like mango, banana, pineapple, jackfruit, breadfruit, sapota, papaya *etc.* and variety of flowering and vegetable crops are also grown on periphery.

Some of the *Kulagar* farmers have included complimentary enterprises such as dairy, poultry, goat farming *etc.* to increase farm profitability and income. The residue generated in the system is recycled through mulching and composting. Natural springs/streams or wells act as a source of irrigation in *Kulagar* system and through technological interventions drip/sprinkler system of irrigation has become popular in the last decade. Currently, labour shortage, increased cost of inputs, lower production, choice of low yielding forage crops and rearing of nondescript/locals breeds of cows are the issues confronting the *Kulagar* farmers.

To revive the full potential of *Kulagar* system, agronomic management practices, pest management and livestock management need to be considered. Scientific *Kulagar* farming will increase the crop and livestock production leading to regular and enhanced income to farmers.

Chakurkar
DIRECTOR

RESEARCH HIGHLIGHTS

Soil quality assessment of the salt-affected soils of coastal region of India using different indexing methods

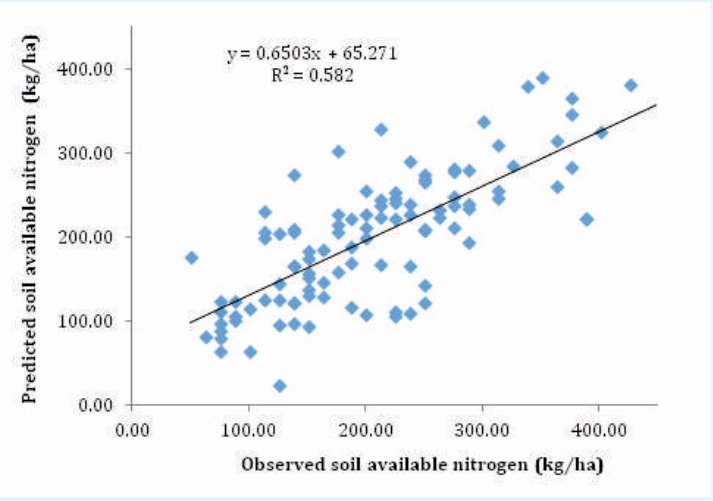
(GR Mahajan and Bappa Das)

The aim of the present study was to assess the soil quality (SQ) of the salt-affected soils of the coastal region of India. About 300 soil samples (total – 402, outliers removed – 102) were collected from the salt-affected and non-salt affected areas. Based on the electrical conductivity they were further classified in to five classes as (1) non-saline (NS) (<2 dS m^{-1}, n=42), (2) slightly saline (SS) (2-4 dS m^{-1}) (n=53), (3) moderately saline (MS) (4-8 dS m^{-1}, n=94), (4) strongly saline (STS) (8-16 dS m^{-1}, n=70) and (5) very strongly saline (VSTS) (>16 dS m^{-1}, n=41). Different approaches namely linear and non-linear scoring; total data set (TDS, 18 soil properties) and minimum data set (MDS, 6 soil properties) and additive and weighted approach leading to eight soil quality indices (SQIs) were calculated . Principal component analysis (PCA) was carried out to identify the soil properties for MDS. The MDS consisted of soil pH, electrical conductivity, ammonium acetate extractable sodium, soil available copper and manganese and bulk density. The SQIs calculated using MDS performed better than using TDS. The SQ was best estimated using the linear scoring and weighted method using MDS (SQI6=0.80) among all approaches. Thus, for evaluating the SQ of salt-affected soils of coastal region, linear scoring, weighted approach with MDS could save time and cost.

Monitoring the physical and chemical properties of the salt-affected soils of coastal region of India using the hyperspectral remote sensing data

(GR Mahajan and Bappa Das)

The aim of the study was to assess predictive ability of soil physico-chemical properties using the hyperspectral reflectance data by applying multivariate analysis. From the results, it was clear that the soil properties like soil pH, EC, soil organic carbon, soil available nitrogen, exchangeable sodium and magnesium, soil available sulphur, iron, manganese, boron, cation exchange capacity and bulk density could be predicted with calibration and prediction accuracies of R^2= 0.79-0.98 and R^2= 0.52-0.82 (p<0.01), respectively. Thus, it can be concluded that the hyperspectral reflectance data can be used to predict the above-mentioned soil physico-chemical properties.



Validation graph of the actual and predicted soil available nitrogen using principal component regression

Long-term effect of conservation measures on soil enzymatic activity

(Sujeet Desai and GR Mahajan)

The long-term effect of soil and water conservation measures on enzymatic activity in lateritic soils under mango cultivation was studied. The results revealed that conservation measures had significant effect on different soil enzymatic activities. The dehydrogenase activity under Continours Contour Trench + *Vetiveria zizanoides*(CCT + VB) and Staggered Contour Trench + *Vetiveria zizanoides* (SCT+VB) were 26.71 and 48.19 µg TPF g^{-1} soil day^{-1}, respectively whereas it was 12.01 µg TPF g^{-1} soil day^{-1} under control treatment. Phosphatase activity of 615.23 and 494.21 µg p-PNP g^{-1} soil day^{-1} was found in CCT+VB and SCT+VB, respectively and it was 482.07 µg p-PNP g^{-1} soil day^{-1} under control treatment at 0-30 cm depth. At 30-60 cm soil depth, dehydrogenase activity in CCT+VB and SCT+VB were 12.57 and 21.93 µg TPF g^{-1} soil day-1, respectively as compared to control (8.40 µg TPF g^{-1} soil day^{-1}). Phosphatase activity in CCT+VB was 466.87 µg p-PNP g^{-1} soil day^{-1}while it was 418.87 µg p-PNP g^{-1} soil day^{-1} under control treatment. The enzymatic activity of soil improved at 0-30 cm and 30-60 cm depths under soil and water conservation measures when compared to control treatment.

Assessment of management intensity and diversity in arecanut agroforestry system

(Paramesh V and V Arunachalam)

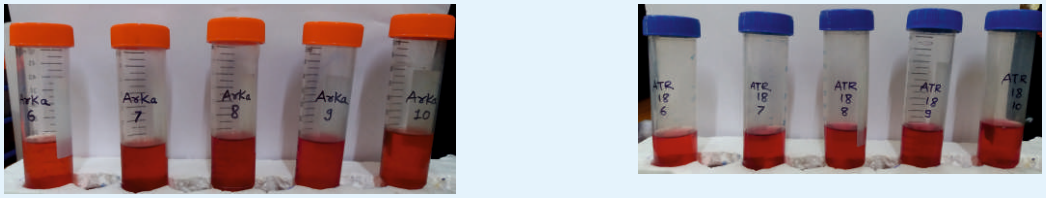
The study was undertaken in 70 arecanut based agroforestry farms of Goa state to assess the management intensity, biodiversity, and ecosystem services. The individual effect of management intensity and species richness on different indicators of ecosystem services was analysed. The management of arecanut agroforestry system was found very low; many of the farms were found neglected due to shortage of labours, wild animal menace and increase in the cost of inputs. The intercrops were introduced without considering the basic principle of the intercropping system. Most of the ecosystem service indicators have not shown synergy between ecosystem services, biodiversity, and management intensity. The availability of major soil nutrients was found lower due to exhaustive nature and competition among intercrops. Canonical correspondence analysis showed that the intercrops were abruptly planted without considering their environmental suitability. Analytical hierarchy process (AHP) indicated that farmers were giving more importance to the conservation of biodiversity. The practices such as nutrient management, pest management, management of crop geometry and intercrop management were neglected and thereby ecosystem services from arecanut agroforestry decreased considerably. The study concluded that the medium to high level of diversification with moderate management intensity is imperative to obtain the multiple ecosystem services from arecanut agroforestry system.

Amaranth germplasm with high pigment content

(V Arunachalam)

Betacyanin content is an important constituent of vegetable amaranth (*Tamdibhaji*) useful as food colourant. The pigment content was quantified with the help of spectrophotometer in the leaves of 14 amaranth genotypes, during 2015-16, 2016-17 and 2017-18. Based on the studies, a potential betacyanin pigment rich genetic stock Atr-18 (IC-598190) has been identified.

Germplasm/ Variety	Betacyanin content (*µg/g fresh weight*)		
	2015-16	2016-17	2017-18
AtR-18 (IC-598190)	416.26±19	329.4±75	427±63
ArkaArunima	314.89±22	166.9±37	235±49



Betacynain content of Arka Arunima and AtR18 (IC-598190)

Fish trophic structure in Terekhol estuary, a low impacted estuary in west coast of India

(Sreekanth GB)

A total of 7 fishing trials in Terekhol estuary lead to collection of 4077 fishes consisting of 128 species (58 families). The study recorded 35 ecologically vulnerable species. Being a major ecosystem for marine migrant species, the fish density was found to increase with the increasing temperature and salinity on spatio-temporal scale. The salinity and temperature increased from inner zone of the estuary towards the mouth of the estuary and the fish density as well. The juveniles of various fish species were dominant towards the mangrove island situated in the middle zone of the estuary. The marine migrant species (101 species) dominated the estuary compared to estuarine resident species (27 species).

Fish species collected from Terekhol estuary 1 and 2

Flower regulation in Karonda

(S Priya Devi)

Although the wild karonda plants (*Carissa carandas*) flower and fruit profusely annually, the plants of var Konkan Bold maintained in the field did not show regular flowering. Hence, a study was undertaken to assess the impact of pruning, foliar application of KNO_3 and deficit irrigation on flowering of Karonda. The results revealed that pruning of bushes in December-January, followed by 3% KNO_3 foliar spray after 30 days, and with holding irrigation completely (from October to May) after monsoon, resulted in 100% flowering and fruiting in all the treated bushes.

Karonda tree in bearing

Traits determining the suitability of banana cultivars to cropping systems

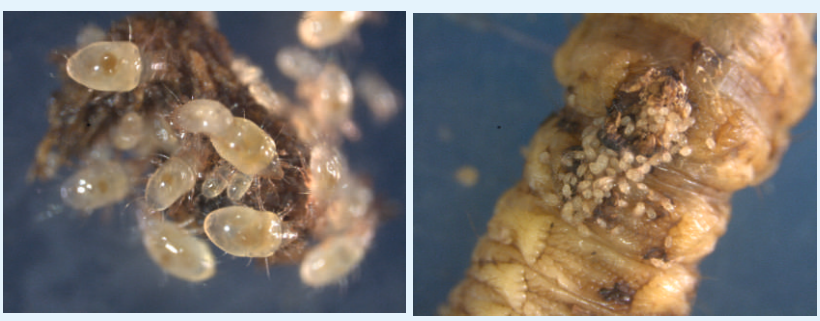
(V Arunachalam)

Banana and plantains form a major mid-storey intercrop in perennial based cropping systems. An experiment was laid out to evaluate seven banana cultivars under high-density areca gardens using growth, development, phenology, and nutrient balance pattern and yield traits over past three years. Cultivars susceptible to pseudostem weevil did not perform well in cropping system as the shade pre-disposed the susceptibility to pest, where as those with wide lamina, high leaf area index, low potassium uptake, higher number of hands gave good yield in areca based cropping systems.

Record of mite on grubs of cashew stem and root borers

(Maruthadurai R)

Stem and root borers *Plocaederus spp.* are the major insect pests of cashew, capable of killing the tree completely. A mite (family, Acaridae) was found associated with the grubs of CSRB under natural conditions. When the mites were further multiplied on the different instars of grubs of CSRB, it was observed that the early instar grubs were highly susceptible to the mite attack. Around 83% of infestation was recorded in the 1st instar grub and it took 5 - 8 days to kill the grub.



Grubs of *Plocaederus spp* infested by mites

Media enrichment in papaya

(Maneesha SR)

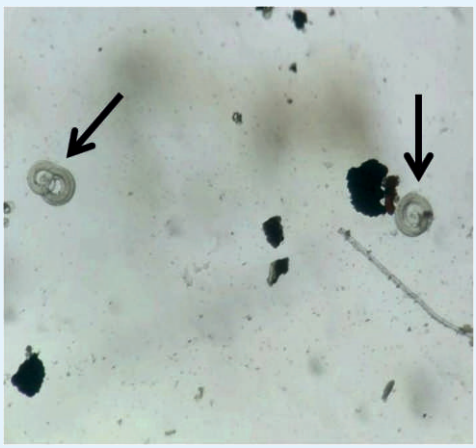
The effect of fortification of the nursery media with vermi compost, poultry manure and biofertilizer was studied in papaya variety 'Madhu bindhu' with potting mixture and coir pith based media. Coirpith + Vermicompost (1:1) showed the least number of days for seed germination (11.40 days), highest seed germination percentage (94.44), highest shoot length (19.07 cm), root length (16.50 cm) , no. of leaves (4.11) , leaf length (8 cm), leaf width (5.76 cm), fresh biomass (6.40g) and dry biomass (0.75g). Inclusion of poultry manure in the nursery media had an adverse effect on germination. Coir pith alone has good germination percentage, but seedling growth was very poor due to the lack of nutrients.

Growth of papaya seedlings under different media mixtures on 30th day of sowing

Detection of zoonotic parasite Trichinella sp. in pork

(Chethan Kumar HB)

Tissue sample *viz* diaphragm, tongue and commercial pork sausages from Goa were screened for the presence of *Trichinella* larvae which is a nematode of zoonotic importance. One pig diaphragm was positive for *Trichinella* larvae by artificial digestion assay. Since this is a zoonotic parasite, pork and pork products should be cooked to an internal temperature of 71 °C for at least 1 minute before consumption to kill the parasite.

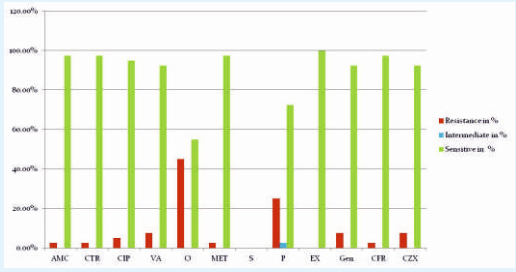


Trichinella larvae isolated from pig diaphragm (60X)

Antibiotic susceptibility screening of Coagulase Negative *Staphylococci* (CoNS) isolates from subclinical mastitis

(Susitha Rajkumar and Shivasharanappa N)

A total of 40 CoNS isolates from subclinical mastitis cases were subjected to antibiotic sensitivity test for studying the resistance or susceptibility against commonly used antibiotics. The CoNS isolates were found to be susceptible to most of the commonly used antibiotics.

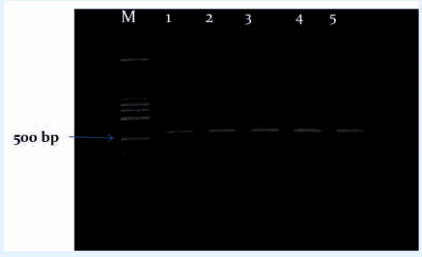


Percentage of resistance, Intermediate and sensitivity of CoNS isolates o different antibiotics

Isolation of Shigatoxigenic *E coli* from calf diarrhoea

(Susitha Rajkumar and Shivasharanappa N)

A total of 44 *E coli* isolates isolated from calf diarrhoea cases were subjected to PCR targeting stx1 gene. A total of 17 isolates were identified as shigatoxigenic *E coli* which showed PCR amplification of stx1 gene.



PCR amplified product of stx1 gene of approximate size 550bp in shigatoxigenic *E coli* isolates (M 100bp Ladder, 1-5 E coli isolates)

Efficacy of prostaglandin analogues in induction and synchronization of estrus in indigenous dairy cattle

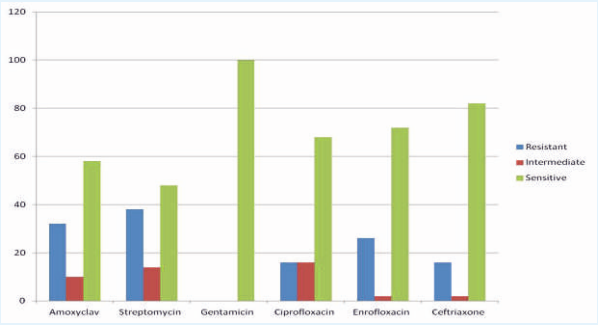
(Gokuldas PP, Chethan Kumar HB, Shivasharanappa N, Susitha Rajkumar and EB Chakurkar)

Estrus synchronization is an important reproductive management tool in dairy cattle and mainly involves the use of luteolytic agents like prostaglandin or their analogues. An experiment was carried out to compare and determine the efficacy of prostaglandin analogue-based synchronization and re-synchronization protocols in relation to overall reproductive performance in indigenous cattle *viz.* Gir, Sahiwal and crossbred cattle. Double prostaglandin protocols were applied using Cloprostenol (250 mg, 2ml i/m) and Dinoprost (25 mg, 5 ml i/m) as exogenous hormonal agents. From the study, Dinoprost Tromethamine, a naturally occurring prostaglandin F2α analogue was found to be more effective in indigenous dairy cattle for synchronization and re-synchronization of estrus with significantly higher estrus induction rate (75.0%) and overall conception rate (66.67%).

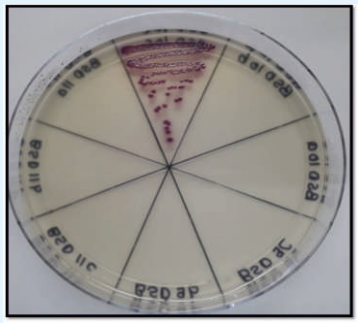
Antibiotic susceptibility screening of *E coli* isolates and isolation of ESBL producing *E coli* from enteritis affected animals

(Susitha Rajkumar and Shivasharanappa N)

E coli isolates from calf diarrhoea (44), piglet diarrhoea (13) and chicken enteritis (11) cases were subjected to antibiotic sensitivity test for studying the resistance or susceptibility against commonly used antibiotics. Results showed varying percentage of resistance to different antibiotics. The antibiotic gentamicin was found to be susceptible to 100% of the isolates. Out of the total 68 isolates screened for extended spectrum beta lactamase (ESBL) producing *E coli* 3 isolates one each from calf diarrhoea, piglet diarrhoea and chicken enteritis were ESBL positive.



Percentage of resistance, Intermediate and sensitivity of E coli isolates to different antibiotics



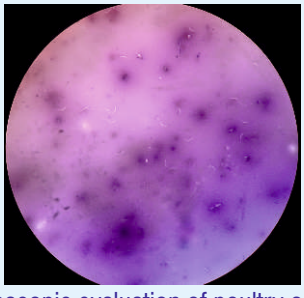
Colonies of ESBL producing E coli on ESBL agar plates

Artificial Insemination in backyard poultry reared under coastal climate

(Gokuldas PP, RS Rajkumar, Nibedita Nayak and EB Chakurkar)

Controlled breeding using artificial insemination is important for broiler breeds and other improved varieties, where fertility is low due to heavy body weight. In this context, preliminary studies on standardizing procedures for semen collection and A.I were undertaken in Gramapriya, an improved egg purpose poultry variety suitable for backyard farming. In the initial phase, procedures for semen collection and insemination were standardized. Ejaculate volume averaged around 0.30-0.75 ml, (n=10 roosters per session). More than 90% of sperm motility could be observed immediately after collection. A total of 365 inseminations were performed and overall average fertility was 89% while average hatchability was found to be 84%.

Artificial insemination trials in poultry



Microscopic evaluation of poultry semen

NEW INITIATIVES

Pineapple germplasm collections

(Maneesha SR and S Priya Devi)

Pineapple (*Ananas comosus*) is an important fruit crop of the West coast region. It is highly suitable as an intercrop in banana and arecanut gardens. A germ plasm collection of pineapple varieties from different locations of West coast is being maintained at our institute.

Pineapple germplasm block

Sl. No.	Group	Variety/Cultivar/ Type	Source
1	**Smooth Cayenne or**	Giant Kew	Sirsi , Karnataka
2	**Cayenne**	Kew	KAU, Vellanikkara, Thrissur, Kerala
3	**Queen**	Mauritius	KAU, Vellanikkara, Thrissur, Kerala
4		Queen	Bedsi, Maharashtra
5		Kerala Local	Thiruvananthapuram, Kerala
6	**Red Spanish**	Goa local	Kundaim, Goa
7	**Hybrids**	Amritha (Kew x Ripley Queen)	KAU, Vellanikkara, Thrissur, Kerala
8		MD-2 (Derivative of multiple parentage, predominantly Cayenne)	PRS, Vazhakkulam, Kerala

Dwarf form of fishtail palm

(V Arunachalam)

A Material Transfer Agreement (MTA) was signed with ICAR-NBPGR RC, Thrissur, Kerala for obtaining seeds of IC 553772 dwarf germ plasm of *Caryota mitis* fishtail palm. The palm is known as *billamode* in Konkani and the leaves are used for ornamental purposes as natural festunes during religious festivals at Goa. The palm is tapped for getting toddy in other parts of the country. The dwarf palm seedlings are raised and being evaluated.

Scientific trials on mangrove Crab farming

(Sreekanth GB)

Mangrove crab farming using Pen and box methods were experimented in a brackishwater fish farm at Orlim, Margao, with the candidate species Green mud crab (*Scylla serrata)*. The crab seeds of 5-15 g size were stocked @ 1000 nos/1000 m^2 and the growth was observed to be 220 g in 5 months trial. The growth of crabs and water quality parameters were monitored regularly and this is the first scientific experimental trial of crab farming in Goa in the recent past.

Mud crab pen culture system

Eco-friendly repellents against wild animals

(Maneesha SR and EB Chakurkar)

Goa state is close to the Western Ghat region. Hence, most of the farm lands adjacent to forests or secondary forest areas are frequently devastated by herbivorous wild animals. Village surveys revealed that Indian bison (*Bos gaurus)*, wild boars (*Sus scrofa cristatus*), monkeys (*Maca casinica*), porcupines (*Hystrix indica*) and rats (*Rattus* sp.) are the major species causing huge crop loss. In order to address this issue, commercially available eco-friendly, organic repellents were tested in farm fields. These repellents produce intense bad smell and repel the animals and prevent the entry to the fields. They are available in liquid and gel formulations. The feed back collected from the farmers showed that these are effective up to 10-15 days. The study is under progress.

Ion meter for rapid analysis of potassium, sodium and nitrate contents

(V Arunachalam)

A new research facility of Horiba Laqua twin ion meters was established at the Horticulture section costing Rs. 1.7 lakhs. The meter can rapidly quantify the ionic content of potassium (K^+), sodium (Na^+) and nitrate (NO_3^-) content in the soil, plant, water, and food samples at ranges of 4 to 9900 ppm, 2-9900 and 6-9900 ppm, respectively. NO_3^- content is an important quality parameter in fruits and vegetables. Ionic concentrations of Na^+ and K^+ play a crucial role in determining the salt tolerance of plants. Currently, the instrument is used to quantify the K^+, NO_3^- and Na^+ contents and judge the quality of tender coconut water. Ionic content of the leaf sap of banana cultivars is measured to develop rapid phenomics techniques. The instrument works on ion selective electrode and needs only few drops of the liquid sample and digitally display the content of ions readily.

MAJOR EVENTS

One day workshop on Scientific Writing

One day workshop on Scientific Writing was held on 29th January, 2018 at the Institute in which, former ICAR Scientist, Mr. Yatendra Joshi, currently a renowned editor and teacher was the resource person. A total of forty participants, including the scientific, technical staff of ICAR-CCARI and students attended the workshop. There were technical sessions on 'Publishing research papers in high impact factor journals', 'Reporting numbers and quantities in text', 'Organizing quantitative data into tables', 'Avoiding common errors in English' and 'Handling citation and references'. The programme was co-ordinated by Ms. Maneesha S.R., Scientist & Library co ordinator, ICAR-CCARI, Goa.

Mid- Institute Research Council Meeting held at ICAR CCARI, Old Goa

ICAR-CCARI, Old Goa conducted Mid-Institute Research Council Meeting on 30th January, 2018 in the Conference hall of the Institute. Dr. E.B. Chakurkar, Director and Chairman, IRC, briefed about meeting and chaired all the technical sessions. All the Scientists and members, IRC participated in the meeting and presented in brief about progress made in the research project since last IRC and technical program for next half year.

Training programme on design and distribution cum demonstration on use of pheromone traps of mango fruit fly

Training was imparted to the mango growers at Chodan on design and development of low-cost pheromone traps for mango fruit fly (*Bactrocera dorsalis*) on 24th February 2018. During the training programme systematic preparation of methyl eugenol lure, trap from used water bottle, trap servicing and lure replacement were explained and demonstrated to the farmers. A total of 40 pheromone traps were distributed to the farmers.

Institute Management Committee Meeting

The 47th Institute Management Committee Meeting was held on 27th February, 2018. The Director highlighted the significant research activities made by the Institute for the benefit of the farming community in the State of Goa. The agenda points were discussed and the IMC Members appreciated the team work carried out by the Scientists, Administrative, Technical and Supporting Staff of the Institute.

National Science Day

Institute celebrated 'National Science Day' on 28th February to mark the discovery of the Raman Effect by Indian Physicist Sir Chandrashekhara Venkata Raman. Dr. Tapas Bhattacharya, Vice Chancellor, Dr.Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, the Chief Guest in his address explained the difference between knowledge and science and delivered an inspiring talk to the scientific community and the students.

Demonstration cum distribution on use of pheromone traps of Red palm weevil and Rhinocerous beetle in coconut

A distribution cum field demonstration on use of pheromone traps of Red palm weevil (RPW) and Rhinocerous beetle (RB) in coconut has been organised at Arossim, Cansaulim on 6th March 2018. The project "Management of economically important insect pests with the use of pheromone technology through training and demonstrations" was funded by NABARD. The damage symptoms, insect life stages and other management aspects were explained to the farmers by Dr. Maruthadurai. R, Scientist (Agricultural Entomology). More than 20 farmers actively participated in the programme and 30 traps of each RPW and RB were distributed to the coconut farmers.

Commercialization of the technology-'Process for manufacturing of ornamental fish feed'

A Memorandum of Agreement (MoA) was signed between ICAR-Central Coastal Agricultural Research Institute (ICAR-CCARI), Ela, Old Goa, and M/s Jenix Aquarium Private Limited, a small-scale enterprise based in Mapusa, Goa for commercialization of the Institute technology entitled 'Process for manufacturing of Ornamental Fish Feed' in a function held at ICAR-CCARI on 12th March, 2018.

Scientist Farmers Interactive Meeting

ICAR–CCARI, Goa and KVK-North Goa, organized "Scientist Farmers Interactive Meeting" on 17th March, 2018. The programme was chaired by Dr. Pramod Sawant, Honourable Speaker of the Goa Legislative Assembly, Government of Goa. Dr. A. R. Desai, Director In-charge, ICAR–CCARI, Goa and Shri Sanjeev Mayekar, Project Director, ATMA, North Goa were also present. Honourable Prime Minster, Shri. Narendra Modi's address from Krishi Unnati Mela, IARI, New Delhi was webcasted. Honourable Prime Minster has given more stress on technologies to be implemented in the agriculture for doubling the farmer's income by 2022. Dr.Gopal Mahajan, Scientist, Soil Science, ICAR–CCARI, Goa gave lecture on "Soil Test Based Fertilizer Application".

Krishi Unnati Mela 2018 at ICAR-IARI, New Delhi

The institute participated in the *Krishi Unnati Mela* held at ICAR-IARI Campus, New Delhi from 16th to 18th March 2018. The *Mela* was inaugurated by Honourable Prime minister Shri. Narendra Modi in the presence of Union Minister for Agriculture Shri. Radha Mohan Singh. Various exhibits and posters were displayed and explained to visitors and farmers across the country at the ICAR-CCARI stall. Dr.Trilochan Mohapatra, Secretary (DARE) & DG (ICAR) and Mr. Chhabilendra Roul (IAS), Special Secretary, (DARE), visited the stall and appreciated. The visitors sought the information on newly released varieties of Rice and Cashew. The value-added products such as Cashew apple crunch, Nutmeg taffy, Nutmeg mouth freshener, Cashew apple syrup and Nutmeg pericarp syrup, By-pass fat, feed block *etc* attracted the visitors. Some of the important publications of the Institute were also displayed.

Commercialization of the technology- 'Process for manufacturing of Nutmeg Pericarp Taffy'

A Memorandum of Agreement (MoA) was signed between ICAR-Central Coastal Agricultural Research Institute (ICAR-CCARI), Ela, Old Goa, and M/s Tanshikar Spice Farm, a small-scale agri-enterprise based in Netravali, Goa for commercialization of the Institute technology entitled 'Process for manufacturing of Nutmeg Pericarp Taffy' in a function held at ICAR-CCARI on 27th March, 2018. This technology was developed by Dr. A. R. Desai, Principal Scientist (Fruit Science) from Horticulture section of the Institute.

ICAR-CCARI foundation day

ICAR–Central Coastal Agricultural Research Institute, Old Goa celebrated 30th Foundation Day on 7th April 2018. Dr. Pramod Sawant , Honourable Speaker, Goa Legislative Assembly, was the chief guest of the function. An exhibition was organized to showcase the significant technologies developed and research work carried out by the Institute. Dr. E. B. Chakurkar, Director, ICAR-CCARI, welcomed the chief guest and participants and gave a brief presentation about the Institute, its activities and output. Shri Nelson Figueiredo, Director, Directorate of Agriculture, Govt. of Goa and Dr. Santosh V. Desai, Director, Directorate of AH&VS, Govt. of Goa graced the occasion. The retired staff of the Institute and those staff who have completed 25 years of service were also felicitated. The staff of the Institute were awarded with various annual awards. Institute also felicitated farmers from different villages of Goa who are actively involved in adoption of Institute technologies and other training activities. The chief guest released few publications and in his address appreciated the research and extension activities being carried out by the Institute.

BMC meeting at Terekhol Panchayat

A meeting of the biodiversity management committee (BMC) was held at Panchayat hall in Terekhol, Keri on 17th April, 2018. The meeting was attended by the members of the BMC and Panchayat officials and fishermen of the Terekhol estuary. Problem such as sand mining and sewage pollution in the estuary were discussed. Dr. Sreekanth GB, Scientist (FRM), ICAR-CCARI emphasized on the conservation and sustainable exploitation of fisheries resources of the estuary and distributed posters on fisheries resources of Goa.

Konkan Fruit Festival

ICAR-CCARI and KVK, North Goa, participated in Konkan Fruit Fest-2018, organized by Botanical Society of Goa at Ravindra Bhavan, Margao, during 20th to 22nd April, 2018. During the exhibition, the technologies developed by ICAR-Central Coastal Agricultural Research Institute were displayed for the benefit of farmers. Quality planting materials, vermicompost and value added products like Virgin coconut oil, Kokum squash, Rose apple squash, Jack fruit pickle, Nutmeg pericarp taffy and Cashew apple crunch were sold.

Twenty-ninth (29th) Institute Research Council (IRC) meeting

The twenty-ninth (29th) Institute Research Council (IRC) meeting of ICAR-Central Coastal Agricultural Research Institute, Old Goa, Goa was held during 24th to 25th April 2018. The meeting was chaired by Dr. E.B. Chakurkar, Director, ICAR-CCARI, Old Goa, Goa and Chairman, IRC. The scientists from different sections made their deliberations as per their respective projects under the mega projects. The action taken on recommendations of last IRC meeting and research activities carried out during the last one year were presented and discussed thoroughly. The Chairman, IRC appreciated the research accomplishments of the scientists. During the plenary session, the important decisions were finalised.

SUCCESS STORY

Commercially successful vegetable cultivation - 2017-18

A farmer Mr. Judas Quadros was a beneficiary of high yielding seeds of vegetables, okra (F1 hybrid Jai Kisan), chilli (OP-Kashi Anmol and F1 hybrid Nisha), vegetable cowpea (OP-Kashi Anmol) under Tribal Sub Plan project (TSP) undertaken by Dr. M Thangam, Principal Scientist. Apart from seeds, systemic fungicides and pesticides, fertilizers like Urea, Rock Phosphate and Muriate of Potash and petrol operated 2HP water pump along with 50 m hose pipe and 8 m suction pipe were distributed during 2017-18. He has earned around Rs. 75,000 from an area of one acre in four months of crop cultivation. The farmer has received "The best vegetable grower award" consecutively for 4 years from Goa State Horticulture Corporation Ltd.

PATENT FILED

Request for Examination for the patent application for technology entitled "Extender for preservation of boar semen" with application serial No. 3037/MUM/2015 was submitted to the Indian Patent office on 4th April, 2018.

WORKSHOP/ SEMINAR/SYMPOSIA/ TRAINING ATTENDED

Date	Name	Programme	Venue
04/01/2018 - 24/01/2018	M Thangam	CAFT training for **21 days on** Recent Developments in Conservation and Characterization of Horticulture Plant Genetic Resources	College of Horticulture, University of Horticulture Sciences, Bagalkot, Bengaluru campus
08/01/2018 - 10/01/2018	Mathala J Gupta	52nd Annual Convention of ISAE & National Symposium on doubling farmers income through technological interventions	AAU, Anand, Gujarat
16/01/2018- 25/01/2018	Maneesha SR	10 days short course training programme on Techniques for estimation of Nutraceutical properties from crops.	Department of Biochemistry, B.A. College of Agriculture, AAU, Anand, Gujarat.
29-01-2018	All Scientists	One day workshop on Scientific Writing	ICAR-CCARI, Old Goa
01/02/2018- 03/02/2018	Sujeet Desai	Conference on Farmers first for conserving soil and water resources in western region (FFCSWR)	AAU, Anand, Gujarat
17/02/2018- 20/02/2018	V Arunachalam	National Banana Festival	Kalliyoor, Thiruvananthapuram
19/02/2018- 21/02/2018	Sreekanth GB	National Seminar on Recent Trends in Zoological Research	Department of Zoology, University of Kerala, Thiruvananthapuram, Kerala
15/03/2018	Gokuldas PP	Conference on Affordable IPR-2018	Goa Engineering College, Farmagudi
16/03/2018	Sreekanth GB	BMC meeting	Panchayat hall, Terekhol, Goa
17/03/2018 - 20/03/2018	Sreekanth GB	105th Indian Science Congress	Manipur Central University, Imphal, Manipur

LECTURES DELIVERED

Date	Name	Programme	Venue
02-02-2018	Susitha Rajkumar	"Importance of vaccination and deworming in goat husbandry and control measures of ecto and endo parasites in goats" for farmers from Goa	KVK, North Goa
06-02-2018	V Arunachalam	"Maturity indices for fruit crops" to M.Sc. students of Botany, Goa University	Goa University, Taleigao
06-02-2018	Mathala J Gupta	"Methods of storage of fruit crops" to M.Sc. students of Botany, Goa University	Goa University, Taleigao
07-03-2018	M Thangam	"Advance technologies in vegetable and flower under polyhouse cultivation" for ATMA trainees from Maharashtra	KVK, North Goa

AWARDS AND RECOGNITIONS

ICAR –CCARI, Goa is awarded with ISO 9001 2015

International Certification Services Pvt. Ltd has awarded ISO 9001:2015 to ICAR–CCARI, Goa for the quality management system applicable to the scope of Research, Development, Training and Advisory Services in the field of Agriculture, Horticulture, Animal and Fishery Sciences with a registration No. RQ91/9735 w.e.f. 9th October, 2017. The ISO certification was facilitated by the M/s NVST TQM CONSULTANTS, Belgaum, Karnataka and Dr. M. Thangam, Principal Scientist and Management Representative (MR).

Dr. Sreekanth GB

Best Poster Award in the section of "Animal, veterinary and fisheries sciences" in the 105th Indian Science Congress held at Manipur Central University, Imphal, Manipur from 16th to 20th March, 2018.

Dr. V. Arunachalam

Conferred Fellowship of International Society for Noni Science (ISNS) for the year 2018 on 24th March 2018 at College of Agriculture, (MPKV) Pune, Maharashtra.

Dr. Mathala Juliet Gupta

Dr. Mathala Juliet Gupta, Scientist (Agricultural Structures and Process Engineering) received ISAE Distinguished Service Certificate Award for Significant Contribution in the Field of Processing, Dairy and Food Engineering for year 2017.