संवादपत्र
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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Director's Desk

As you all are aware the COVID-19 pandemic has disrupted many activities in India and elsewhere. The ongoing crisis has affected the agriculture sector in India due to lack of input supply, leading to decreased production and marketing of the produce. This has affected the livelihood of small and marginal farmers. Considering the importance of the situation, ICAR-CCARI, Goa made all the efforts to provide the different agricultural inputs and imparted training to farmers under Scheduled Tribe Component (STC) despite the concerns and difficulties faced throughout the pandemic, to help the farming community. Fertilizers and vermicompost were distributed to the paddy, coconut, cashew growers, and dairy farmers of Priol and Veling villages of North Goa. During the program, farmers were advised to adopt the Integrated Farming System (IFS) model in their farms. The importance of scientific agronomic practices, namely, the use of vermicompost, and the use of balance doses of fertilizers and organics to improve soil health and productivity was explained to the farmers. The seeds of high-yielding rice varieties, namely, Goa Dhan 1, Goa Dhan 3, and Goa Dhan 4 along with fertilizers and other essential plant protection chemicals were distributed to tribal farmers in Agassaim village of North Goa and Gaodongrim and Cotigao village of South Goa. Distribution-cum-awareness program on nutrient and water management in coconut was organized for tribal farmers of Bhupar and Badsare village of Canacona taluka, South Goa. This program was undertaken as a part of two projects 'Site-specific nutrient management in different crops for improved crop productivity and income of tribal farmers of Goa' and 'Soil and water conservation interventions for improving crop productivity and income of tribal farmers of Goa' to improve the livelihood security of the tribal farmers through interventions on water and nutrient management in coconut. The farmers received soil health cards and organic and inorganic fertilizer inputs based on soil testing for nutrient management. Water management interventions included rainwater harvesting ponds along with the gravity-based drip fertigation system. To popularise the indigenous, improved, and ornamental varieties of backyard poultry and to increase the farm income, farmers of Canacona, Salcette, and Tiswadi talukas were supplied with Vanaraja and Grampriya birds, feed supplements, and litter material. The interventions were intended to add supplementary income to the farm families and improve their livelihood and nutritional security. All these programs were undertaken keeping in view the safety measures for COVID-19. The beneficiary farmers also received face masks and Institute made hand sanitizer (prepared as per WHO guidelines) as a preventive measure.

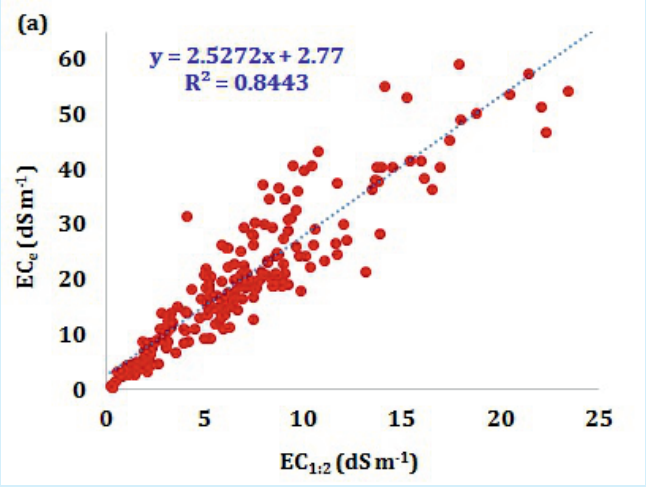
DIRECTOR

RESEARCH HIGHLIGHTS

Measurement of the soil salinity for the salt-affected soils of the Indian west coast region

(GR Mahajan)

A selection of appropriate analysis methods for soil salinity is key to determine accurate estimates and reclamation measures. About 216 soil samples were collected from the salt-affected areas of the west coast region of India (State of Maharashtra, Goa, Karnataka, and Kerala). The soil pH and electrical conductivity (EC) in fixed ratios of 1:1, 1:2, 1:2.5 and 1:5 soil to water extracts and soil saturation paste extract(pH_e) were determined. The average soil pH measured in 1:1, 1:2, 1:2.5, 1:5 soil to water extract and soil saturation paste (pH_e) extract was 4.32, 4.96, 5.01, 5.15 and 5.33, respectively, whereas, the corresponding EC was 14.00, 7.65, 6.37, 3.52, and 19.96 dS m^{-1}. The pH and EC of soil saturation paste extract were in the range of 3.06-7.39 and 0.61-59.18 dS m^{-1}, respectively. The EC decreased with decreasing soil to water extract ratio and it was the highest in soil saturation paste extract. The relationship of the pH and EC in different ratios with respective pH_e and EC_e was studied. The coefficient of determination (R^2) of pH_e with pH of 1:1, 1:2, 1:2.5 and 1:5 soil extract ratio was 0.73, 0.73, 0.72 and 0.73 ($p<0.05$), respectively. The EC_e had a R^2 of 0.85, 0.84, 0.85 and 0.84 ($p<0.05$) with EC of 1:1, 1:2, 1:2.5 and 1:5 soil: water extract ratio. All these relationships were linear and significant. Thus, the regression relation of EC_e with $EC_{1:2}$, $EC_e = 2.53 \times (EC_{1:2}) + 2.77$ ($R^2=0.84$, $p<0.05$) could be more useful for studies related to salinity of salt-affected soil of the Indian west coast region where soil salinity is typically associated with the acidity.



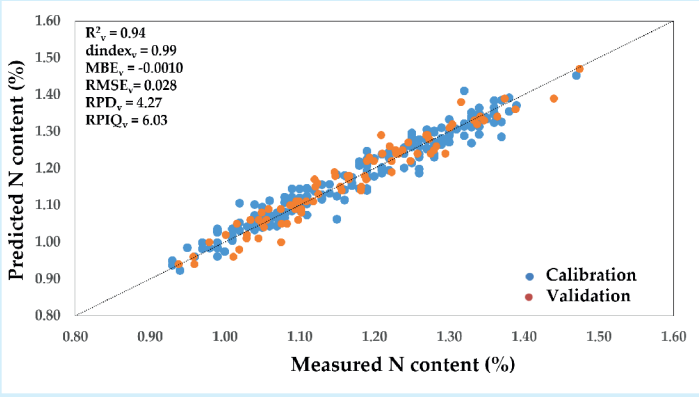
Relationship between EC measured in soil saturated paste extract (ECe) with that measured in 1:2 ($EC_{1:2}$)

Monitoring the foliar nutrients status of mango using spectroscopy-based spectral indices and PLSR-combined machine learning models

(GR Mahajan)

Conventional methods of plant nutrient estimation for nutrient management need a huge number of leaf or tissue samples and extensive chemical analysis, which is time-consuming and expensive. Remote sensing is a viable tool to estimate the plant's nutritional status to determine the appropriate amounts of fertilizer inputs. The aim of the study was to use remote sensing to characterize the foliar nutrient status of mango through the development of spectral indices and machine learning modelling of the spectral data. A spectral database within the 350–1050 nm wavelength range of the leaf samples and leaf nutrients were analyzed for the development of spectral indices and multivariate models. The normalized difference and ratio

spectral indices and multivariate models like partial least square regression (PLSR), principal component regression (PCR), and support vector regression (SVR) were ineffective in predicting any of the leaf nutrients. An approach of using PLSR-combined machine learning models was found to be the best to predict most of the nutrients. Based on the independent validation performance and summed ranks, the best performing models were cubist ($R^2 \geq 0.91$, the ratio of performance to deviation (RPD) ≥ 3.3, and the ratio of performance to interquartile distance (RPIQ ≥ 3.71) for nitrogen, phosphorus, potassium, and zinc, SVR ($R^2 \geq 0.88$, RPD ≥ 2.73, RPIQ ≥ 3.31) for calcium, iron, copper, boron, and elastic net ($R^2 \geq 0.95$, RPD ≥ 4.47, RPIQ ≥ 6.11) for magnesium and sulfur. The results of the study revealed the potential of using hyperspectral remote sensing data for non-destructive estimation of mango leaf macro- and micro-nutrients. The developed approach is suggested to be employed within operational retrieval workflows for precision management of mango orchard nutrients.

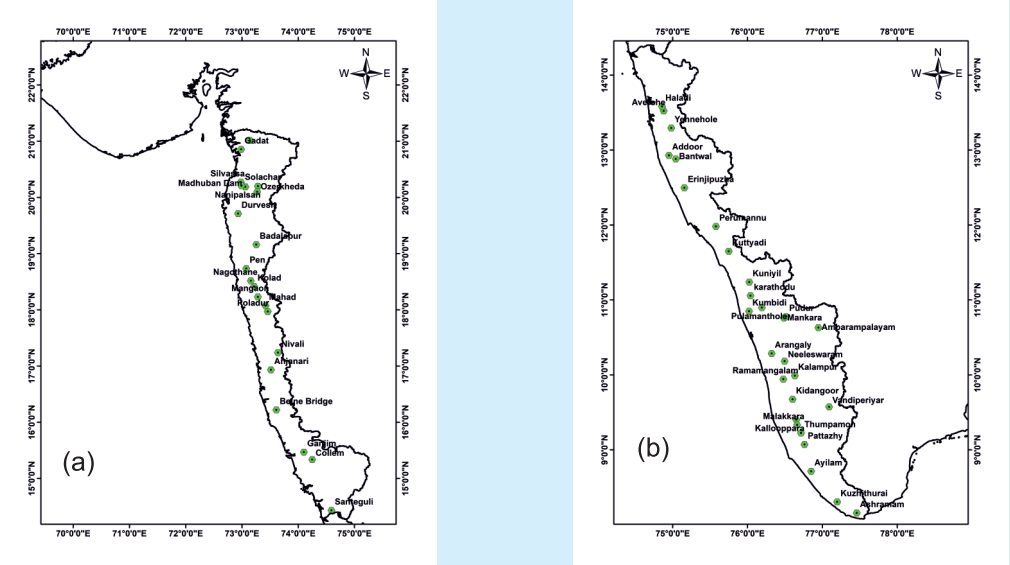


Performance of the best performing partial least square regression combined Cubist model to predict the foliar nitrogen concentration in mango leaf

Streamflow trend analysis of rivers flowing in the west coast of India

(Sujeet Desai and Bappa Das)

Long-term trends in seasonal and annual streamflow of rivers flowing in the west coast of India was studied. The streamflow time series data from 1986-2015 (30 years) was used to analyse the temporal trends. A total of 29 streamflow gauging stations were selected i.e 10 from Tapi to Tadri basin and 19 from Tadri to Kanyakumari basin. Mann-Kendall test, Spearman's rho test and linear regression were used to analyse the trendand sen's slope was used to estimate the rate of change. In the monsoon season (JJAS), out of 29 stations, 5 stations exhibited significant increasing trend and 2 stations exhibited significant decreasing trends. The trend analysis of streamflow during pre-monsoon season (MAM) showed that,4 stations exhibited significant increasing trend and 4 stations exhibited significant decreasing trend. In the post-monsoon season (OND), only 2 stations showed significant increase in streamflow whereas the trends in other 27 stations was not significant. During winter season (JF), only 3 stations exhibited significant increasing trend whereas 4 stations exhibited significant decreasing trend. The annual streamflow followed the trend similar to monsoon streamflow. Decreasing trends in the seasonal and annual streamflow in some of the river basins indicates decrease in water resources.Such studies will be useful for planning proper water resource management strategies in the river basins.

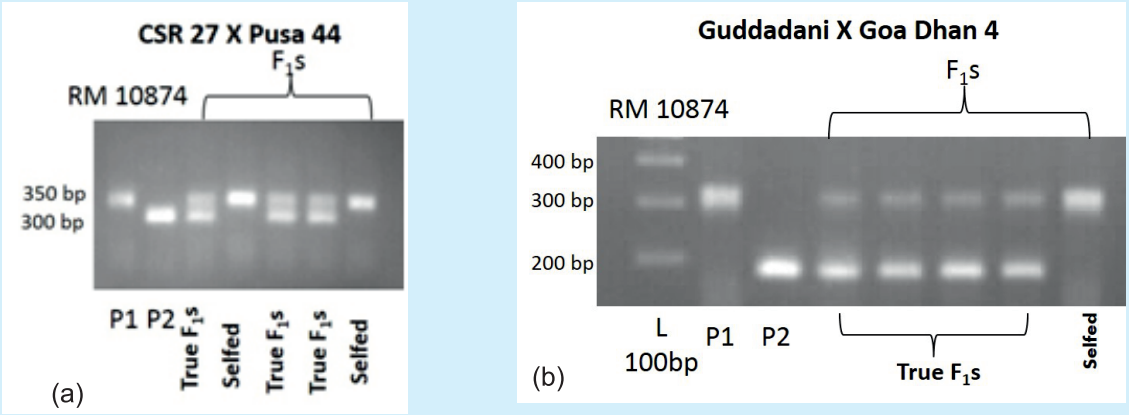


Location of streamflow gauging stations (a)Tapi to Tadri basin (b)Tadri to Kanyakumari basin

Confirming hybridity of F_1 plants using Simple Sequence Repeat (SSR) markers

(Manohara, K. K.)

About 16 parents were selected during *Kharif* 2019 for utilization in the hybridization program to develop a new set of Recombinant Inbred Lines. The parents chosen were high-yielding, some are salt-tolerant, some submergence tolerant, and a few are aromatic rice landraces. Altogether 27 different cross combinations were produced and 10 F_1 plants from each of the 27 cross combinations were planted during the Rabi season of 2019/20 to confirm their hybridity. Two highly polymorphic Simple Sequence Repeat (SSR) markers, namely RM10871 and RM21539, were utilized to check the hybridity in the F_1s. Based on the bands generated by the parents and F_1s, true F_1 plants were tagged and seeds were collected for forwarding to F_2 and subsequent generations.

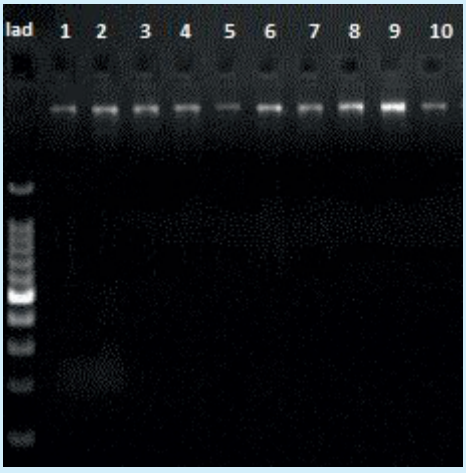


Gel images showing the true F1s and selfed progenies using marker RM 10874 in (a) CSR x Pusa 44 cross and (b) Guddadani Batta x Goa Dhan 4.

Characterization and DNA barcoding of leaf tip mutant of black pepper (*Piper nigrum* L.)

(V Arunachalam)

Black pepper is one of the oldest and most widely used spices in food and medicine. A unique black pepper accession was reported at ICAR-CCARI, Old Goa Research Farm with a mutated leaf tip which is hitherto unknown in the gene pool of black pepper. It has the potential as a valuable genetic resource with a morphological marker and also as ornamental. Initially the leaf size and shape were compared between the mutant and wild type black pepper. Characterisation was undertaken with morphometric traits and DNA barcoding loci to understand the differences between wild type and mutant. DUS (Distinct, uniform and stable) traits were employed to characterise the mutant. DNA was isolated from selected plant leaf samples of mutant and wild type (Fig. 1). PCR followed by sequencing was attempted to understand the DNA sequence level differences. Two DNA barcoding loci *rbc* Large subunit and *matK* were used to infer the differences during the study.



Yield and quality attributes of banana under nutrient management treatments

(Maneesha S.R., G.R. Mahajan and R. Ramesh)

Yield characteristics of banana under different nutrient management practices were recorded. The highest bunch weight (26.52 kg) was in Grand Naine variety treated with one kg integrated nutrient mixture (IN mixture). Bunch weight was the highest in V2-Grand Naine (18.68 kg) among the varieties and in T3: RDF+ IN mixture (19.28kg) among the nutrient management treatments. The number of hands was highest in V1- Velchi (8.92) among the varieties and T3 (9.10) among the nutrient management treatments. Fruit weight, fruit length and fruit circumference were highest in Velchi treated with an integrated nutrient mixture (131.85 g, 19.90 cm and 13.13 cm respectively). The highest TSS was in Velchi treated with a commercial nutrient mixture (25.67 °Brix) and the highest acidity was in Velchi treated with an integrated nutrient mixture (0.34 %).

Bunches of Velchi (V1) and Grand Naine (V2) in T3 treatment

Effect of growing media on lemongrass (*Cymbopogon citratus*) seed germination in vertical nursery

(Maneesha S.R., Mathala J. Gupta and E. B. Chakurkar)

Seed germination of lemongrass (*Cymbopogon citratus*) variety 'Sugandhi' (OPD-19) was tested in different growing media in a vertical nursery structure (2m × 0.6m × 2.25m) inside a double span polyhouse. Plastic trays (82cm × 28.5cm) were placed one above the other at 45 cm vertical intervals, which reduced the nursery space requirement from 70m^2 to 12m^2. Cocopeat, potting mixture, vermicompost and IN mixture were used in different proportions as the media and lemongrass seeds @50 g per 0.23m^2 were sown. Fastest germination (4DAS) with the highest % germination (80%) was recorded in treatments T2: Cocopeat + Vermicompost (75:25v/v), T3: Cocopeat + Vermicompost (50:50v/v), T7: Potting mixture + IN mixture (98:2), T8: Cocopeat + IN mixture (98:2) and T9: Potting mixture + Vermicompost + IN mixture (90:8:2). Treatment T6: Potting mixture + Vermicompost (50:50) recorded the longest days for germination (7 DAS), but the highest number of seedling per unit area (106.67), shoot length (14.40cm), root length (18.71cm), number of tillers (2.45), leaf length (34.21cm), leaf width (5.61cm), fresh biomass (3.59g) and dry biomass (0.80g) were recorded in T6 treatment. The germinated seedlings were transplanted to the main field after 45 days.

Predicting potential distribution of fall armyworm, *Spodoptera frugiperda* based on Maxent modelling under future climate change

(Maruthadurai. R, Bappa Das and R. Ramesh)

The fall armyworm (FAW), *Spodoptera frugiperda* (J.E. Smith) (Lepidoptera: Noctuidae) is an invasive polyphagous pest native to the Americas. The current study aimed to predict the potential distribution of FAW under present and future climate change scenarios in 2050 and 2070 with 19 bioclimatic variables through Maximum Entropy (Maxent) niche modelling. The Maxent model predicted the current and future distribution of FAW with a training AUC value of 0.940 and a test AUC value of 0.936 which indicates a better ability of the model for discriminating between suitable and unsuitable habitat areas for *S. frugiperda*. Jackknife test for estimating predictive power of the variables showed that annual precipitation, annual mean temperature and temperature seasonality were strongly influencing the distribution of FAW. There was significant increase in the highly suitable areas for FAW under future climatic conditions and was mostly detected in southern and central India.

Predation potential of rove beetle *Paederus fuscipes* (Curtis) (Coleoptera: Staphylinidae) on invasive fall armyworm *Spodopterafrugiperda*

(Maruthadurai, R. and R. Ramesh)

Invasive fall armyworm (FAW), *Spodoptera frugiperda* (J.E. Smith) (Lepidoptera: Noctuidae) has emerged as a serious threat to maize cultivation in India. Rove beetle *Paederus fuscipes* Curtis (Coleoptera: Staphylinidae) is a generalist predator found predating on FAW larvae. Adult rove beetle population varied between the vegetative and reproductive phases of the crop. Within the season, the predatory adult beetle population was found significantly higher at the reproductive phase than at the vegetative phase. Adult predator fed more first instar FAW larvae compared to eggs and second instar larvae. Conservation of *P. fuscipes* could be encouraged through use of safer insecticides.

Rove beetles predationg on FAW larvae

Polymorphism of *HSP90AA1* gene in Shweta Kapila cattle of Goa

(Amiya Ranjan Sahu)

Heat stress proteins are highly essential in protecting living cells against environmental stress leading cellular homeostasis. Zebu cattle are well known for the prevalence of novel mutations responsible for heat tolerance. Hence, the study was carried out to identify single nucleotide polymorphisms (SNPs) in 3'-untranslated region (3'UTR) of heat shock protein *HSP90AA1* gene in Shweta Kapila cattle breed raised in hot and humid coastal climate of Goa, India. Genomic DNA was isolated from whole blood in EDTA using the ReliaPrep™ Blood DNA miniprep system. The 3'UTR of *HSP90AA1* gene of genomic DNA was amplified using designed oligonucleotide primers and sequenced. The custom sequencing results revealed three SNPs at loci g.G4733C, g.C4765A and g.A4848G in 3'UTR of *HSP90AA1* gene. Moreover, SNPs g.G4733C and g.C4765A resulted in amino acid substitutions as Cysteine to Serine and Glutamine to Cysteine, respectively. This is a novel report of mutations in *HSP90AA1* gene in the newly registered Shweta Kapila cattle breed of India adapted to hot and humid coastal climate. Further genotypic studies based on large sample size are required to study their significant effect on thermotolerance which can be used as a molecular marker for thermotolerance.

NEW INITIATIVES

Harnessing palms for sustainable livelihoods of coastal India

(V. Arunachalam, S. K. Singh and V. Paramesha)

Palms form the major livelihood option in coastal farming communities of India, especially coconut, areca and oil palm in humid regions, date palm and palmyra in dry regions, Nypa and Phoenix padulosa palms in submerged /mangrove ecosystems. Global market oil palm and date palm are anticipated to reach the values of about US$ 48.1 billion and US$ 6.98 billion respectively in 2020. India exported arecanut worth Rs 6987 Lakhs (2019-20) mainly to Malaysia and Sri Lanka. Coconut contributes to RS 15,000 crores to Indian GDP with a high productivity level of 10,616 nuts/ha. Coconut is grown in India in 2.1 million ha with an annual production of 24 billion nuts. Arecanut is grown in India in 0.47million ha with production levels of 1.55 million tonnes. Date palm is harnessed only in part of Kutch district of Gujarat. Palmyra forms the livelihood option to marginal farm families and tribal communities of dry coastal districts. India imports 80 % of its requirement (65 lakh tonnes) of palm oil (Rupees 50,000 crore every year) from Malaysia and Indonesia. The exact share of palms in the economy and livelihood of each district is not yet quantified. The proposal explores the area, production, productivity, economic dependence, utilization activities, employment generation and livelihood security of people in coastal districts. The proposal also plans to tap the potential untapped and underutilized genetic resources of palms. Geospatial data of soil survey maps of the coastal states were obtained. Preliminary investigations in the study reveal that the coconut in coastal districts of Kerala contributes to 1 % of the state GDP of Kerala. Coconut palm occupies about 14 % (Kanyakumari district of Tamil Nadu) to and 52 % (Mahe District of Puducherry Union Territory) of total geographical area.

Establishment of terrace garden at ICAR-CCARI main building

(Maneesha S.R. and E.B. Chakurkar)

A model terrace garden was established in the open terrace of the ICAR-CCARI main building to demonstrate the possibilities of urban gardening at the Institute. The terrace has an octagon shape with an area of 85 m^2. Plants are grown in pots, poly bags, thermocol boxes, bottles, unused utensils etc. Fruit vegetables like brinjal, tomato, chilli and bhindi are planted in pots. Cucurbits, cowpea and basella are trailed in pandal. Leafy vegetables like palak, red amaranthus, chekkurmanis, fenugreek, coriander and root vegetables like carrot, radish, and onion were

successfully grown in this garden. Fruits like pineapple, banana, papaya, sapota, lemon; spices like turmeric, ginger, mango ginger, mint, mustard and curry leaves are also present in the garden. Ornamental flowering plants like jasmine, rose, portulaca, marigold, button flower, rose and medicinal and aromatic plants like tulsi, aloe vera, sugandha, lemongrass, stevia and madhunashini are also planted here. The garden is maintained as a model to demonstrate organic and sustainable production of horticulture crops throughout the year from limited space in urban area.




ITMU/IPR Cell Activities

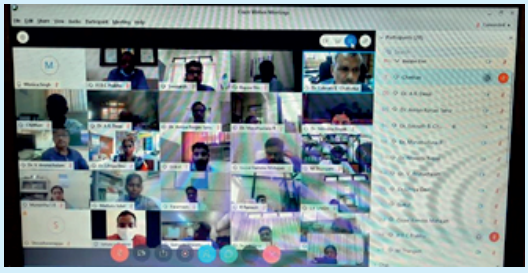
- Information on Biological Resources collected from various parts of the State of Goa was compiled.
- Reply to First Examination Report (FER) and application for National Biodiversity Authority (NBA) approval for the patent application "Extender for the preservation of boar semen" (PA# 3037/MUM/2015) was communicated to Patent Attorney.

MAJOR EVENTS

ICAR - CCARI, Goa, conducted 31st Institute Research Council (IRC) Meeting

ICAR - Central Coastal Agricultural Research Institute, Goa, conducted its 31st Institute Research Council (IRC) meeting through video conferencing mode during 12th to 16th May 2020. The meeting was chaired by Dr E. B. Chakurkar, Director, ICAR-CCARI. At the outset Secretary, IRC, Dr. Manohara, K.K., Senior Scientist (Plant Breeding) welcomed the Chairman and members of IRC.

Chairman of the IRC Dr. E. B. Chakurkar in his inaugural address, welcomed all the members and suggested all the scientists to come out with technologies and outputs for reaching out to the farmers in the coastal region of the country. In discussion, emphasis was given on establishing a network with the ICAR institutions and State Agricultural universities located in the east and west coast region for research and technology dissemination. All the research projects were reoriented to cover complete coastal India and prepare inventories of resources including socio-economic status. The scientists from different sections presented their research achievements for the period April 2019 to March 2020 under their respective institute as well as externally funded projects. The actions taken on recommendations of the last IRC meeting and research activities carried out during the last year were presented and discussed. The Chairman appreciated the research accomplishments of the scientists. During the plenary session, Secretary IRC presented the rapporteurs' report and the decisions about each of the projects were finalized.

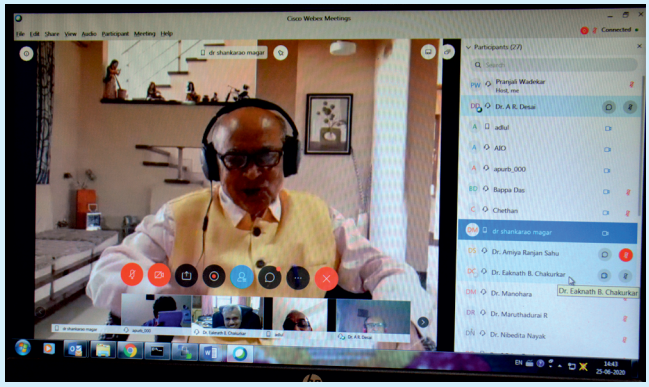


Pre-Kharif Interface Meeting between ICAR-CCARI, Old Goa and Directorate of Agriculture, Government of Goa through videoconferencing

The pre-kharif interface meeting between ICAR-CCARI, Old Goa and Directorate of Agriculture, Government of Goa was held on Tuesday 28th May 2020 via video conferencing mode. Dr E.B. Chakurkar, Director (A), ICAR-CCARI chaired the meeting along with Shri. Nevil Alphonso, Director of Agriculture, Government of Goa. The meeting was attended by Scientists of ICAR-CCARI, Deputy Directors, Assistant Directors, Officers of Directorate of Agriculture, the Government of Goa and Subject Matter Specialists of Krishi Vigyan Kendra, North Goa. Different agenda points highlighted by the Directorate of Agriculture were discussed at length. Scientists of the Institute presented and informed the participants about the technologies and information available in response to the agenda points. The meeting ended with a vote of thank and concluding remarks by the Chairman

The third meeting of VIII Research Advisory Committee (RAC) of this Institute was held on 25th June 2020 through video conferencing

The third meeting of VIII RAC was held on 25th June 2020 via video conferencing mode. Dr. E.B. Chakurkar, Director (Acting), ICAR–CCARI, Goa briefed the house about the Institute, status of coastal agriculture, ongoing research projects and the research achievements. Action was taken report for the last year RAC recommendations were presented by Dr R. Ramesh, Principal Scientist and Member Secretary, RAC and reviewed by the committee. Presentations were made by the sectional in-charges on the research accomplishments about their research projects. The chairman and members of RAC appreciated the achievements made by the scientific and technical manpower. After detailed deliberations and discussions, the RAC made the recommendations.



Training and agricultural inputs distribution under STC scheme to the integrated farming systems farmers of Goa

On 26th June 2020, under the Scheduled Tribe Component scheme, a training and agricultural inputs distribution program for the beneficiary farmers of Priol, Ponda, Goa was organised. The fertilizers were distributed to the paddy, coconut, cashew growers and also dairy farmers of Priol and Veling villages of Goa. Dr. Paramesha, V., Scientist (Agronomy) highlighted the importance of the integrated farming systems in Goa for sustainability and livelihood security of the small and marginal farmers. Furthermore, he highlighted the importance of the new technologies and their adoption for improving crop productivity and income. He distributed the fertilizers and vermicompost to the beneficiaries and briefed them about the scientific agronomic practices for improved yields and explained the importance of vermicompost in the farming system. Dr. Monika Singh, SMS, KVK-ICAR, North Goa explained the importance of the integrated nutrient management approach by use of balance dose of fertilizers and organics to improve soil health and productivity. Mr. Rahul M. Kulkarni, Senior Technical Officer assisted to coordinate the programme.

Third blood donation camp organized by ICAR-CCARI

The third blood donation camp was organized by the officials of the Blood Bank, Goa Medical College, Bambolim, Goa at this Institute on 31st July at the Dr. A.R. Bhattacharyya Farmers Exhibition Hall. Around 25 staff (both permanent and contractual) and their family members participated in the noble cause conducted under the supervision of Dr. E.B. Chakurkar, Director, ICAR-CCARI. A total of 20 units of blood were collected at the camp.

74th Independence day celebrations

ICAR-CCARI celebrated the 74th Independence Day on 15th August 2020 at 9.30 a.m. Dr. E. B. Chakurkar, Director (Acting) of the Institute hoisted the flag. All the staff of ICAR CCARI along with their family members participated in the flag hoisting. On the occasion, he extended warm greetings to all the employees and others who attended the program. During his address, he briefed about the achievements of the Institute and congratulated everyone for it. Tree planting was done to improve the green cover.

Administration

Superannuation:

- Shri. Gokuldas Kaskar, Skilled Support Staff retired on 31-05-2020
- Shri. Dugu Khandeparkar, Skilled Support Staff retired on 30-06-2020

Promotion:

- Shri. Vyas Hiren Kumar, LDC promoted to the post of UDC w.e.f 30-06-2020
- Smt. Swati Khandeparkar, Skilled Support Staff promoted to the post of LDC w.e.f 30-06-2020

Transferred from ICAR-CCARI:

- Dr. M. Thangam, Principal Scientist (Vegetable Science) to ICAR-IIHR, Bengaluru on 19th August 2020.
- Dr. S. Priyadevi, Principal Scientist (Fruit Science) to ICAR-IIHR, Bengaluru on 19th august 2020.
- Dr. Chethan Kumar H. B., Scientist (Veterinary Public Health) to ICAR- NIVEDI, Bengaluru on 19th August 2020.

Transferred to ICAR-CCARI:

- Dr. B. L. Kasinath, Principal Scientist (Soil Science) and Head KVK joined ICAR-CCARI, Goa on 01-06-2020 on transfer from ICAR- KVK, Nimbudera, North & Middle Andaman, administered under ICAR-CIARI, Port Blair.
- Dr. Shripad Bhat, Scientist (Agricultural Economics) joined ICAR-Central Coastal Agricultural Research Institute, Goa on 03-08-2020 transferred from ICAR-IIPR, Kanpur.

Conference/Symposia/Workshop/Training attended:

Date	Name of Scientist	Programme	Venue
21/07/2020-22/07/2020	Dr. Gokuldas PP Scientist	National webinar on Applications of Flow cytometry in Semen Analysis	ICAR-NDRI SRS, Bengaluru
3/07/2020	Dr. Gokuldas PP Scientist	Webinar on Fertility crisis -Advances in male fertility prediction organized by the ISSAR, Puducherry Chapter	ICAR-NDRI SRS, Bengaluru
22/07/2020-24/07/2020	Dr. Sujeet Desai	International Webinar on “Achieving Land Degradation Neutrality”	ICAR-IISWC, Dehradun
25/07/2020	Dr. Maneesha S.R.	Webinar on 'Precision farming in banana’	Online: NRC Banana, Thiruchirapalii

29/07/2020 - 1/08/2020	Dr. Maneesha S.R.	Online training program on "Good Agricultural and Collection Practices for Medicinal Plants"	Online: ICAR-DMAPR, Boriavi-387310, Anand, Gujarat
28/07/2020-30/07/2020	Dr. Amiya Ranjan Sahoo	International Webinar on "Role of Poultry Sector in Boosting the Post COVID Indian Economy"	College of Avian Sciences and Management, Kerala Veterinary and Animal Sciences University, Thiruvazhamkunnu, Palakkad, Kerala, and ICAR-NAHEP Innovation Grant
29/07/2020	Dr. Amiya Ranjan Sahoo	National Webinar on "Modern genetic approaches for improvement of indigenous cattle"	Department of Animal Genetics and Breeding, C.V.Sc. & A.H., Mathura, U.P.
08/08/2020	Dr. Shripad Bhat	Webinar on "Export Challenges and Mitigation Strategies for Fresh and Processed F&V in COVID-19 Times"	Department of Agriculture and Environmental Sciences, NIFTEM, Sonipat
10/08/2020-13/08/2020	Dr. V. Arunachalam	XXIX annual group meeting of palms	Videoconference mode
27/08/2020	Dr. Shripad Bhat	National Webinar on 'Abiotic Stress in Agriculture: Geospatial Characterization and Management Options'	ICAR-National Institute of Abiotic Stress Management, Baramati
10/08/2020	Dr. Maneesha S.R.	National webinar on Under-utilized Crops for Augmenting Farmers' Income in Abiotic Stress Region	Online: ICAR-NIASM, Baramati and SARAS
22/08/2020	Dr. G.R. Mahajan	Workshop on 'Towards self-reliance coastal agriculture: Challenges and way forward'	Virtual platform by Indian Society of Coastal Agricultural Research, ICAR-CSSRI, Canning Town, West Bengal, India
27/08/2020	Dr. G.R. Mahajan	Webinar on Abiotic Stress in Agriculture: Geospatial Characterization and Management Options	Virtual platform by ICAR-National Institute of Abiotic Stress Management, Baramati, India

Lectures Delivered

Date	Name	Programme	Venue
06/07/2020	Dr. G.R. Mahajan	Nacks of Preparation: Soil Science Competitive Exams in a Five Weeks Online Training Programme for students	Virtual platform by ICAR- NAHEP, CAAST, CSAWM, MPKV, Rahuri, Maharashtra, India
05/08/2020	Dr. G.R. Mahajan	Plant Nutrition Management for Fruit Crops in Goa to farmers	Virtual Platform by RCPR School of Agriculture and KisanSamvad, Pune