



काजू समाचार CASHEW NEWS



भा.कृ.अनु.प. – काजू अनुसंधान निदेशालय, पुत्तूर के अर्ध वार्षिक वार्ता पत्र
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DIRECTOR'S DESK

Cashew is an important export-oriented commercial crop that supports the livelihood of farmers along the east coast, west coast and maidan parts of India. It also provides employment to the rural poor by the way of processing industries. There is a huge demand for Indian cashew nuts in the domestic as well as international markets. The cashew fruits consist of cashew nut and cashew apple and it is estimated that 1 ton of cashew nut production yields around 9 tons of cashew apple of which only 3.5% is processed and the remaining is left in the orchards as an agricultural residue.



In India, it is currently grown on an area of 11.05 lakh hectares with an annual production of 7.43 lakh metric tons of cashewnuts. Our country is the largest producer of raw cashewnuts contributing 20% of total global production. The major cashew growing states are Kerala, Karnataka, Goa, Maharashtra, Tamil Nadu, Andhra Pradesh, Odisha, West Bengal, Chhattisgarh, Gujarat, Jharkhand and the North-Eastern States. In recent years, there has been a general shift to cash over other plantation crops such as rubber in a few regions of Karnataka, mainly due to the low labour requirement, climate resilient nature and increasing demand for cashew kernels.

Drones are being used in practically every sector of the economy, but their popularity is particularly high in agriculture. The Use of large and small farms will become increasingly common in the next few years, from scouting to security. Drone data collected on farms is frequently utilized to better inform agronomic decisions as part of a system known as 'precision agriculture.' In many places, drones have already become an integral component of large-scale precision farming operations. Data acquired from drones monitoring fields assists farmers planning the planting and treatments to maximize yields.

The usage of drones to apply spray treatments is already common throughout the country. Drone sprayers can travel difficult-to-reach regions, like as steep cashew farms at high altitude. Drone sprayers eliminate the need for personnel to travel fields with backpack sprayers and tractor mounted sprayers which can be harmful to their health. Drone sprayers offer very fine spray treatments that can be targeted to specific locations, increasing efficiency, and lowering chemical costs. Currently, drone sprayer rules vary greatly between countries. In India, they are currently permitted for agricultural use.

Drones have revolutionized agriculture, notably crop spraying. Unmanned Aerial Vehicles (UAVs) have increased spraying capabilities, and are playing an important role in optimizing fertilizer and pesticide delivery. This thorough investigation digs into the opportunities and issues related with the use of agricultural drones for

spraying in modern agriculture. Drone pesticide spraying has transformed modern agriculture, providing crop protection with greater precision and efficiency. These drones are fitted with innovative technology that allow for precise pesticide spraying while minimizing waste and environmental damage. The drones' advanced navigation systems and high-resolution sensors provide exact coverage while addressing specific areas of concern in the field. This unique strategy not only improves crop health and yields, but it also helps to promote sustainable agricultural practices by lowering pesticide use overall. Drones for pesticide spraying are a game changer, providing farmers with a technologically advanced and environmentally conscientious crop management solution.

The ICAR-Director of Cashew Research has conducted several experimental trials in cashew orchards for spraying of micronutrients and pesticides through drones and standardized the operational parameters for aerial spraying. ICAR-DCR conducted 65 frontline demonstrations on drone technology for spraying agricultural chemicals, micronutrients, and organic pesticides in farmers' fields, covering 91.25 acres and benefitted 3106 farmers through the programme. The demonstrations were also conducted under the scheme "Drone Technology Demonstration (DTD)" funded by Central Sector Scheme of Dept. of Agriculture & Farmers Welfare, implemented through ATARI (Sub Mission on Agricultural Mechanization) with an aim to create awareness about drone applications in agriculture among the farmers, extension workers and other stakeholders.



Dr. J. Dinakara Adiga

1. RESEARCH HIGHLIGHTS

A novel design of 3 in 1 moisture meter for cashew

Moisture content (MC) of Raw cashewnuts (RCN) has direct consequence on the market value of the nuts as it decides ability to store for prolonged period and its usability in the line of processing. A portable moisture meter (MM) of non-destructive nature indicating near accurate moisture of the material is essential for the cashew industry as whole. A 3in1 moisture meter is developed to determine the MC of raw cashewnuts, unpeeled kernels (UPK) and peeled kernels (PK). It has capacitance based parallel plate technique to assess MC and its sensitivity is enhanced by innovative approach of 'double cavity'. The Calibration of moisture meter was carried out with generated data and tested for its accuracy and repeatability. Data mining carried out with experimental data to develop polynomial formulation and its accuracy is $\pm 1\%$. A patent is filed to protect the technology through intellectual property rights.

(Dr D Balasubramanian, Principal Scientist, ICAR-DCR, Karnataka and Mr Sreejith, M/s EMCON, Cochin, Kerala)

Development of finger tool for manual peeling of cashew testa

Viewing the cost of peeling machine and the necessity of manual peeling with personal hygiene especially for 'home scale or cottage level cashew processing', an attempt has been made to develop a finger tool to serve the purpose. Commercially available artificial nails are made out of chemical i.e., acrylic powder, and has allergic effect to human. Therefore, thimble used in protection while hand sewing is referred for fabricating metal cap with nail structure to scratch testa of cashew kernels. It is designed for thumb and index fingers and trial conducted. Various treatments applied viz., aqueous solutions with different concentration, solution temperature, steam treatment, physical damage etc., for short duration dried cashew kernels and assessed for

manual peeling. Performance of finger tools confirmed ease of peeling and retained its surface colour with enhanced whole kernel recovery.

(Dr D Balasubramanian, Principal Scientist, ICAR-DCR, Karnataka)

Cashew Sprout Nutri Bars

There is a demand for healthy nutri bars in the market. Nutri bars are those which provide essential nourishment and energy to the body. Cashew sprouts have got several beneficial mineral and other nutrient compositions in it. Therefore, cashew sprouts along with other millets and cereal sprouts were

added to develop the 'Cashew nutri bars' to enrich the nutrient composition (Fig 1). The developed cashew sprout based nutri bars consists of total flavonoids (10.55 mg QE/100g), total antioxidant activity (197.47 mg/100g), ash content (4.07%), similarly protein and fat. Cashew sprouts nutri bars are rich in minerals and other phytochemicals encourages farmer to get added income out of value addition as well as consumers with nutrient enriched bars.



Fig. 1. Cashew sprout nutri bars

(G. L. Veena¹, Delma Lora D¹, Preethal Milan¹, M Shamsudheen¹, P. Preethi², H Rajashekara¹, G N Manjesh¹ and Jyothi Nishad¹ ¹ ICAR-Directorate of Cashew Research, Puttur, ²ICAR-IIHR, Bengaluru)

Incidence of leaf and flower thrips in the cashew plantations

In cashew, thrips occur both on the leaves and flowers. Common thrips that occur on cashew leaves include, *Selenothrips rubrocinctus* (Giard), *Rhipiphorothrips cruentatus* Hood, *Retithrips syriacus* (Mayet). Infestation on the leaves cause distortion, yellowing and premature leaf fall. The nymphs of *S. rubrocinctus* have a reddish band on its body, while its adults are black in colour (Fig. 2.). The flower thrips include, *Scirtothrips dorsalis* H., *Rhynchothrips raoensis* G., *Haplothrips ganglbaueri* (Schmutz), Thrips hawaiiensis, *H. ceylonicus* Schmutz and *Frankliniella schultzei* (Trybom) (Thripidae). The heavily infested flower buds dry away, and the infested nuts show scabby appearance and malformation. In the recent surveys conducted in cashew plantation of DCR, Puttur indicated occurrence of some more thrips species including Thrips palmi and other Tubuliferan species. *S. dorsalis* and *T. hawaiiensis* which occur on cashew were also collected on *Calycopteryx floribunda*, a common weed in west coast regions. Surveys conducted in Sagar, Karnataka indicated occurrence of two new species viz., *Anascirtotrips arorai* Bhatti and *Scirtothrips bispinosus* (Bagnall) along with *S. dorsalis* in the infested cashew plants. These observations indicate monitoring is required to understand the species complex and their role in cashew.



Fig. 2. *S. rubrocinctus* nymphs and adult (left) and its damage on cashew(right)

(K. Vanitha¹, Rachana, R. R², T.N. Raviprasad¹, H. Rajashekara¹ and G.S Mohana¹. ¹ ICAR-Directorate of Cashew Research, Puttur, ²ICAR-National Bureau of Agricultural Insect Resources, Bengaluru)

Insects that help in decomposing of fallen cashew apples

In general, majority of the cashew apples are left to rot and goes as waste. In the field conditions, insects help in decomposition of cashew apples. The common insects recorded on the decomposing cashew apples include beetles, flies and ants. Among the beetles, sap beetles belonging to the genus, *Dactylosternum* sp. (Hydrophilidae) and *Carpophilus* sp. (Nitidulidae) were very common (Fig.3). The flies recorded include, oriental fruit fly, *Bactrocera dorsalis* (Tephritidae), *Drosophila* sp. (Drosophilidae), tachinid flies and black soldier flies, *Hermetia illucen* (Stratiomyidae). Ants namely, *Anaplolepis gracillipes*, *Camponotus* spp., *Monomorium* spp., *Myrmecaria brunneriana* etc. also feed the fallen cashew apples. The grubs of *Dactylosternum* sp. up to 20 numbers /fruit are seen in fallen ripe apples during April-May and its pupation takes place in soil. Unlike *Dactylosternum* sp., the grubs of *Carpophilus* sp. multiplies faster and complete its life cycle in a short time of 11-13 days. These sap beetles aid in decomposing of cashew apples in nature. Further, the larvae of black soldier flies (harmless insects) which are commercially used in decomposing of plant and animal waste were found to survive well and develop as adults on the cashew apples under a laboratory trial at ICAR-DCR.



Grubs of
Dactylosternum sp.

Grubs and adult of
Carpophilus sp.

Fig. 3. Sap beetles recorded in fallen cashew apples

(K. Vanitha, T.N. Raviprasad and M. Shamsudheen, ICAR-Directorate of Cashew Research, Puttur)

Developing soilless media for multiplication of quality grafts in Cashew (*Anacardium occidentale*)

The nursery study on effect of soilless media on production of quality graphs was carried out with 4 different media viz. soil: sand: FYM (1:1:1) (M1), vermicompost (M2), coir pith compost (M3) and vermicompost + coir pith compost (1:1) (M4). In this experiment VTH-174 was used as root stock. Survival percentage and growth parameters of root stock was recorded in monthly interval for 2 months. Survival % was varied from 94 to 98 % The height of graft was varied from 19.12 to 24.16 cm and 30.40 to 34.64 cm during 30 days and 60 days after sowing respectively and in M1 media height of grafts were recorded less as compared M2, M3 and M4.

(H. P. Bhagya., J. D. Adiga., V. Thondaiman., M. Shamsudheen., G. L. Veena., Babli Mog and G. N. Manjesh, ICAR-Directorate of Cashew Research, Puttur,)

Effect of inter-stocks in Cashew (*Anacardium occidentale*)

An inter-stock grafting experiment was conducted at the nursery with different dwarf and vigorous inter-stock with VTH-174 as root stock to know the success of inter-stock grafting and to induce the dwarf character in grafts and 6 different inter-stock were used in grafting of V-4 and Bhaskara variety along with normal grafting of V-4 and Bhaskara. This study indicates that, inter-stock grafting gave good success rate in terms of survival percentage an it varies from 12.5 to 100 %. Highest survival percentage was recorded in single grafting of V-4, Bhaskara and V-7+V-4 (100 %) followed by V-7+Bhaskara and KAU Nihara (Taliparamba) (86.66 %), Nethra Vaman +V4 (83.33%), KAU Nihara (Taliparamba) (80 %), V-4+V4 (50 %), Nethra Vaman +Bhaskara (43.33 %), Bhaskara+V4 (26.67 %), Bhaskara+Bhaskara (20 %), V4+Bhaskara (16.67%), A. Pumilum +V-4 (14.29 %) and A. Pumilum+ Bhaskara (12.5 %). In the nursery experiment it was difficult to observe the dwarf traits, so we have laid out new field experiment by using these successful inter-stock grafts and planted in the field with 12 different inter-stocks along with 2 control (V-4 and Bhaskara) as normal graft.

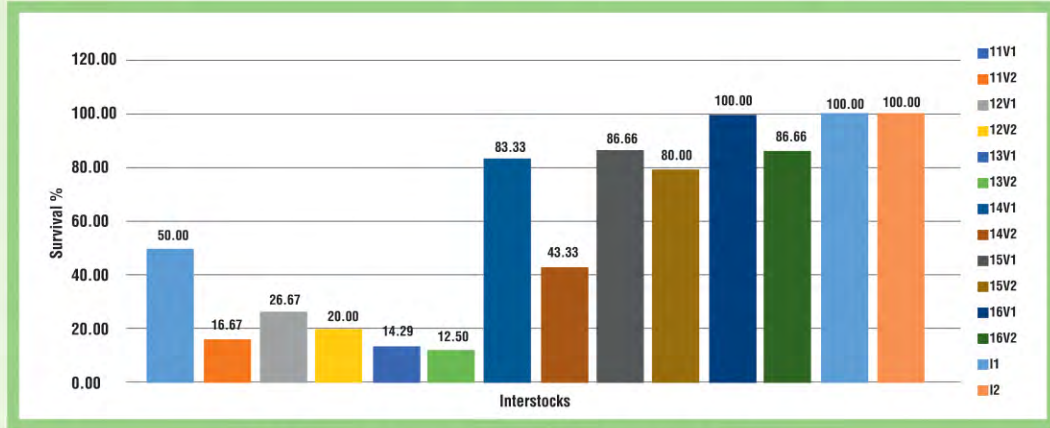


Fig 4. Survival percentage of inter-stock grafts in the nursery

(H. P. Bhagya., J. D. Adiga., V. Thondaiman., M. Shamsudheen., G. L. Veena., Babli Mog and G. N. Manjesh
ICAR-Directorate of Cashew Research, Puttur)

2. PUBLICATIONS

Research Article

Manjunatha, K., Balasubramanian, D., Naik, R and Adiga, J. D., 2023. Engineering properties of cashew apple and nut in relation to design of cashew apple and nut separator. *Journal of Applied Horticulture*, 25(2).

Manjunatha, K., Nayak, M. G., Mangalassery, S., Palpandian, P., Muralidhara, B.M. and Siddanna Savadi, 2023. Energy budgeting and life cycle assessment of cashew cultivation under different planting densities. *Environment Conservation Journal*, 24 (3): 67-78.

Chethan, C.R., Shrivastava, A.K., Nare, B., Kumar, S.P., Singh, P.K., Venu, S.A., Manjunatha K. and Chaturvedi, S., 2023. Effect of Tuber Shape, Picking Cup Size and Peripheral Speed of Metering Unit on Tuber Metering Efficiency of Belt Type Automatic Potato Planter. *Agricultural Mechanization in Asia, Africa, and Latin America*, 54(2): 38-45.

Lakshmpathi, Adiga, J.D., Kalaivanana, D., Bhagya, H.P., Thondaiman, V., Babli Mog, Manjesh, G.N., Veena, G.L., Shamsudheen, M., Vanitha, K. and Manjunatha, K. 2023. Effect of growth regulators and micronutrients on quality parameters in cashew (*Anacardium occidentale* L.). *Journal of Horticultural Science*, 18(1): 98-103.

Rajashekara, H., Pandian, R. T. P., Mahadevkumar, S., Raviprasad, T. N., Vanitha, K., Siddanna, S., Thube, S. H., Vikas, K and Chandra Nayaka S. 2023. First report of *Neopestalotiopsis clavispora* causing cashew leaf blight disease in India. *Plant Disease*. 107:2864.

Preethi. P., Shamsudheen. M., Reddy, S.V.R., Veena, G.L., Kalal, P. and Pandiselvam, R. 2023. Biochemical quality comparison of forced air dried osmo-dehydrated cashew apple products infused with spice mixture and sugar. *Journal of Horticultural Sciences*, 18(2): 402-407.

Book/Book Chapters/Popular articles

Babli, M., Adiga, J.D., Mohana, G.S., Shamsudheen, M., Thondaiman, V., Veena, G.L., Manjesh, G.N., Bhagya, H.P., Vanitha K and Manjunatha, K. 2023. Cashew Nut Shell Liquid: An alternative fuel for diesel engine. *Kerala Karshakan English Journal* 11(3):7-11.

Technical bulletins/Extension folders

K. Vanitha, T.N. Raviprasad and Rajashekara, H. 2023. Inflorescence pests of cashew. Extension folder, Published by Director, ICAR-DCR, Puttur, funded by SCSP, ICAR-DCR, Puttur.

Shamsudheen, M, J. D. Adiga, Veena G L., Babli Mog, Bhagya H P, V Thondaiman and Manjesh G.N.2023, Nutrient Deficiency in Cashew-Symptoms and management, [Extension leaflet-English]. ICAR-Directorate of Cashew Research, Puttur.

Eradasappa E, Veena G L, Dinakar Adiga, Mohan G S, Bhagya H P and Manjesh G N, 2023. Nethra Ubhaya – A dual purpose cashew variety. [Extension leaflet-English]. ICAR-Directorate of Cashew Research, Puttur.

Veena G.L., Preethi, P. Rajkumar, A.D., Shamsudheen, M. and Manjesh G. N. 2023 Value added products of cashew apple. [Extension leaflet-English]. ICAR-Directorate of Cashew Research, Puttur, Karnataka.

Manjesh G. N., Bhagya H.P., Veena G.L., Shamshudeen M., Thondaiman V., Eradasappa E., Babli Mog, Manjunatha Krishnappa, Aswathy Chandrakumar. 2023. Cashew cultivation practices [Extension leaflet-English]. ICAR-Directorate of Cashew Research, Puttur, Karnataka.

Conference/Symposium/Training organized/Training attended

Dr. Bhagya	Coordinated online collaborative training on Agripreneurship development through cashew production and post-harvest technologies organized by the National Institute of Agricultural Extension Management (MANAGE), Hyderabad and ICAR -Directorate of Cashew Research, Puttur	22 nd to 24 th November 2023
Dr. Balasubramanian D.	Training programme on SAMAGRA – Sensitization workshop of Agri Business Incubator (ABI) conducted by IP &TM Unit, ICAR, New Delhi.	17 th to 18 th October 2023
Dr. Eradasappa, E.	Participated and presented on genotype by year interaction for tea mosquito bug incidence in cashew (<i>Anacardium occidentale</i> L). 2 nd International Conference: Prospects and challenges of environment and biological sciences in food production system for livelihood security of farmers (ICFPLS-2023) held at ICAR-CIARI, Port Blair Andaman & Nicobar Islands, India	18 th to 20 th September 2023
	Participated and presented on Nethra Ubhaya – A new dual purpose cashew variety released for cultivation' in the 25 th National Symposium on Plantation Crops at ICAR-IIOPR, Pedavegi, Andhra Pradesh	12 th to 14 th December 2023
Dr. Manjesh G. N.	Organized Front-line demonstration on “Tractor mounted sprayer in cashew orchard” at ICAR-DCR, Puttur during the occasion of Kissan Diwas	23 rd December 2023
	Organized a training program on Cashew cultivation and Cashew apple utilization and promotion of Kitchen gardening cum distribution of agri inputs to the SC beneficiaries of Gadag district under SCSP scheme in collaboration with ICAR-K H Patil KVK Hulkoti, Karnataka.	26 th September 2023

	Organized training program on Cashew cultivation and Nursery management in Cashew cum Distribution of agri inputs under SCSP Scheme at ICAR-DCR Puttur	08 th September 2023
	Participated and delivered an oral presentation on the Growth and Maturity of Cashew Nut and Apple in Relation to Climate Variables and Modified Biologische Bundesantalt, Bundessortenamt, and Chemische Industrie (BBCH) Scale during the 5th International Conference on "Sustainable Natural Resource Management under Global Climate Change". Soil Conservation Society of India, New Delhi, India.	7 th to 10 th November, 2023
Dr. Manjunath K	Acted as a training co-coordinator for the "Agripreneurship Development through Cashew Production and Post-Harvest Technologies" organized by ICR-DCR, Puttur in collaboration with National Institute of Agricultural Extension Management (MANAGE), Hyderabad through online mode	22 nd to 24 th November 2023
	Acted as a Co-organizer for organizing the Kisan Diwas organized by ICR-DCR, Puttur.	23 rd December 2023
Dr. Veena G. L.	Participated and presented oral presentation on Nutritionally enriched cashew apple and finger millet flour based extrudates on 10th Indian Horticulture Congress 2023 organized by IAHS at Assam agricultural University Khanapara Guwahati	6 th to 9 th November 2023.
	Participated and given oral presentation on Cashew apple pomace-based Nutri rich cookies at international seminar on exotic and underutilized horticultural crops held at ICAR-IIHR Bengaluru	17 th to 19 th October 2023
	Organized Front-line demonstration on "Tractor mounted sprayer in cashew orchard" at ICAR-DCR, Puttur during the occasion of Kissan Diwas	23 rd December 2023

3. NEWS AND EVENTS

Programmes organized

Vigilance Awareness Week

Vigilance Awareness Week - 2023 was celebrated by ICAR-Directorate of Cashew Research, Puttur. A week-long programme was conducted by the Directorate from 31st October 2023 to 6th November 2023. The Vigilance Awareness week was started by taking the integrity pledge by staff members and general public on 31st October 2023. The week-long activities during the period were intended to create awareness about the transparency, accountability and corruption free governance, among the staff members and the civil society. Various internal housekeeping activities were attended by different sections. Awareness posters on PIDPI was also displayed during the vigilance awareness week programme.

The valedictory function was held at the main conference hall of the Directorate on 07th November 2023. Dr. Shamsudheen. M, Senior Scientist & Vigilance Officer, ICAR-DCR, Puttur welcomed the gathering. The programme was inaugurated by all the dignitaries by lighting the lamp. The programme was presided over by introductory remarks of Dr. J. Dinakara Adiga, Director of the Directorate. He highlighted that it is the duty of citizen to not to give opportunity for corrupt people. Smt. Archana K. Unnithan., Principal Civil Judge Puttur, addressed the gathering by mentioning that small changes in our daily life and discipline can help to curb the corruption and leads to corruption free tomorrow. Sri. Shyam Prasad Kailar, Advocate and Treasurer, Bar Association, Puttur also talked on the occasion and he indicated that employment generation will minimize the corruption. He also indicated that, the students and youth should be motivated to give importance for being honest right from the beginning.

The resource person, Adv. Nanda Kishore, Puttur, delivered a special talk on the theme “Say No to Corruption; Commit to the Nation”. He narrated in detail how the corruption comes, different forms of corruption, consequences of corruption and how it can be curbed at system level.

The programme was concluded with vote of thanks by Dr. Veena. G.L., Scientist (Fruit Science), ICAR-DCR, Puttur. The programme was organised jointly by ICAR-DCR, Puttur, Legal Cell, Puttur and Bar Association, Puttur. The programme was attended by 120 members including the students from Sandeepani School.





World Soil Day celebrations

World Soil Day is celebrated on 5th December, 2023 advocating the importance of healthy soils and the need for sustainable management of soil resources. The theme for this year is “Soils and water: A Source of life”. As a part of the World Soil Day celebrations at the Directorate, an awareness training and demonstration on soil health management was organized. During the programme, Dr. Shamsudheen. M, Senior Scientist (Soil Science) and Coordinator explained about the importance of soil and water management and highlighted the significance of celebrating the World Soil Day. Dr. Veena. G.L., Scientist (Fruit Science) and convenor explained about the nutrient management in cashew. This was followed a field visit and demonstration on soil sampling.



Kisan Diwas

Kisan Diwas was celebrated at ICAR-Directorate of Cashew Research Puttur on 23rd December 2023, for the cashew farmers. The programme commenced with ICAR Song followed by the welcome address by Dr. Veena G.L, Scientist (Fruit Science). The presidential address was delivered by Dr. J. Dinakara Adiga, Director, ICAR-DCR, Puttur. In his speech, he narrated about the objective of conducting Kisan Diwas and briefed about ICAR-DCR's achievements and schemes for the benefit of the cashew farmers. Dr. Manjunatha K, Scientist (Farm Machinery), ICAR-Directorate of Cashew Research oriented the farmers towards cashew farming. He gave a detailed demonstration on tractor operated spraying of micro nutrients and pesticides in cashew orchards. The farmers were also given exposure to cashew production technologies viz., information on newly released cashew varieties, grafting technique, management of tea mosquito bug, processing of Cashew nut and apple etc. Following the training session, as a part of the Kisan Diwas celebration, DCR publication kits both in English and Kannada were distributed to the farmers of Bettampady and Mottethdka villages at the end of the event.



Swacchata Pakhwada

The ICAR- Directorate of Cashew Research, Puttur, Karnataka observed “Swacchata Pakhwada” from 16th December 2023 to 31st December 2023 by conducting various day-wise activities as per the guidelines received from the Government of India. The Inauguration and Pledge Taking Ceremony of Swacchata Pakhwada marked a pivotal moment on 16th December 2023, as every staff member enthusiastically participated in this initiative. The event was inaugurated with great zeal with the aim of fostering cleanliness and hygiene. Various activities were planned to kickstart the Pakhwada. Notable among these were the prominent display of banners at key locations, serving as a visual reminder to uphold the spirit of cleanliness across the premises. Planting of trees was also taken up in our institute premise. This served as a guiding compass for the upcoming events, ensuring a structured and impactful series of cleanliness-oriented programs. The series of activities include cleaning of Office building and Residential campus, talk on waste management, recycling of waste water, debate on Swacchata, celebration of Kisan Diwas, quiz competition among DCR staff to create awareness on Swacchata and VIP address on Swacchata.



Online Training programme on “Agripreneurship Development through Cashew Production and Post harvest technologies”

A three days online training programme on “Agripreneurship Development through Cashew Production and Post harvest technologies” was jointly organized by ICAR-Directorate of Cashew Research, Puttur and MANAGE, Hyderabad from 22nd to 24th, November, 2023. The training was attended by 47 participants from 16 states and comprised of students, Assistant Professors, scientists, subject matter specialists from KVKs, officials from agriculture departments and entrepreneurs. The technical sessions focused on imparting knowledge on various aspects of cashew production, protection, post-harvest processing, marketing and export and threw light on opportunities of agripreneurship development in cashew through commercial nursery management, raw cashew nut processing and value addition of cashew apple. The training was useful for the participants as expressed through their feedbacks.



Agri-Business Incubation

Agri Business Incubator (ABI) initiated in this institute under the scheme of Intellectual Property and Technology Management funded by Indian Council of Agricultural Research, New Delhi has 'State-of-the-Art' processing facility for promotion of entrepreneurship and business environment in the cashew eco system. During the reporting period, four incubates viz., Mr Aswath Hebbar, Karnataka, Mr Prakash P, Karnataka, Mr B Narendra Baliga, Karnataka and Mrs Sumana, K, Karnataka have registered with ABI have undergone three days training on 'Starting Cashewnut processing' and utilized the facility on the basis of 'Custom hiring'. Among the incubatees registered with ABIC, Mr Aswath Hebbar and Mr Gururaj Kolathaiya signed MoU with this institute and utilized the processing facility. Activities of ABIC, to promote cashew business and technologies developed in this institute, exhibited during Indian Horticultural congress held at Assam Agricultural University, Guwahati and Horticultural exhibition conducted at Indian Institute of Horticultural Institute, Bangalore. Any further information, visit ICAR-DCR website <https://cashew.icar.gov.in/>

4. SCSP/TSP/NEH Activities

1. Training Programme on Cashew Cultivation and apple Utilization and distribution of Inputs under SCSP-scheme

Training Programme on Cashew Cultivation and apple Utilization and distribution of Inputs under the SCSP scheme to Schedule caste (SC) beneficiaries of Gadag District was organized on 26th September 2023 in collaboration with ICAR-K.H. Patil, KVK, Hulkoti, Gadag, Karnataka. In this programme, Dr. H Rajashekara Scientist, (Plant Pathology), ICAR-DCR, Puttur, Chief guest briefed about the institute activities and gave a lecture on pest management practices in cashew. Further, Dr. Manjesh G.N. Scientist (SPM&AP), Nodal officer SCSP, ICAR-DCR, Puttur addressed the gathering highlighted the SCSP activities, and gave a lecture on Cashew cultivation. Dr. Veena G L., Scientist (Fruit Science) addressed the gathering and delivered a lecture on the scope and importance of value addition in cashew apple. Dr. Narayan H. Bhandi addressed the gathering stating the collaborative efforts in the implementation of the SCSP scheme at Gadag and emphasized on self-utilization of inputs provided under the scheme. The President of the programme Dr. Sudha V. Mankani, Senior Scientist and



Head ICAR-K.H. Patil KVK, Hulkoti, Gadag, briefed about the importance of balanced nutrition in the daily diet and emphasized the benefits of the kitchen garden. Radio talk on cashew cultivation, Cashew apple Utilization, and the Varietal wealth of cashew were delivered at the community radio station (FM 89.6Hz) for the benefit of new cashew farmers at Gadag. This was followed by the distribution of inputs (Tarpaulins, Vegetable seed kit, and Vegetable special- nutrient mixture”) to 100 SC beneficiaries of Gadag District.

2. Distribution of inputs to SCSP beneficiaries of Dakshina Kannada, Karnataka

As a part of the Scheduled Caste Sub Plan (SCSP) program of this Directorate, the inputs for the Scheduled caste community were distributed with a collaboration of ICAR, KVK, Dakshina Kannada on 05th September 2023. During the program, Dr. K. Ramesh (Senior scientist & Head), ICAR-KVK, Dakshina Kannada briefed about the scheme of the Scheduled Caste sub-plan (SCSP) program of ICAR-DCR and implementation. The guest of honor Dr. J.D. Adiga, Director, ICAR-DCR, Puttur addressed the beneficiaries and informed them about the proper use of the inputs for their utilization. Dr. Mallikarjuna L (Scientist, Soil Science, N/O SCSP, ICAR-KVK, D.K.) gave a brief note on the process of selection of beneficiaries under the scheme. The inputs were distributed to SC beneficiaries of taluks – Mangalore, Ullal, Mulki, Moodabidre, and Bantwal covering 90 beneficiaries (75 for Tarpaulins and 15 for Solar lights). Dr. Manjesh G.N. Scientist, Nodal officer SCSP, ICAR-DCR coordinated the programme.



3. Training Programme on Cashew Cultivation and Nursery Management and Distribution of inputs under the SCSP scheme to the beneficiaries of Dakshina Kannada, Karnataka

As a part of the Scheduled Caste Sub Plan (SCSP) scheme of this Directorate, the inputs for the Scheduled caste community were distributed in collaboration with ICAR, KVK, Dakshina Kannada on 08th September 2023. Dr. J Dinakara Adiga, Director of ICAR-DCR Puttur chaired the program. Dr. Mallikarjuna, L. (Scientist), ICAR- KVK, Dakshina Kannada was chief guest. Dr. Manjesh G N, Nodal officer SCSP briefed about the scheme of the

Scheduled Caste sub-plan (SCSP) scheme of ICAR- DCR and its implementation and the basis of selection of beneficiaries. Dr. J.D. Adiga the Director (ICAR-DCR, Puttur) addressed the beneficiaries and informed them about the proper use of the inputs for their utilization. Dr. Mallikarjuna L (Scientist, Soil Science, N/O SCSP, ICAR-KVK, D.K.) gave a brief note on the process of selection of beneficiaries under the scheme. The inputs were distributed to SC beneficiaries of Belthangadi, Sulia, Puttur, Kadaba, and talukas covering 49 beneficiaries (25 for Tarpaulins and 24 for Solar lights). On this occasion, one-day training programme was organized for the beneficiaries on cashew cultivation and nursery management. Dr. Manjesh G.N. Scientist, Nodal officer, and the members of the SCSP scheme of ICAR-DCR coordinated the programme.



4. Distribution of farm input Cow mats to SCSP beneficiaries of Dakshina Kannada, Karnataka

As a part of the Scheduled Caste Sub Plan (SCSP) program of this Directorate, the input-Cow Mats for the Scheduled caste community was provided with a collaboration of ICAR, KVK, Dakshina Kannada on 03rd November 2023. The distribution program was organized at ICAR-DCR, Puttur covering 30 beneficiaries from Puttur, Sullia, and Belthangadi taluk on 03rd November 2023.



During this program, Dr. Adiga J.D. Director, ICR-DCR, Puttur emphasized various central government schemes being implemented for the welfare of the SC community for the benefit of farmers and suggested utilizing the inputs for their use.

5. Distribution of farm input-Cow mats to SCSP beneficiaries of Dakshina Kannada and technical workshop on Nutritional management in Dairy animals

The distribution of Cow mats to SC beneficiaries of Mangalore and Bantwal taluks covering 20 farmers was organized at ICAR-KVK, D.K., and a technical workshop on Nutritional management in Dairy animals on the

occasion. During this program, Dr. Ramesh Head of KVK, DK briefed about the implementation of the SCSP scheme in collaboration with ICAR-DCR and spoke about an overview of the Dairy sector in D.K. and insisted on minimizing the cost input towards rearing of dairy animals to realize higher profits. The resource person Dr. NKS Gowda, Principal Scientist, ICAR-NAINP, Bengaluru addressed the gathering and briefed about the importance of nutritional feed for the dairy animals. The chief guest Dr. Mohana G.S. Principal Scientist (G&PB) in his remarks insisted on exploring the possible utilization of agricultural wastes (jackfruit, cashew apple, etc.,) as a source of fiber and nutritional components for dairy animals and appreciated the efforts from the Head and N/O SCSP-ICAR-KVK D.K. for their collaborative activities.



**Webinar organized as a part of Azadi Ka Amrit Mahotsav
(Organizers: J D Adiga, Mohana G S and Bhagya H P)**

SI No	Title of Webinar	Resource person with contact details	Date	Number of participants
1.	Midlife- Risks and Precautions 13th, July, 2023	Dr. K. Bhat, M.B.B.S, PMO, ICAR-DCR, Puttur	13 th July 2023	49
2.	The River Kaveri: Lifeline of Karnataka and Tamil Nadu	Dr. Eradasappa, E., Senior Scientist (Plant Breeding), ICAR-DCR, Puttur	20 th July 2023	50
3.	Science Communication Skills: Essential for Scientists?	Dr. Mohan, G.S., Principal Scientist (Gen. & Cyto.), ICAR-DCR, Puttur	26 th July 2023	50
4.	Palynological studies in fruits	Dr. Veena G.L., Scientist (Fruit science), ICAR-DCR, Puttur	8 th August 2023	27

5. Meetings Conducted (IMC/IJSC/RAC/IRC/Hindi etc.)

Institute Research Committee (IRC)

The meeting of the 36th Institute Research Committee (IRC) was held during 9th to 10th, August 2023 under the Chairmanship of Dr. J.D. Adiga, Director, ICAR-DCR, Puttur in hybrid mode at Videoconference hall of Silver Jubilee Building, DCR, Puttur and through Zoom platform. Dr. Shamsudheen M, Member Secretary, IRC welcomed the Chairman, members of IRC and the resource persons. In a brief address, the Chairman, IRC, Dr.J.D. Adiga welcomed the scientists and appreciated the efforts of the scientists. The scientists presented the achievements made under various ongoing projects and presented some new project proposals also. The summary of projects presented in IRC and approvals are given below.

Section	Ongoing institute projects presented	Ongoing external projects presented	Ongoing activity presented	New projects approved	New activity approved	Project concluded in 36 th IRC	External projects concluded	Total institute projects approved for 2023-24 = (a+d)-f	Activity concluded	Total activity for FY 2023-24 = (c+e)-i	Total External projects 2023-24 (b-g)
	a	b	c	d	e	f	g	h	i	j	k
Crop Improvement	9	1			2			9		2	1
Crop Management	11	3	1	1	3			12		4	3
Crop Protection	6	1	1					6		1	1
Post Harvest Technology / Food Technology	8		1	1	1	2		7		2	
Transfer of Technology	2	4						2			4
Total	36	9	3	2	6	2		36		9	9

Institute Management Committee (IMC) Meeting

The 52nd meeting of the IMC was held on 22nd November 2023 under the Chairmanship of Dr. J. Dinakara Adiga, Director, ICAR-DCR, Puttur. The Chairman informed the members about research and achievements of the Directorate. Various administrative and financial matters were discussed and finalized. Director Dept. of Horticulture Govt, of Karnataka, Lalbagh, Bangalore, Karnataka; Director Dept. of Agricultural Development and Farmers Welfare Government of Kerala, Vikas Bhavan, Thiruvananthapuram -33 ; Vice-Chancellor , Keladi Shivappa Nayak , University of Agricultural & Horticultural Sciences Iruvakkki, Sagar Taluk, Shivamogga,574412 Karnataka; Dr.VB Patel, ADG, Fruit & Plantation Crops, ICAR, New Delhi; Dr. M K Rajesh, Head, ICAR-CPCRI, Regional Station, Vittal – 574243, Karnataka; Dr. Arun Kumar Sit, Principal Scientist & Scientist-in-charge, ICAR-CPCRI. Research Centre, Mohitanagar, West Bengal; Dr. D K Singh, Professor & Principal Scientist, Division of Agricultural Engineering, IARI, New Delhi – 110 0012; Dr. Om Prakash Awasthi Head, Divn. of Fruits & Horticulture Technology IAR, New Delhi; Mr. Ram Avtar Parashar, Chief Finance & Accounts Officer/ICAR-CPCRI, Kasaragod, Kerala; Mr. K K Sasi, Asst. Finance & Accounts Officer, ICAR-DCR, Puttur; Mr.K.R.Nithianandan, Administrative Officer, ICAR-DCR, Puttur, attended the meeting.

Institute Joint Staff Council (IJSC)

The XI IJSC meeting was held on 29.08.2023 under the chairmanship of Dr. J. Dinakara Adiga, Director, ICAR-DCR, Puttur. The following members were present in the meeting

1	Dr. J. D. Adiga, Director	Chairman
2	Dr. Mohana G. S.	Member, official side
3	Shri. Muralikrishna K.	Member, official side
4	Shri. Sasi K. K.	Member, official side
5	Smt. Leela M.	Secretary, Staff side
6	Smt. Reshma K	Member, Staff side
7	Ms. Winnie Lobo	Secretary, Staff Side
8	Shri. Bojappa Gowda	Member, Staff side
9	Shri. Vijaya Achary	Member, Staff side
10	Shri. T Padmanabha	Member, Staff side

Institute technology management committee (ITMC) meetings:

During July-December 2023, four ITMC meetings were conducted in the presence of Dr.J.D. Adiga, Director, Chairman of ITMC ICAR-DCR, Puttur and the members of the ITMC committee for the discussions of activities related ITMU and to identify the technologies ready for the commercialization.



6. TRANSFER OF TECHNOLOGY

Advisory visits/Consultancies/Lectures delivered/Exhibitions

Dr. Balasubramanian	Lecture delivered on advanced technologies in c a s h e w processing and future thrust. in the 'Workshop on Opportunities and Challenges in Processing and Value addition of Plantation Crops' conducted by ICAR-Central Plantation Crop Research institute, Kasaragod, Kerala	2 nd to 8 th September, 2023
	Lecture delivered on transition to mechanization –boon or bane for Indian cashewnut processing system. in the 'Indian Horticultural Congresss-2023' held at College of Veterinary Science, Assam Agricultural university, Khanapara, Guwahati, Assam	6 th to 9 th November, 2023

	Lecture delivered on processing mechanism and value addition in cashew. in the 'National level training program on Cashew' conducted jointly by Kheladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga and Directorate of Cashew and cocoa Development, Cochin	6 th to 8 th September, 2023
	Lecture delivered on equipment's specification of machines in cashew processing. in the 'training of master trainers on spices and plantation crops processing' under PMFME Scheme conducted by National Institute of Food technology and entrepreneurship Management – Thanjavur (NIFTEM-T), Tamil Nadu	20 th September, 2023
	Presented on development of physical attributes-based quality index for inshell cashewnuts. in the '25th Plantation Crop Symposium' conducted at ICAR- Indian Institute of Oil palm Research Institute, Pedavegi, Eluru, Andhara Pradesh	12 th to 14 th December, 2023
Dr. Bhagya	Advisory visit taken to Rajapuram Estate, Plantation Corporation of Kerala, Panathur Post, Kasargod dist, Kerala of cashew plantation of 15 years old and old and senile plantation and juvenile plantation and given recommendation of proper canopy management by proper pruning and training and also thinning of cashew trees in between to reduce dense plantation for proper exposure of sunlight.	01 st August, 2023
Dr. Mohan G. S.	A lecture delivered on "Core collection in Cashew" was delivered for Ph. D. students of Fruit science IIHR, Bangalore	13 th September, 2023
Dr. Manjesh G N	Advisory visit taken to Rajapuram Estate, Plantation Corporation of Kerala, Panathur Post, Kasargod dist, Kerala of cashew plantation of 15 years old and old and senile plantation and juvenile plantation and given recommendation of proper canopy management by proper pruning and training and also thinning of cashew trees in between to reduce dense plantation for proper exposure of sunlight.	1 st August, 2023
	Delivered a lecture on "Cashew cultivation and Nursery management in Cashew" during the distribution of inputs to the SC beneficiaries of Dakshina Kannada district under SCSP scheme in collaboration with ICAR- KVK, Dakshina Kannada.	8 th September, 2023
	Delivered a lecture on "Scientific Cashew cultivation" during a training program on Cashew cultivation and Cashew apple utilization and promotion of Kitchen gardening cum distribution of inputs to the SC beneficiaries of Gadag district under the SCSP scheme in collaboration with ICAR-K H Patil KVK Hulkoti.	26 th September, 2023

	Delivered a lecture on Commercial nursery management and softwood grafting in Cashew organized by the National Institute of Agricultural Extension Management (MANAGE), Hyderabad in collaboration with ICAR-DCR, Puttur.	22 nd to 24 th November, 2023
Dr. Manjunath K	Acted as a resource person and delivered a lecture on drone technology and its potential applications to the SCSP/TSP trainees from ICAR-CPCRI, Regional Station, Vittal during their exposure visit to ICAR-DCR, Puttur.	3 rd November, 2023
Dr. Veena G. L.	Delivered a lecture on Cashew apple utilization during training programme on Cashew cultivation and Cashew apple utilization and promotion of Kitchen gardening cum distribution of inputs to the SC beneficiaries of Gadag district under SCSP scheme in collaboration with ICAR-K H Patil KVK Hulkoti.	26 th September, 2023
	Participated and Exhibited DCR technologies in Horti-Expo 2023 held at ICAR-IIHR, Bengaluru and showcased the DCR technologies, achievements, and activities of DCR.	17 th to 19 th October, 2023
	As a resource person delivered lecture on Value addition in cashew apple for SCSP/ TSP trainees of ICAR-CPCRI, Regional station Vittal	3 rd November, 2023
	Participated and exhibited DCR technologies at 10th Indian Horticulture Congress organized at Assam Agriculture University Guwahati	6 th to 9 th November, 2023
	Delivered a lecture on value addition of cashew nut and cashew apple during three days online training programme on Agripreneurship development through Cashew Production and Postharvest Technologies organized by National Institute of Agricultural Extension Management (MANAGE), Hyderabad in collaboration with ICAR-DCR, Puttur	22 nd to 24 th November, 2023

Radio talks/TV Programmes

Dr. Rajashekara H.	Radio talk on cashew production technologies in Community Radio Station, Sahakar Radio, Gadag	26 th September, 2023
Dr. Veena G. L.	Radio talk on value addition in Cashew apple in Community Radio Station, Sahakar Radio, Gadag	26 th September, 2023
Dr. Manjesh G. N.	Delivered a radio talk on improved varieties of cashew at Community Radio Station, Sahakar Radio, Gadag	26 th September, 2023

Exposure visit

Several farmers, input dealers, students, and other officials from various Agriculture and Horticulture Universities and Departments visited the directorate during this period. They were shown the museum, cashew nursery, and technology showcasing plots to appraise the achievements and technologies developed by ICAR-DCR. Details of the visitors are given below

S No	Name and address	Purpose of visit	Date of visit	Number of participants	Coordinators
1.	Bhavya, N and Anusha, A, College of Horticulture, Bengaluru	Study tour	31 st October 2023	2	Bhagya H P
2.	Dr. S Elain Apsara, Principal Scientist (Hort.), CPCRI RS, Vittal	Institute visit with Trainees	3 rd November 2023	18	Bhagya H P
3.	Mr. Santhosh Assistant Professor tour BESTIU, Andhra Pradesh	Educational	3 rd November 2023	3	Bhagya H P
4.	B S Mokesh Farmer, Bagalkot	Exposure visit	4 th November 2023	4	Bhagya H P & Veena G L
5.	Kushal V Gowda COH, Mudigere Karnataka	Exposure visit	29 th December 2023	13	Bhagya H P

Frontline Demonstrations on Drone Technology

Conducted twenty frontline demonstrations on drone technology for spraying agricultural chemicals, micronutrients, and organic pesticides in farmers' fields, covering 39 acres and 819 farmers participated in the programme. The demonstrations were conducted under the scheme "Drone Technology Demonstration (DTD)" funded by Central Sector Scheme of Dept. of Agriculture & Farmers Welfare, implemented through ATARI (Sub Mission on Agricultural Mechanization) with aim to create awareness about Drone applications in agriculture among the farmers, extension workers and other stakeholders.

Sl. No.	Date	Place	No. of Demonstrations	Area covered (acres)	Crop	No of participants
1.	16 th October 2023	Neechadi and Hosabale, Shivamogga (D)	5	10	Cashew	127
2.	17 th October 2023	Dombe and Shadthikere, Shivamogga (D)	5	9	Cashew	74
3.	18 th October 2023	Talavata and Chandragutti, Shivamogga (D)	5	12	Cashew	75
		Total	20	39		819








‘Front line demonstration of newly developed cashew varieties of ICAR-DCR Puttur’




A total of 10,000 (no) quality cashew grafts of four varieties viz., Nethra Ganga, Nethra Jumbo-1, Nethra Ubhaya & Bhaskara were supplied to 125 FLDs (farmers). These FLDs were taken up in three states of covering districts viz., Dakshina Kannada, Udupi, Chitradurga, Mysuru, Hassan, Haveri, Tumakuru, Gadag, Koppal, Kodagu in Karnataka, Kasaragod in Kerala and Anantpur and Parvathipuram Manyam in Andhra Pradesh.




(Drs. Eradasappa E. Mohan G. S. Aswathy C. Bhagya H. P. & Adiga J. D., ICAR - DCR, Puttur)


7. RECOGNITIONS/ AWARDS

<p>Dr. Balasubramanian D.</p>	<ul style="list-style-type: none"> ☑ Editorial member of Journal of Plantation Crops published by Indian Society of Plantation Crops, ICAR-Central Plantation Crops Research Institute, Kasaragod, Kerala for the period up to 2026. ☑ Chairman, Editorial Committee, ICAR--Directorate of Cashew Research, Puttur, D.K., Karnataka. ☑ Acted as Chairman in the selection committee for the selection of Young Professional under the Scheme on Intellectual property and Technology Management Unit, ICASR, New Delhi on 25.09.2023. 	
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Dr. Bhagya H P	<ul style="list-style-type: none"> ☑ Participated in ICAR south zone sports at ICAR-IIHR, Bengaluru during 13th to 16th December, 2023 and won silver medal in Discus throw event (Women). ☑ Reviewed research article in Euphytica journal in July 2023. ☑ Reviewed research article in International Journal of Environmental sciences and climate change in July 2023. ☑ Reviewed research article in physiology and molecular biology of plants in October 2023. ☑ Two copyrights received for technical bulletin and software in oil palm during July 2023 (Registration no- L-128689/2023 and SW-16714/2023). ☑ Reviewed Research article in international journal of plant and soil science during May and July, 2023. 	
Dr. Eradasappa E	<ul style="list-style-type: none"> ☑ Acted as Rapporteur for the International Conference Technical session IV:2nd International Conference: Prospects and challenges of environment and biological sciences in food production system for livelihood security of farmers (ICFPLS-2023) held during September 18-20, 2023 at ICAR-CIARI, Port Blair Andaman & Nicobar Islands, India. 	
Dr. Jyoti Nishad	<ul style="list-style-type: none"> ☑ Inducted into PG faculty as faculty member of regional academic hubs of IARI- Bengaluru hub of ICAR-IARI in Food Technology 	
Dr Manjesh G. N.	<ul style="list-style-type: none"> ☑ Bagged best oral presentation award for presenting the paper entitled “Growth and Maturity of Cashew Nut and Apple in Relation to Climate Variables and Modified Biologische Bundesantalt, Bundessortenamt, and Chemische Industrie (BBCH) Scale” at 5th International Conference on “Sustainable Natural Resource Management under Global Climate Change”, November 7-10, 2023, Soil Conservation Society of India, New Delhi, India. ☑ Acted as Jury Member for evaluation of posters presentation at the international seminar on Exotic 	

	<p>and underutilized horticultural crops: Priorities and emerging trends from 17th to 19th October 2023, organized by ICAR-IIHR, Bengaluru.</p> <ul style="list-style-type: none"> ☑ Received DGCA-Certified Remote Pilot Certificate with certificate No. PC092300005MV for the ROTORCRAFT Unmanned Aircraft System (UAS) to fly the small class UAV in the visible line of sight (VLOS) on 24 September 2023. 	
<p>Dr. Manjunatha K.</p>	<ul style="list-style-type: none"> ☑ Member of the board of studies for the Dept. of Agricultural Engineering, Alvas Institute of Engineering & Technology, Moodabidri for crafting the curriculum and syllabus and to give insights into the latest technological advancements in the field of Agricultural Engineering (FMP) from 04.12.2023. ☑ Acted as an Expert for selection of Young Professional-I held on 20.12.2023 at ICAR-DCR, Puttur. ☑ Acted as a technical expertise on experiment on Drone based spraying of fungicides and fertilizers for the management of leaf spot disease of arecanut at ICAR-CPCRI, Vittal on 08.12.2023. ☑ Acted as an expert to purchase Drones under the ICAR Kisan Drone Scheme at ICAR-CPCRI, Kasaragod on 20.02.2023. 	
<p>Dr. G.S. Mohana</p>	<ul style="list-style-type: none"> ☑ Best oral presentation award for the paper on 'Cashew Protect: Problems and Prospects of developing an AI based app for identification of pests, diseases and nutrient deficiencies in cashew" in the ICT session of the national level Plantation Crop Symposium (PLACROSYM) – 25. This was conducted by Indian Society of Plantation crops at IIOPR, Pedavegi, Andhra Pradesh during December 12 to 14, 2023. 	
<p>Dr. Rajashekara, H</p>	<ul style="list-style-type: none"> ☑ Inducted into PG faculty as faculty member of regional academic hubs of IARI- Bengaluru hub of ICAR-IARI in Plant Pathology. ☑ Acted as reviewer in peer reviewed journals of Plant Pathology like Crop Protection, European Journal of Plant Pathology and Journal of Plant Pathology for the reporting period ☑ Acted as member for selection of apprentice for different sections of ICAR-DCR, Puttur on 21.11.2023 ☑ Nominated as member in selection of YP-II for biotechnology on 11.12.2023 	

<p>Dr. Shamsudheen M</p>	<ul style="list-style-type: none"> ☑ Served as Rapporteur during the 5th International Conference on Sustainable Natural Resources Management under Climate Change during 7-10 November 2023 at ICAR-NASC Complex, New Delhi organized by the Soil Conservation Society of India 	
<p>Dr. Siddanna Savadi</p>	<ul style="list-style-type: none"> ☑ Received DCR Best Publication Award-2023 instituted by the Directorate for the research article 'De novo transcriptome assembly and its utility in development and characterization of the first set of genic SSR markers in Cashew' published in Industrial Crops and Products journal. 	
<p>Dr. Vanitha K</p>	<ul style="list-style-type: none"> ☑ Received 'Kanwar Virender Singh Memorial All India Best publication award – 2022' during 2023 for the research paper, Artificial nests conserve important native bees, <i>Braunsapis</i> spp. pollinating cashew. <i>Current Science</i>, 121 (1): 127-132. ☑ Bagged first oral presentation award for the paper 'Role of <i>Apis cerana indica</i> on cashew yield and quality on comparison with a native bee, <i>Braunsapis mixta</i>' presented in the 2nd International Conference on 'Prospects and challenges of environmental and biological sciences in food production system for livelihood security of farmers (ICFPLS-2023), during 18-20 September, 2023 at ICAR-CIARI, Port Blair, Andaman and Nicobar Islands, India. ☑ Received 'Women Scientist Award' by Pragathi International Scientific Research foundation conferred during 2nd International Conference on 'Prospects and challenges of environmental and biological sciences in food production system for livelihood security of farmers (ICFPLS-2023), 18-20 September, 2023 at ICAR-CIARI, Port Blair, Andaman and Nicobar Islands, India. ☑ Awarded 'Plant Protection award - 2023' by Insect Environment Journal & AVIAN Trust, Bengaluru. ☑ Acted as member in the selection committee of YP- II for AKMU (Networking and hardware) work held on 29.12.2023 at ICAR-DCR, Puttur ☑ Served as external examiner for the qualifying viva-voce for three M.Sc. Students and one Ph.D. student of College of Agriculture, Padannakad held on 18.10.2023 at College of Agriculture, Padannakad (KAU), Kasargod 	

	<ul style="list-style-type: none"> ☑ Inducted into PG faculty as faculty member of regional academic hubs of IARI- Bengaluru hub of ICAR-IARI in Agricultural Entomology 	
Dr. Veena G L	<ul style="list-style-type: none"> ☑ Acted as Jury Member for evaluation of posters presentation at international seminar on Exotic and underutilized horticultural crops: Priorities and emerging trends from 17th to 19th October 2023, organized by ICAR-IIHR, Bengaluru ☑ The technology, Cashew Apple Crisp has received ICAR certificate (No. ICAR-HS-DCR- Product-2023-021) on 16 July 2023. ☑ Acted as rapporteur for in international seminar on Exotic and underutilized horticultural crops: Priorities and emerging trends from 17th to 19th October 2023, organized by ICAR-IIHR, Bengaluru ☑ Acted as Reviewer for an International Journal Emergent Life sciences Research 2023. ☑ Acted as thesis evaluator for the thesis entitled "Standardization of Harvesting stage and pretreatment for dehydration of tender jack" from University of Agriculture and Horticultural Sciences Shimoga. ☑ Inducted into PG faculty as faculty member of regional academic hubs of IARI- Bengaluru hub of ICAR-IARI in Fruit Science Received Best Oral presentation award entitled "Nutritionally Enriched Cashew Apple and Finger Millet Flour Based Extrudates" in 10th Indian Horticultural Congress organized at Assam Agricultural University Guwahati 2023 by Indian Academy of Horticultural Sciences Presented in session VIII on 8/11/2023 	

8. STAFF NEWS

Inter- Institutional Transfers

- Dr. V. Thondaiman, Scientist (Spices, Plantation, Medical & Aromatic Plants) lien of Technical transferred to CUTN, Tiruvarur Tamil Nadu on 14.11.2023.
- Dr. Shamsudheen M, Senior Scientist (Soil Science) transferred to Indian Institute of Spices Research, Kozhikode on 29.12.2023
- Sri. Sasi. K. K, Assistant Finance and Accounts Officer, from ICAR- CPCRI Regional station, Kayamkulam, has reported for duty to this Directorate w.e.f 18.07.2023.

Retirement

- Miss. Winnie Lobo, Assistant retired on superannuation w.e.f – 31.08.2023.
- Sri. Bhojappa Gowda. M, TO retired on superannuation w.e.f – 30.11.2023.

Appointment

Dr. Jyoti Nishad, appointed as Scientist (Food Technology) w.e.f 17.07.2023.

Distinguished Visitors

Sl. No.	Name and designation	Address	Date of visit
1.	Manjunatha Hebbar Founder & CEO,	Buoyanci Innovations	04 th October 2023
2.	Anil Koushik Chief Manager	Karnataka Bank, Mangalore	09 th October 2023
3.	Shwetha T. R	Kadur, Chikkamangaluru	27 th October 2023
4.	Dr. T. Janakiram Vice-Chancellor	Dr. Y.S.R. Horticultural University, Venkataramannagudem	30 th October 2023
5.	Satheesh, Asst. Professor	BESTIU, Andhra pradesh	03 rd November 2023
6.	Dr. Chandrakala M. Scientist	ICAR-NBSS & LUP, RC,	29 th December 2023

9. FARMERS CORNER

A Success Story of Farmer Sri. Kadamajalu Subhash Rai

Sri Kadamajalu Subhash Rai, is from Kedambady village, Puttur Taluk, in Dakshina Kannada district of Karnataka State, India. He holds a BA degree and owns 14 acres of land and cultivating 5 different cashew varieties viz., Bhaskara, VRI-3, Ullal-3, Vengurla-7 and Ullal-1 in ultra-high and normal density. Apart from cashew cultivation, he grows areca nut, coconut, pepper, rubber, and cocoa.

With the goal of planting golden crops on barren land, he started cashew cultivation in 2013 under the technical guidance of scientists from the ICAR-Directorate of Cashew Research, Puttur, D.K., Karnataka. He first planted 400 VRI-3 variety cashew plants in a square layout with a 3 x 3 meter spacing in an ultra-high-density mode on 2 acres of land. Additionally, he placed 350 Bhaskara variety plants 8 x 8 meters apart. He planted 520 Ullal-3 plants in 2014 with a 5 x 5 m spacing, then 425 Ullal-3 plants (a total of 1,695 saplings) in 14 acres of land during the year 2015.

Apart from cashew cultivation he is passionate about cultivating various crops such as areca nut, coconut, pepper, rubber, and cocoa. He is also practicing areca nut based multi cropping system, raw cashew and areca nut drying using a solar tunnel dryer, Astra Ole firewood smoke free stove which serves both cooking and water heating with just same fire, biogas production for domestic applications and managing labor scarcity through mechanization.

Sri Kadamajalu Subhash Rai's work has been acknowledged through several awards for his remarkable achievements, including Raastriya Uttama Krishika Prashasthi from DCCD, Kochi, Kerala; Uttama Thotagarika Prashasthi; Aranya Mitra Award from Karnataka State Forest Department; Honors from Puttur Taluk Kannada Sahitya Sammelana for Agriculture and Literary Service.

Numerous farmers and extension personnel frequently visit his field to learn about various crop cultivation techniques. He shares knowledge with schoolchildren, university students studying agriculture, and other farmers. Subhash Rai's hard work, devotion, and commitment have demonstrated that agriculture is a viable venture.



10. INDUSTRY NEWS

Success stories of a Cashewpreneur

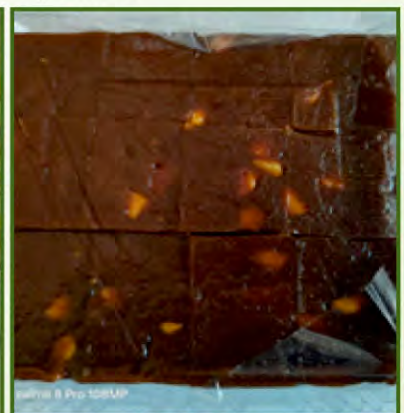
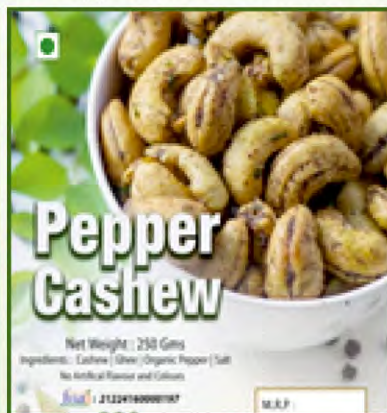
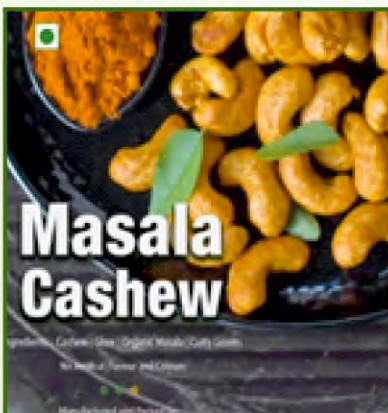
The cashew industry in India has been thriving with the country processing almost half of the global cashew kernels and consuming 40% of the global output. The success story of Mr. Ashwath Hebbar, a cashew farmer from Perdoor Village, Udipi district, is a testament to the potential of the cashew ecosystem. Ashwath, who hails from a farming background, completed his bachelor's degree and developed a passion for photography. He ran a successful studio instead with a keen interest in the cashew ecosystem, He decided to venture into the world of cashew processing business with an aim to establish in his own start-up.



Seeking guidance and support, he approached the Agri-Business Incubator (ABI) at ICAR-Directorate of Cashew Research, Puttur, to gain knowledge on processing and value addition of cashew kernels. Putting his newfound knowledge into action, he started processing raw cashewnuts during the season using ABI facility and then launched a small-scale business, offering a variety of value-added products made from cashew kernels and other fruit products. These products included different flavoured and masala-coated cashew kernels, as well as cashew apple halwa. Besides, he diversified his business by incorporating other fruits based value-added products viz., Jackfruit and Guava Halwa.

One of the unique aspects of his business is the use of homemade masalas for coating cashew kernels which impart a distinct and delightful flavour and peculiar taste that has become a signature element of his brand. The cashew apple halwa, made from a mix of different varieties such as Bhaskara, Vengurla-7, VRI-3, and UN-50, has also garnered praise for its rich taste and texture. Usually, large quantity of cashew apple discarded after detaching the nuts, but with innovative mind set a good product has been prepared out of waste. Initially, he faced challenges in selling cashew kernels, but adopted a multi-pronged approach, engaging in business-to-business (B2B) and Business-to-Customer (B2C) marketing, as well as utilizing online platforms developed for better marketing link in and around Karnataka. Today, with a brand name of 'Samagra Cashews', its food products are now in high demand in big towns and urban areas and gaining popularity in the market.

Ashwath's success has inspired many farmers in the surrounding areas of Perdoor village to switch over to cashew cultivation and start-up business in cashewnut processing. The difference due to value addition has attracted large consumers to the business. More importantly, it is highly motivating the budding entrepreneurs and farmers alike towards the potential and opportunities of the cashew industry in India.



AICRP NEWS

1. Salient achievements

AICRP Bapatla

Among the evaluated cashew germplasm the mean nut weight was found maximum in Gangavaram-1 (9.60 g) and the maximum mean annual nut yield per tree was recorded in gangavaram-3 (2.30) followed by Gangavaram-1 (2.10 kg/tree) and Gangavaram -2 (2.00 kg/ tree).The highest cumulative nut yield for seven annual harvests (88.45 kg) was recorded in H-695 followed by H-660 (40.80 Kg).



H-695 (BPP-8 × Ulla-3)



Marigold as intercrop in cashew

Intercropping cashew with marigold recorded maximum yield of 4087 Kg/ha and was superior over the rest of the treatments with Cost benefit ratio of 2.41

AICRP Hogalgere

Among the different promising varieties and hybrids evaluated for their performance in plains regions. H-11(3.98 kg/tree) and H-662 (3.87 kg/tree) performance is on par with Chintamani-1(4.49 kg/tree) which is the check variety.

Among different plant population densities being studied, 10m x 5m registered better growth and yield parameters viz., 4.28 m height, 5.48m canopy spread, 7.74g nut weight, and 8.28 kg nut yield per plant and 26.08 kg cumulative nut yield /plant.

Fipronil (2ml/l) and Chlorpyriphos (0.2%) treatments were found to be the most effective against infestation of CSRB at Hogalagere; with mean tree recovery without re-infestation being 84.40% and 75.40%, respectively.

AICRP Jhargram

One promising hybrid H-113 with cluster bearing (10 Nos/Panicle), bold nut (7.6g), high yield (16.4 kg/tree) and high shelling% (32.2%) was identified to be promising for the red and laterite zone of West Bengal





Bee Hotel

Two new products from cashew apple, i.e., cashew toffee, and cashew energy bar were released from Madakkathara center. A bee - hotel was set up to facilitate nesting of indigenous pollinators.

AICRP Vengurla

Thiamethoxam 0.2 g/l was found to be the best for the management of thrips and L - cyhalothrin 0.6 ml/l performed the best in managing tea mosquito bug.

From the co-operating Center at Old Goa, two new varieties were identified as below:

Goa Cashew 5 (Tudal -1): Selection from germplasm collected Tudal village Canacona, South Goa, Goa state having semi spreading canopy and a high nut yield (7.03 kg/tree) high shelling percentage (28.7 %) and W180-W210 kernel grade. The proposed variety has bigger and juicy apples which can provide higher Feni yield



Goa Cashew 5



Goa Cashew 6

Goa Cashew 6 (HB 21/05): Hybridization of Valpoi-7 x Tiswadi-3, resulted in a cluster bearing, high nut yield (10.28 kg/tree) over average of eight years of harvest, high shelling percentage (31.2 %) and W180-W210 kernel grade This variety also has bigger and juicy apples (78 g)

2. Book / Book chapter / Research article / Research note / Popular article

AICRP Bapatla:

Jeedimamidi totalanu asinchu purugulu-Nivarana paddathulu, Rythulokam, 54 (12) :5-6.

AICRP Bhubhaneswar:

Sethi, K., Dash, M., Panda, P. K., Mohana G. S and Adiga J. D. Assessment of adaptability of cashew varieties to changing environmental conditions of Odisha. *Scientia Horticulturae*, 324(1-9).

Gouda S., Panda, P. K., Sethi, K., Jena, C., and Panda, R.K. 2023. Influence of various mulching techniques and NAA application on flowering and nut parameters of cashew cv. BPP-8 under Odisha condition. *International Journal of Plant and Soil*, 35(23), 132-138.

AICRP Jagdalpur

Ramteke, V., Nanda, H. C., Nirala, Y. S. and Mohana, G. S. 2023. Studies on crossability in cashew (*Anacardium occidentale* L.) genotypes. Journal of Horticultural Sciences 18 (2) DOI: <https://doi.org/10.24154/jhs.v18i2.1338>

Thakur, P., Thakur, O., Ramteke, V. and Kumar, U. 2023. Evaluation of greater yam (*D. alata*) genotypes in southern Chhattisgarh for yield and yield attributing characters. International Journal of Statistics and Applied Mathematics 2023; SP-8(6): 880-883.

AICRP Madakkathara

Nasiya Beegum A.N, Asna A.C, Dr. Jalaja S. Menon. 2023. Kasumavile keedaniyanthranathinu ini mobile appum. Krishijagaran.

Meera V. Menon, S. Jalaja, menon, A.C Asna, A. N. Nasiya Beegum and Teresa Alex. Long term effect of soil nutrient management on composition and structure of weed community in a cashew plantation. Indian Journal of weed science 55(3):319-323.

A book on traditional recipes of the cashew apple and green nut (Malayalam) was published



AICRP Vengurla

Y.R. Govekar, L.S. Khapre, S.V. Deshmukh, S.S. Bhure and S.N. Pawar, effect of different bioinoculants on growth attributes of cashew grafts under nursery condition, Pharma Innovation 2023; 12(7):1846-1848.

3. NEWS AND EVENTS

a) Programmes Organized

A training programme for scheduled tribe farmers under Tribal Sub Plan programme on “Improved technology on cashew cultivation” was conducted at Chhotonakdona, Garhbeta – II, Paschim Medinipur, West Bengal in which cashew grafts were also supplied to the tribal farmers during the training.



AICRP Madakkathara

During the Golden Jubilee Celebration of Cashew Research Station, Madakkathara was inaugurated by Sri. K. Rajan, Hon'ble Minister of Land Revenue on 27th October 2023. As a part of the program two new products from cashew apple viz., Cashew Toffee and Cashew Energy Bar were launched for public sales.

AICRP Vengurla

Vengurla center has successfully organized area expansion programmes for cashew under SCSP programme in Sawantwadi tehsil, Dist. Sindhudurg.



Area expansion of cashew under SCSP programme at Adeli village, Vengurla tehsil, Dist. Sindhudurg



Area expansion of cashew under SCSP programme at Nirwade village, Sawantwadi tehsil, Dist. Sindhudurg

b) Meetings conducted (IMC/IJSC/RAC/IRC/ Hindi)

The Quinquennial Review team (QRT) under Chairmanship of Dr. T. Jankiram, Hon'ble Vice Chancellor, Dr. Y. S. R. Horticultural University, visited three centres of AICRP on Cashew and monitored the on-going research trials.



QRT Visit to Jagdalpur Center



QRT Visit to Hogalagere Center



QRT Visit to Vengurla Center

4. Tribal sub plan / SCSP/ NEH / MGMT

Under SCSP programme the area expansion with cashew grafts of recommended varieties and other providing farm inputs was taken up by Bapatla, Hogalagere, Jhagram and Vengurla Centers.

Farmers training on the topic entitled “Hi-Tech cashew cultivation” has been organized by Bhubhaneswar Center at Jagatsinghpur. One day training programme under TSP scheme was done by Jagdalpur Center in Bastar.



Distribution of Cashew grafts and Inputs under TSP Scheme in Jagdalpur Centre



Grafts distribution under SCSP Program at Hogalagere



Planting of cashew under area expansion in SCSP programme at Jhagram



Distribution of farm implements to beneficiaries of SCSP program by Madakkathara Center.

5. Trainings organized

AICRP Bapatla

Programmes on Farmers' training on Advanced Production technology of Cashew were organised by Bapatla in Srikakulam and Vizianagaram districts



AICRP Bhubaneswar

Farmers training was conducted on “Hi-Tech cashew cultivation” at Jagatsinghpur by Bhubaneswar.

AICRP Madakkathara

DCCD funded district level seminar on cashew and famers' traininig were conducted by Madakkathara Centre in Kollam and at Cashew Research Station



AICRP Vengurla

One Day Farmers Training Programme on Cashew” in Sindhudurg



HORTSAP training on Cashew plant protection for Agricultural department staff and fix plot farmers were also organised by Vengurla Centre

6. Transfer of technology (Exhibition /FLD/PTD/e-Extension)

AICRP Bapatla

Field visits and advisories on pruning technology, problems in flowering, cultural practices to be taken up in young cashew grafts were done by Bapatla.



AICRP Vengurla

Scientist from Vengurla center demonstrated techniques of management of pest and disease of cashew at Kunkeri village, Sawantwadi tehsil, Dist. Sindhudurg

7. Advisory visits / Consultancy

AICRP Jhargram

Scientist from Jhargram center participated in “One day hand holding training programme for plantation management of farmers at different WUA under WBADMIP” Organized by WBADMIP, GOWB at Jhargram block of Jhargram district.

AICRP Madakkathara

An advisory visit to cashew plantation under Ultra high-density planting system at Thodupuzha was taken up by scientists of Madakkathara to deliver recommendations for efficient crop management.

8. Supply of planting material

Name of AICRP center	No. of cashew grafts provided
Bapatla	30647
Bhubaneswar	10510
Hogalagere	800
Jhargram	2460
Madkkathara	40113
Vengurla	9051
TOTAL	93581

9. Visit of dignitaries

Visit of Dr Vikramaditya Pandey;
Principal Scientist, (Hort. Science Division),
ICAR, New Delhi to CRS, Bhubaneswar



10. Any other relevant information

Ph.D. research work entitled “A ready to serve beverage obtained by standardizing and enriching of cashew apple juice with other juice powder - a method for manufacturing the same” of Dr. K. Umamaheswara Rao, Senior Scientist (Hort.) & Head was published in the Indian Patent Office Journal.



भाकृअनुप
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