ALL INDIA COORDINATED RESEARCH PROJECT ON CASHEW

PROCEEDINGS OF THE ANNUAL GROUP MEETING

OF

SCIENTISTS OF AICRP-CASHEW

Online meeting through Zoom

5-6th, DECEMBER 2021

ICAR - DIRECTORATE OF CASHEW RESEARCH

PUTTUR-574 202, D.K., KARNATAKA

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ACKNOWLEDGEMENT

The Annual Group Meeting of All India Coordinated Research Project on Cashew was held virtually from 5 to 6th December, 2021. AICRP research workers and progressive farmers have participated in this meeting.

I hereby express my deep sense of gratitude to Dr. A.K. Singh, DDG (Hort.), ICAR for his kind advice and suggestions in organizing this Annual Group Meeting of Scientists of AICRP on Cashew-2021. I place on record my thanks to the authorities of the ICAR, New Delhi for their support in conducting meeting.

I am extremely thankful to Dr. B.K. Pandey, ADG (Hort- II), ICAR for inaugurating the AGM Meeting 2020. My thanks are due to Dr. M.R. Dinesh, Former Director, ICAR-IIHR for the Crop Improvement Session, Dr. Ravi Bhat, Principal Scientist, ICAR-CPCRI for chairing the Crop management session and Dr. P.S. Bhat, Former Principal Scientist (Ento.), ICAR-IIHR for chairing the Crop Protection session and Dr. Venkatesh Hubballi, Director, DCCD, Kochi for chairing the Interactive Session. My heartfelt thanks are also due to all the rapporteurs of different sessions.

I thank all the scientific colleagues from the Coordinating Centers and ICAR-DCR for their participation and cooperation in making this Annual Group Meeting a success. My sincere thanks are also due to Dr. Mohana G.S., Scientist-in-charge (PC Cell) & Smt. Reshma K, PA for their immense support extended in organizing this group meeting.

[TN RAVIPRASAD]

Puttur
Date : 1.1.2022

Director (Acting) &
Project Coordinator (Cashew)

PROGRAMME

ANNUAL GROUP MEETING OF AICRP ON CASHEW-2021

Venue: Virtual Meeting through Zoom

Date: 5-6th December, 2021

Join Zoom Meeting

https://us02web.zoom.us/j/89511454280?pwd=VUJmU0xYeHlUUVBwOWlqVTdyY29mQT09

Meeting ID: 895 1145 4280

Passcode: 356451

5.12.2021 (9.30 AM)		
INAUGURAL SESSION		
Welcome & Project Coordinator's Report	:	Dr. TN Raviprasad, Director (Acting), ICAR-DCR, Puttur
Chief Guest's Address	:	Dr. A.K. Singh, DDG (Hort.), ICAR, New Delhi
Address by Guest of Honour	:	Dr. B.K. Pandey, ADG (Hort-II.), ICAR, New Delhi
Rapporteurs	:	Dr. R.C. Gajbhiye, RFRS, Vengurla Dr. P.K. Panda, OUAT, Bhubaneshwar
TECHNICAL SESSIONS		
10.00 AM		
Presentation of Action Taken Report	:	Dr. Mohana G.S., Pr. Scientist (Gen. & Cytogen.) and SIC (PC Cell), ICAR-DCR, Puttur
TECHNICAL SESSION-I	:	**CROP IMPROVEMENT**
Chairman	:	Dr. M.R. Dinesh, Former Director, IIHR, Bengaluru
Rapporteurs	:	Dr. Kabitha Sethi, OUAT, Bhubaneshwar Dr. Naveen Puttaswamy, Kanabargi center
Presentation of Reports on Crop Improvement by Scientists of AICRP-Cashew		

5.12.2021 (2.00 PM)		
TECHNICAL SESSION II	:	**CROP MANAGEMENT**
Chairman	:	Dr. Ravi Bhat, Principal Scientist, CPCRI, Kasaragod
Rapporteurs	:	Dr. Jaleja Menon, CRS, Madakkathara Dr. Mini Poduval, AICRP, Jhargram
Presentation of Reports on Crop Management by Scientists of AICRP Cashew		

6.12.2021 (9.30 AM)		
TECHNICAL SESSION III	**:**	**CROP PROTECTION**
Chairman	**:**	Dr. P.S. Bhat, Former Principal Scientist, IIHR, Bengaluru
Rapporteurs	**:**	Dr. Nirala Y.S., AICRP-Jagdalpur Dr. Ashwath Narayana Reddy, AICRP, Hogalagere
Presentation of Reports on Crop Protection by Scientists of AICRP-Cashew		
6.12.2021 (1.30 PM)		
TECHNICAL SESSION-IV **Brainstorming session on achieving self sufficiency in cashew: The way forward – Interaction between Development Departments, Research Centers and Farmers**		
Chairman	**:**	Dr. Venkatesh Hubballi, Director, DCCD, Kochi
Rapporteurs	:	Dr. Vikas Ramteke, AICRP Jagdalpur Dr. Meera Manjusha, AICRP Pilicode
Discussion by participants of various development departments		
Variety Release proposals		
PLENARY SESSION		
Chairman	**:**	Dr. B.K. Pandey, ADG (Hort-II.), ICAR, New Delhi
Presentation of Rapporteur's reports	**:**	By Rapporteurs
Vote of Thanks	**:**	Dr. Mohana G.S., Scientist-in-charge, PC Cell, ICAR-DCR, Puttur

PROCEEDINGS OF INAUGURAL SESSION

At the outset, Dr. T. N. Raviprasad, Director (Acting) & Project Coordinator (AICRP-C), ICAR-DCR, Puttur welcomed the dignitaries and all the scientists of DCR and AICRP centres. In his Project Coordinator's report, he presented the achievements of different AICRP centres on crop improvement, crop management and crop protection experiment during the last year and highlighted on graft production and extension activities executed by different AICRP centres.

The guest of honour of inaugural session Dr. B. K. Pandey, ADG (Hort.-II), ICAR, New Delhi in his address emphasized on how to increase the production and productivity of cashew through effective nutrient management by fertigation, drip irrigation and pest management etc. He also stressed upon proper survey and collection of good germplasm of cashew available in different cashew growing regions of India to avoid the duplication. He opined that organic cashew cultivation is a better option particularly in hilly and tribal regions. He urged upon the AICRP scientists not to use the banned pesticides in cashew and requested ICAR-DCR, Puttur to develop and design a template for uniform data presentation by the AICRP scientists. As large number of datasets have been generated, a common platform needs to be developed to host this data for easy access by individuals. He also requested cashew scientists to demonstrate and disseminate the developed technologies through KVKs and line departments to reach farmers.

Dr. A. K. Singh, DDG (Hort.) ICAR, New Delhi, Chief Guest of the session appreciated the efforts of scientists for developing technologies on various aspects viz., cashew cultivation, pest and disease management as well as preparation of different value-added products from cashew for the benefit of the farmers. He urged the scientists to identify the need of the country and accordingly develop suitable technologies which are economically viable and cost effective for achieving self-sufficiency in cashew production. He also emphasized on the following points for increasing the production and productivity of cashew in the country.

a) Development of varieties responsive to climate change
b) Production and distribution of quality planting material
c) Good management practices for resource maximization
d) Scientific management of water and nutrients etc.
e) Development of apps to solve the problem of pest and diseases
f) Effective control of pests and diseases by replacing the chemicals with biological means
g) Proper checking and validation of the technologies
h) Technologies should be more scientific and time bound
i) Harnessing the vast knowledge of experts in the field

The session was concluded with the vote of thanks by Dr. Mohana G. S., Principal Scientist and Scientist-in-Charge, PC Cell, ICAR-DCR, Puttur.

PROJECT COORDINATOR'S REPORT

Dr. T. N. Raviprasad

Director (Acting), ICAR-DCR and Project Coordinator, AICRP-Cashew

Respected Chief Guest of the today's function, the Guest of Honor and distinguished experts, scientists from AICRP-Cashew and other invitees,

I would like to express my sincere gratitude to all the dignitaries, experts and invitees for making it convenient to be here for the Annual Group Meeting of AICRP on Cashew online. I take this opportunity to express my gratefulness to Dr. A.K. Singh, DDG (Hort.) ICAR New Delhi for permitting us to host this Annual Group Meeting of AICRP on Cashew – 2021 through virtual platform.

On this occasion, I am happy to present the Project Coordinator's Report. An independent All India Coordinated Research Project on Cashew was established in the year 1986 with its headquarters at the National Research Centre for Cashew at Puttur, which has been renamed as ICAR-Directorate of Cashew Research during the year 2009. At present, AICRP on Cashew has 14 centers spread across the country in east coast, west coast and plain regions. During this year also, we could not visit the AICRP centers due to COVID. However, they have been in touch regularly through telephone and WhatsApp group.

The centers of AICRP on Cashew along with other centers working on cashew have so far developed and released 34 high yielding cashew varieties for commercial cultivation in different agro-eco-regions. The production potential of these varieties is very good and they have played a significant role in improving production of raw cashew nut in the country. The AICRP centers are working on crop management aspects such as nutrient requirement, irrigation and high and ultra high density planting systems. They also work on management aspects of pests such as TMB and CSRB in addition to their enumeration with respect to seasonal variations and made significant achievements.

I would like to emphasize some of the salient results of the work done during the year.

CROP IMPROVEMENT

The total germplasm accessions conserved at various centers is 1461. A total of 25 new germplasm accessions have been collected by different centers during the year. As for as evaluation of germplasm accessions are concerned, during the year, 92 accessions for yield and yield attributing characters have been evaluated by different centers. The trial on CNSL free accessions is under progress at Vengurle center where tender cashewnuts are in demand for culinary purposes. In the trial on performance of released varieties, BPP-4 at Bapatla, BPP-8 at Darisai, Ullal-1 at Hogalagere were found to be superior.

In the trial on hybridization and selection, a total of 125 F_1 progeneis were evaluated at different centers and many promising types are identified. 8 new cross combinations each at Jagadalpur and Madakkathara were developed resulting in 104 F_1 progenies. 4 new cross combinations are developed at Jhargram center resulting in 64 plants. A

rapid clonal hybrid evaluation trial which aims at bringing desirable characters from promising germplasm accessions is under progress at Bhubaneshwar, Madakkathara, Vridhachalam and Vengurle centers. Further, the trial on evaluation of promising bold nut, bigger size apple types and high yielding cashew genotypes is under progress in ten centers. The trial on dwarf genotypes in cashew is going to be initiated in ten centers during this year for which grafts are getting ready.

CROP MANAGEMENT

In the trial on nutrient management for yield maximization in cashew, recommended dose of fertilizers with FYM and foliar spray of major and minor nutrients gave best results in Bubhaneshwar and Hogalagere. In drip irrigation trial, irrigation at 80% cumulative pan evaporation was found to be the best in Hogalagere center. In the high density planting – observation trial, it was found that BC ratio goes on decreasing as the years advance in high density (4m x 4 m) and the reverse is true in case of normal planting (8 m x 8m) .

The intercrop marigold at Bapatla, Tomato at Darisai, Blackgram at Jhargram, China Aster Kanabargi, Arrowroot at Madakkathara, Coriander at Paria, Yardlong bean at Vengurle centers gave highest net returns in the intercropping experiment. In organic management trial, 100% N as vermicompost and biofertilizers gave highest nut yield in Bapatla center, whereas recommended dose of fertilizer with 10 kg FYM gave highest benefit ratio in Darisai, Vridhachalam and Vengurle. However, 25 % N as FYM + Recycling of organic residue + in situ green manuring green leaf manuring + Bio-fertilizers (200 g) was the best treatment at Hogalagere. Further, the trial on ultra high density planting is under progress in Bapatla, Bhubaneshwar, Jhargram, Madakkathara and Vengurle centers. In Vengurla center, 2.5m x 2.5m (S_1) spacing (1.19 t/ha) and variety VRI-3 (0.72 t/ha) were found to be superior in the second year. The trial on pruning response of different varieties is initiated in five centers.

CROP PROTECTION

L-Cyhalothrin (0.6 ml/litre) found to be more effective compared to other insecticides against TMB, Shoot tip caterpillar, Apple and nut borer, leaf miner in Jagdalpur and Vridhachalam and Thicloprid (1.5 ml/l) in Madakkathara. However, Thiomethoxam (0.2g/l) was found to be effective in Vengurle centers and Buprofezin in Paria center. As for as botanicals are concerned, Azadirachtin 1% (1 ml/l) was found effective at Hogalagere and Kanabargi, *Datura metel* decoction @ 5 % at Jagadalpur, Neem seed kernel extract @5% at Pilicode , *Datura* seed extract @ 5 % at Vengurla, spraying of combined Leaf extracts of *Adathoda, Datura, Vitex, Calotropis* and Neem at Vridhachalam were found effective against TMB with least toxicity to non target organisms.

As for as CSRB is concerned, Chloropyriphos (10ml/l) was found to be effective in Madakkathara, Vridhachalam, Hogalagere and Jagdalpur. However, Imidachloprid

(2ml/l) was effective in Bapatla center. In Vengurle centers, Fipronil gave the best results.

TRANSFER OF TECHNOLOGY

The coordinating centers of AICRP are also involved in transfer of technology activities and have produced about 3.99 lakh cashew grafts during 2021 which were distributed to cashew farmers, government and non-government organizations. Frontline demonstration plots have been laid out by different centres to disseminate the recent production techniques with backup of necessary technical guidance. It is worth mentioning that the Centres of AICRP on Cashew have conducted 50 training programmes on different aspect of cashew cultivation and management practices under SCSP, TSP and other programs in which more than 4000 farmers have participated.

I sincerely hope that all scientists of AICRP-Cashew will be earnestly implementing the approved technical programmes for their centres as well as, the decisions that are taken in this Annual Group Meeting. I would like to express my deep sense of gratitude to the Hon'ble Deputy Director General (Hort.) Dr. A.K. Singh and Dr. B.K. Pandey, Assistant Director General (Hort. Science-II) for their continued guidance and support from the Council.

Before I conclude my report, I would like to thank all my scientist colleagues of the coordinating centres of AICRP on Cashew; Directors of Research, Deans and other University authorities for extending cooperation for the effective functioning of the AICRP work in their respective centres. The financial assistance and timely help extended by Dr. Venkatesh N. Hubballi ; Director, DCCD-Cochin in conducting cashew extension and development activities is gratefully acknowledged. I sincerely acknowledge the cooperation and technical support received from my colleagues at DCR, Puttur particularly Dr. Mohana G.S., Principal Scientist & Scientist-in-charge of PC Cell and Mrs. Reshma K., Personal Assistant which has enabled me to smoothly run the day-to-day work of the Project Coordinator's Cell.

ACTION TAKEN REPORT ON THE DECISIONS OF AGM-2020

Action taken report on major recommendations of the Annual Group Meeting held during 18th & 19th Dec. 2020 through online mode was presented by Dr. Mohana G.S., Sr. Scientist (Gen. & Cytogen.) & Scientist-in-charge, PC Cell, ICAR-DCR, Puttur.

CROP IMPROVEMENT

Recommendations		Action Taken
General Recommendations :		
1.	Uniform format of data recording and reporting across the centers to be followed.	It is followed by all centers as per the experimental manual provided by DCR Puttur
2.	Experiment numbers should be uniform for all the centers for a particular experiment.	Followed by all centers
3.	Follow the DUS descriptor for reordering data in new germplasm/hybrid trials.	Followed by all centers
4.	Descriptors of the local germplasm conserved at respective centers may be developed and accessions with unique traits may be shortlisted for MLT/registration as trait specific germplasm with NBPGR.	Noted and followed by Bapatla, Jagdalpur, Jhargram and Vridhachalam Bhubaneswar: Descriptor has been developed. Accessions have been identified for important traits Madakkathara : Descriptors of local germplasm with unique traits will be developed Pilicode: Descriptor has been prepared for the germplasm. Dwarf accession will be included in the MLT Vengurla : The preparation of descriptor for 107 accessions is in progress. The cashew accession RFRS-195 is having the unique traits like early/precocious, bold tender kernel, easy to open green nut shell and low CNSL content and hence RFRS-195 is already included in MLT.
5.	Centers may take up evaluation of CNSL free genotype including RFRS 195.	Bapatla : Followed and included in the trial on CNSL free types Jagdalpur : Noted and followed Jhargram: This genotype could not be collected from RFRS, Vengurla this year. Next year it will be collected. Madakkathara : RFRS 195 and local CNSL free genotypes were collected for initiating the trial Vengurla: Evaluation of CNSL free genotype including RFRS 195 is in progress at Vengurla centre.

		Vridhachalam: RFRS 195 has been collected from vengurla centre and grafted.
6.	Thirty seed nuts to be harvested from each of the genotypes of polyclonal breeding trial to account for maximum diversity.	Followed by Bapatla, Bhubaneshwar, Jagadalpur, Madakkathara, Vengurla and Vridhachalam.
7.	While evaluating cashew apple parameters, the juice quality may also be assessed. The number of fruits per panicle may also be recorded while sampling for quality studies.	Noted and followed by Bapatla, Jagadalpur, Pilicode, Vengurla and Vridhachalam Madakkathara : Number of fruits per panicle were recorded in evaluation trial and juice quality of apple was also assessed.
8.	MLT on evaluation of dwarf genotypes should be initiated across the centres.	Will be initiated this year in Bhubaneshwar, Jagadalpur, Jhargram, Madakkathara and Pilicode Jhargram : Grafts of JGM – 282 were prepared for supplying to other centres. The land has not been cleared yet as permission from the forest department is awaited. Vridhachalam : HC-6 semi dwarf genotype has been grafted. Vengurla : H-3831 grafts are ready
	Centre - wise Recommendations	
	BAPATLA While presenting evaluation data, information on experimental design and population size should be provided	Followed and recorded
	Canopy characters may be recorded as per standard procedures.	
	Research results should be presented with more clarity to avoid confusion in Poly clonal breeding trial.	
	BHUBANESWAR Since descriptors of conserved germplasm has been published, the center may list out trait specific lines for registration/MLT.	Trait specific lines have been listed out and used for Hybridization Programme
	Care may be given to ensure proper rejuvenation of the cyclone damaged germplasm blocks.	Partially rejuvenated
	Possibility of establishing a core germplasm conservation block may be examined.	Clearing of land for laying out of the experiment has been initiated
	Possibility of planting wind breaks in the boundary of the farm may be explored to	Planting wind breaks will be taken up in the

	reduce damage due to cyclone.	coming year
	DARISAI Since cashew is a potential plantation crop of the region and has scope for area expansion, there should be greater focus on identification of varieties suitable for the region. Incidence of damage to foliage during cold season in the conserved germplasm may be documented along with the actual time of flowering initiation. Data should be presented with information on experimental design, population size and appropriate statistical analysis in each experiment.	All recommendations have been implemented.
	HOGALAGERE Data should be presented with appropriate statistical analysis in each experiment. Data on vegetative growth parameters, yield attributing traits and nut yield should be recorded as per standard procedure. Cumulative yield data should also be presented. More emphasis should be given on research activities, including local germplasm collection and recording of research data. Additional experiments, including trial on bold nuts and polyclonal breeding may be initiated.	All recommendations have been implemented.
	JAGDALPUR Compact types may be used as male parent in breeding. Genotype, HC-6 may be considered in place of VRI-1 for use in breeding programme to induce compact canopy behaviour in the hybrid progeny.	Genotypes HC-6 and HC-10 have been established in germplasm block. Crossing will be initiated in ensuing year.
	Cold tolerant genotypes may be used in the breeding programme to induce cold tolerance in the F_1 progeny. Possibility of evaluating hybrid progenies for cold tolerance in farmers field may be explored.	Progenies were developed from genotype CARS-10 (cold tolerant). Promising types will be planted in farmers' field after preliminary evaluation.
	Characterization of cashew germplasm for	Trial has been concluded.

	apple utilization should be concluded and the results should come out as recommendation	
	Evaluation of CNSL free genotypes may be taken up.	Scion sticks received from RFRS, Vengurle for the trial however, sufficient numbers successful grafts were not obtained.
	JHARGRAM Data should be presented with information on experimental design, population size and appropriate statistical analysis in each experiment.	Noted and followed.
	Two times pruning are to be imposed (1st : in the month of July & 2nd : in the month of September) instead of one time pruning in the month June in UHDP.	Two times pruning has been done for 3m X 3m spacing.
	Relative incidence of damage following hailstorm in different germplasm may be critically looked in to identify suitable lines for such conditions.	This year there was no hailstorm during the fruiting period.
	Possibility of collecting local germplasm from areas with low winter temperature may be explored.	During the current year, one germplasm has been collected from farmer's field.
	KANABARGI Data should be presented with information on experimental design, population size and appropriate statistical analysis in each experiment.	Data has been collected and analyzed statistically for each experiment and submitted.
	More emphasis should be given on research activities, including local germplasm collection and recording of research data.	This year due to Covid-19 lock down during April – May 2021, germplasm evaluation during fruiting season was not possible. Local germplasm collection (in and around Belagavi taluk) and recording research data of previous years is being done.
	Trial on UHDP may be initiated.	Trial on UHDP with 3 Varieties VRI-3, V-9 and V-4(Check) at different spacing will be initiated
	PARIA The center should focus on establishment of evaluation trials, and undertake germplasm collection activities, record scientific data and present the research results to improve the performance of the center.	All recommendations have been implemented.
	PILICODE Care should be taken while drawing inference on quality parameters and health benefit of cashew apple juice.	Will be complied with. Inferences have been drawn based on the nutrient content and published information on the benefit of nutrients

	Hybridization programme may be initiated, utilizing superior lines identified at the center for desirable traits.	Hybridization has been done and promising hybrid is being evaluated. Will be continued in following years also.
	Evaluation of CNSL free genotypes may be taken up.	Trial is not allotted for this Centre.
	MADAKKATHARA Evaluation of hybrids shouldn't be reported under Gen. 1 Germplasm collection, conservation, evaluation, characterization and cataloguing.	Evaluation of hybrids were included under Gen. 4 Hybridization and selection
	Hybrids identified for specific traits and suitable for registration as superior genetic stock with NBPGR, can be given a separate accession identity and included in the germplasm block.	Hybrids with specific traits will be included in the germplasm block with separate accession identity.
	A. semicarpus and *A. reniforme* may be planted at 10 mx10 m / 15 mx15 m, instead of 4mx 4m spacing.	*Semicarpus prainii and Semicarpus kurzii* were maintained at a higher spacing of 10 m x 10 m
	Hybridization programme to be initiated by selecting diverse germplasm/best performers as parents. Due consideration may be given for the characters like bold nut, cluster bearing and high yield while selecting germplasm as parents.	Hybridization programme has been initiated with due consideration for bigger nut and high yield cluster bearing habit
	TURA Carry forward the research work initiated by the scientists as the center is strategically very important for cashew research in NE region.	The ongoing research work has been continued in the year 2020-21
	Recording of damage to foliage during cold season in the conserved germplasm may be explored.	No severe damage observed during cold season during 2020-21
	VENGURLA F_1 progenies shouldn't be included in germplasm conservation block, unless they are given a unique identity and identified for registration as superior genetic stock with NBPGR.	Noted. No F_1 progenies are included in germplasm conservation block at AICRP-Cashew, Vengurla Centre.
	VRIDHACHALAM Trial on CNSL free genotypes may be taken up.	The trial will be initiated by collecting planting material from DCR, Puttur.
	The local germplasm conserved at the center may be explored for identification	Due to cyclone, heavy monsoon and age factor many germplasm trees have lodged. As per the

	of trait specific parental lines.	University recommendation, these germplasm trees were removed. However, grafting of these 101 accessions has been done. The grafted plants are ready for planting. As of now germplasm could not be used as parental lines.
	Hybrid HC-6 with semi-dwarf habit may be taken up for high density planting.	Will be taken up in next year.
	Hybrid HC-10 may be considered for varietal release/MLT at different centers.	Hybrid HC-10 has been grafted. The grafted plants will be distributed to different centers in due course.

CROP MANAGEMENT

General Recommendations :		
1.	It is required to assess constraints in production in each centre and to get reasons for low yield	Jhargram : 1. Disease problems. 2. Late flowering in early varieties due to excessive low temperature for longer period during winter season. 3. TMB infestation in patches. 4. Thrips damage during marble stage. 5. Sudden rise in temperature during flowering and thereby scorching of the flower panicles. Vridhachalam : Due to delayed and extensive monsoon, the yield was low.
2.	It was suggested to negotiate for a moderate spacing rather than a higher or lower spacing	Noted and followed in Bhubaneswar, Jagadalpur, Jhargram, Madakkathara, Pilicode, Vengurla and Vridhachalam
3.	The possibility of rejuvenating or replanting the senile plantation of cashew is to be worked out taking proper care in management of CSRB and TMB under top working and limb pruning	Noted and followed for Bhuvaneshwar, Jagadalpur, Madakkathara, Pilicode, Vengurla and Vridhachalam Jhargram : In top working and limb pruning trials the cut ends were treated with a combination of primer and insecticide which protected the cut ends from CSRB attack.
4.	The possibility of expansion of cashew is non-traditional area needs to be assessed**.**	Bhubaneswar : Noted Jhargram: Cashew can easily be cultivated in the all the agro climatic zones of West Bengal except Hill Zone. Madakkathara : Expansion of cashew in

		nontraditional area of state has been noticed Pilicode : Efforts are being undertaken to expand cashew to nontraditional areas in Kozhikode district by undertaking FLD under TSP and by providing planting material through the sales counter in Vengeri, Kozhikode Vengurla : Noted. The new potential area identified for cashew expansion in non-traditional area of cashew in Maharashtra such as Nashik (Igatpuri), Gondia and Gadchiroli districts. Vridhachalam : Expansion of cashew was achieved in non-traditional of Thuraiyur of Trichy district and Namakkal district.
5.	The potential of planting of three "C" s Casuarina, Cashew and Coconut to alleviate natural calamities like cyclone in the east and west coastal area was elaborated. Hence trials of longer perspective by DCR in coastal area will be effective	Noted and trial will be formulated as per the needs of the centers in the cyclone prone areas. Studies on roots and salinity tolerance is under progress at DCR, Puttur
6.	DCR may initiate trials in the sloppy areas on a longer perspective to use cashew for soil and moisture conservation by resorting to bio engineering measures	Noted and will be formulated in due course of time based on the requirement from the centers
7.	Drip irrigation trial can be taken up in representative areas only, as cashew in general is not an irrigated crop	Bhubaneswar: Drip irrigation trial has been allotted to the centre during 2021-22 and steps have been taken up for conducting the trial. Noted by Jhargram, Madakkathara, Pilicode and Vengurla centers
8.	Dynamics of microbial load at regular interval need to studied especially in organic trials	Jhargram : In earlier organic management trial microbial load was studied (fungi, bacteria and actinomycetes) Madakkathara : Microbial load in organic trial were recorded Vengurla : The total microbial count (CFU) during 2017-18 to 2020-21 was studied and included in

		the concluded report of organic trial. Vridhachalam : In organic trial, it has been followed
9.	DCR has to take policy decision in consultation with respective states for production of cashew apple beverage similar to fenny in Goa	Madakkathara : A draft proposal by the State government on the preparation of alcoholic beverages from cashew apple is under consideration for policy decision DCR has already discussed with excise department officials of Karnataka state. And we are contemplating to write to respective state's excise departments for permission to produce cashew apple beverages.
10.	Precision farming trials in cashew on holistic approach for effective utilization of natural resources may be initiated	Jhargram : Sub-soil poly mulch has been introduced in all new cashew plantations established under SCSP and TSP to utilize the soil moisture and available water resources. Madakkathara : Precision farming will be initiated wherever possible in the state as majority of the plantations are in the foothills and barren lands under rainfed conditions.
11.	Collaboration with other national and international institutions is necessary for effective research output	Jhargram : Trying to attend the international conferences whenever getting an opportunity. Madakkathara : Attempts will be made to collaborate with other national and international institutes Pilicode : The Centre is ready to collaborate with national and international institutions for effective research out put Vengurla : The MOU between DBSKKV, Dapoli and ICAR-NRC Grapes, Pune have been made for Phytochemical profiling of Cashew (African cashew of different origin and cashew varieties V-1 to V-9).
12.	In irrigation trial all the characters pertaining to nut yield and other attributes need to be included	Noted and followed by all centers

13.	In HD and UHD, application of fertilizer should be in a scientific way. The performance of border plants and inner plants should be recorded separately.	Bhubaneswar: In UHD trial, fertilizer has been applied scientifically. The performance of border and inner plants will be recorded. Jagdalpur : Noted and followed Jhargram : In HD and UHD trials fertilizer is applied per ha basis instead of per plant basis. Data has been recorded from all the plants including border and inner plants. Madakkathara : In UHD trial, fertilizers were applied as per the recommendations of KAU. Yield of both border and inner plants were recorded
14.	A trial involving pruning response of released varieties in different Centres to be taken up.	The trial has been finalized by PC cell. Jhargram : This year 100 plants were identified, provided with inorganic fertilizer for enhancing the growth as the plants were earlier (Upto 2019) under organic trial and never been fed with uniform dose of fertilizer. Next year onwards, the trial will be started from June month as per the mandate. Madakkathara : Trial on pruning response was initiated Pilicode : The trial has been laid out and treatments will be done soon Vengurla : The trial is initiated Vridhachalam : Pruning has been carried out in the released varieties
	Centre-wise Recommendations	
	BAPATLA Explore the reason for low yield in cashew in treatment with cashew as a sole crop in the intercropping trial.	Followed and recorded
	In high density trial indicate the pruning operations undertaken and how long the experiment on high density can be prolonged.	In 4 m x 4 m high density planting limb pruning was done during 2017. So far, three harvests were completed after limb pruning. Further two more harvests are to be studied.
	BHUBANESWAR Initiate drip irrigation trial considering soil moisture status.	Drip irrigation trial has been allotted to the Centre during 2021-22 and step has been taken for conducting the trial.

	Propose intercropping trial based on consumer preference and local market demand.	Intercropping trial has been allotted to the Centre during 2021-22 and steps have been taken up to start the experiment with new set of intercrops based on consumer preference and local market.
	MADAKKATHARA The initial and final soil properties, nutrient status and microbial load are to be studied in intercropping and organic management trials.	Soil properties, nutrient status and microbial load have been studied in organic management trial and intercropping trials.
	Since trial on organic management has completed seven years, the experiment can be concluded.	The experiment on organic management has been completed and hence concluded.
	In Ultra High Density planting trial, incidence of pest needs to be observed. The canopy spread may be studied in detail. Pruning may be extended up to August to skip the incidence of CSRB.	Incidence of pests and diseases were recorded and canopy spread was studied in detail. Pruning will be extended up to August.
	Since the stomatal density is more in lower surface of leaves, cashew cannot be considered as water mining crop. An observational trial may be initiated in pot culture to study the moisture extraction pattern of cashew.	An observational trial was initiated in pot culture to study the moisture extraction pattern
	VRIDHACHALAM In intercropping trial, go for pooled analysis of yield and morphological data after 3-4 years.	Intercropping of flower crops is in the 2nd year After completion of four years, the pooled data will be analyzed.
	Since eight year yield (harvest) data is available, the organic management trial can be concluded.	Pooled data has been analyzed and tabulated
	Initiate the ultra high density trial.	The project will be initiated during the next season 2022 – 23.
	VENGURLA It was recommended to conclude the organic management trial after recording one more year's yield and other growth parameter.	As per the decision, the AICRP-Cashew, Vengurla centre has concluded the trial during the year 2021 and final concluded report has been submitted
	In intercropping trial correlate the pre planting nutrient status and the soil fertility status after the harvest of crop in each year.	The data on initial soil nutrient status and soil fertility status after harvest is recorded, correlated and included in the report.

	HOGALAGERE Estimate the leaf fall and nutrient content in at least two plants in the nutrient management trial.	Data has been generated as suggested.
	Initiate the trial on ultra high density planting.	The experiment is being Initiated with VRI-3 variety
	JHARGRAM Record the crop phenology data in ultra high density planting during flowering and fruiting period and also record the B:C ratio.	Due to lock down in the state, this data could not be recorded regularly this year. This study will be done in the next flowering and fruiting season.
	KANABARGI Conclude organic and spacing trials	Both the trials have been concluded and report will be submitted to PC Cell.
	Initiate ultra high density trial	Trial on UHDP with 3 Varieties VRI-3, V-9 and V-4(Check) at different spacing will be initiated
	Promote planting of cashew grafts and discourage the farmers to plant seedling progeny	A university level training programs has been conducted for the farmers of Northern Karnataka, and are advised to go for planting varieties suitable to their location and plant grafted plants. At our research station we are producing quality grafts of cashew and selling to the farmers.
	JAGDALPUR The proposed intercropping trial can be taken up with locally important vegetable, flower, pulses etc.	The trial has been started and first year data has only been recorded which will be presented in the next AGM.
	Initiate the trial on Ultra High Density.	Efforts are being made to take experiment in new site. Search for the site to establish Cashew Research Station is going on so the all the new trails can be taken up in a separate site.
	PARIA The trial on cashew in black cotton soil may be shifted to red/ sandy loam soil	The matter has been communicated to DR for needful.
	While presenting the results, field photographs of experimental trials should be included along with appropriate tables and graphs	Suggestion incorporated
	A letter may be addressed to VC/DR to shift the cashew Centre to appropriate place with sandy loam soil	The matter has been communicated to DR for needful.
	One young scientist may be posted to facilitate / undertake allotted field trial efficiently	The matter has been communicated to DR for needful.

	DARISAI, JHARKHAND The experiments should be carried out in a systematic way and need to be presented in detail.	Has been implemented.

CROP PROTECTION

General Recommendations		
1.	Uniformity of templates for data recording across AICRP centres is to be maintained. Doses, frequency of sprays, observation intervals, recording of data (percentage/grade/numbers) should be uniform. Methodology explained in the experimental manual of ICAR-DCR should be followed.	Followed in Bapatla, Jagadalpur, Madakkathara, Pilicode, Vengurla and Vridhachalam
2.	Attempts may be made to have online entry of experimental data (Decision to be taken based on the AICRP - PC cell convenience).	PC cell has already made arrangements for this and will be implemented
3.	Details on methodology of extraction of botanicals should be provided in the reports. Addition of surfactants, if any in spray solutions need to be included in reports. Besides the crude extracts of plants, the plant extracts obtained using different polar and nonpolar solvents may also be tested against pests. The procedure may be finalized upon discussion with Entomologists at ICAR-DCR.	Noted and followed by Bapatla, Jagadalpur, Madakkathara, Pilicode, Vengurla, Vridhachalam and will be presented in AGM
4.	Commercial formulations of important botanicals if available (like *Acorus calamus*) excepting neem may also be tested for its efficacy against tea mosquito bug (TMB).	None of the center has followed this. The reasons may be explained by the Centers
5.	A formulation of *Metarhizium anisopliae* available at ICAR-CPCRI, Kasaragod can be tested for TMB in the AICRP centres. Availability of the strain for field testing has to be checked	Madakkathara: The formulation will be tested once it is available. Pilicode: The formulation will be tested once it is available.
6.	The influence of insecticides and botanicals on the pollinators of cashew has to be documented in the respective trials.	Documented by all Centers and will be presented.

7.	Field efficacy of insecticides can be analyzed using Henderson Tilton formulae, which gives information on per cent reduction over control.	Followed by Bapatla, Madakkathara, Pilicode.
8.	The insecticides proposed to be banned need to be removed from the experiments/recommendations and alternate insecticides to be included. This may be finalized upon discussion with Entomologists at ICAR-DCR, Puttur.	Madakkathara : The insecticides proposed to be banned were replaced with newer molecules upon discussion with Entomologists. Vengurla : Followed as per discussion held with Entomologists at ICAR-DCR, Puttur. Vridhachalam : Followed.
9.	Suitable transformations need to be applied for the data while analyzing. The data should be subjected to Post Hoc Test and the results need to be inferred accordingly.	Jagdalpur : Noted and followed Madakkathara : Suitable transformations have been done wherever applicable and inferred accordingly Pilicode : Data has been transformed and analyzed and subjected to Post hoc comparison and inferences are drawn accordingly using GRAPES platform developed by KAU Vengurla : Followed. The per cent incidence data has been transformed to arc sine transformations before analysis. Vridhachalam : For per cent damage arc sine $\sqrt{\text{per cent}}$ transformation and For population numbers $\sqrt{x + 0.5}$ transformation was carried out.
10.	Reaction of plant germplasm to TMB over the years needs to be analyzed and presented. Promising ones, if any must be tested across the Centres and included in resistance breeding programmes.	Bapatla : Followed Jagdalpur : Noted and followed Madakkathara : Reaction of plant germplasm to TMB over the years have been analyzed and will be presented Pilicode : Susceptibility of germplasm to TMB is being recorded as part of screening the germplasm Vengurla : No promising cashew germplasm/ varieties were found tolerant against TMB at AICRP-Cashew Vengurla Centre. Vridhachalam : Followed. Pooled 20 years

		data and included in the report.
11.	Pest distribution map (over years) for cashew pests may be developed at respective Centres and across the country based on available data to understand the changing pest scenario. Biodiversity indices can be worked out for cashew pests.	Bapatla : Pest calendar has been prepared for Andhra Pradesh Jagdalpur : Efforts are being made to develop map according to guidance of DCR Puttur Madakkathara : Attempt will be made to develop pest distribution map and biodiversity indices Pilicode : Pest distribution map (over years) for cashew pests have been developed during earlier period but has not been done recently. Vengurla : Efforts have been initiated to develop the pest distribution map of cashew. Vridhachalam : Collection of pest data is in progress.
12.	Additionally, information on influence of different TMB damage grades (1-4) on yield of cashew can be worked out. (Action: ICAR-DCR, Puttur)	It is being recorded at DCR, Puttur

	Centre-wise Recommendations:	
	HOGALAGERE The centre has reported sudden incidence of chaffer beetles on cashew apples. In this regard, the information on incidence of Chaffer beetles on other crops in nearby regions may be collected to understand the reason for upsurge of its population.	Attended
	Damage levels of apple and nut borer (ANB) have to be worked out. Detailed accounts of its biology, alternate hosts if any, scout for natural enemies can be recorded.	Attended
	Preliminary trials on insecticides efficacy on ANB need to be conducted at laboratory for ANB before taking up as field trial with many treatments. Effective ones may be tested later in other centres as well wherever apple and nut borer incidence is high.	Attended

	PARIA The centre has reported high efficacy of NAU formulation (Navsari Agricultural University, Gujarat) against TMB. Hence, the possible causes or the novelty of the NAU formulation over the existing formulation can be shared as it would benefit the other centres to think on these lines.	Novel organic liquid nutrients is a patented product of NAU, Navasari. It is prepared from banana pseudostem sap and enriched with different organic materials. Novel organic liquid nutrients is good source of plant nutrient along with growth promoting substances like cytokine, GA_3, *etc*.
	PILICODE Grading of TMB has to be rechecked for pre and post treatment observations.	Rechecked and no variation has been obtained. Grading was done by the entomologist of the station strictly in accordance with experimental manual
	Information on constituents of Kasaragod dwarf cow urine related to pest management may be collected or analyzed.	Microbial count of Kasaragod dwarf cow urine in comparison with cross-bred cow urine has been done. Constituents of Kasaragod dwarf urine could not be identified due to lack of facilities.
	VENGURLA Data on different natural enemies under treatments have to be recorded and presented.	Noted & followed. The data on natural enemies in different experiments have been recorded and presented in the report.
	VRIDHACHALAM Data transformation needs to be checked.	Followed
	Availability of effective botanical mixture (T1) for TMB may be studied, to understand its availability to the farmers.	Followed

RECOMMENDATIONS OF AGM – 2021

The major recommendations of the Annual Group Meeting of AICRP-Cashew held during 5th and 6th December 2021 are presented below.

CROP IMPROVEMENT

General decisions/recommendations to all the Centres:

1. Diversity map in cashew may be developed for survey and collection of germplasm
2. Efforts should be made for collection of trait specific and unique germplasm relying on core collection
3. Joint efforts should be made for collection of germplasm from other state with due credit to the scientist or staff involved in the work
4. Analysis of genetic variability of existing germplasm to avoided haphazard crossing
5. Screening of germplasm for tolerance/resistant to different biotic and abiotic stresses should be accelerated
6. In hybridization programme number of cross combinations should be less but number of crosses per combination should be more
7. Old data should not be presented
8. Experimental trials should be laid out with uniform planting material
9. Director, ICAR-DCR, Puttur and PC may submit a report to ADG & DDG (Hort. Sci) for closing the non performing centers.

CROP MANAGEMENT

General recommendations

1. The results of each experiments across various centers may be compiled and presented in the group meeting
2. In the experiment, on intercropping in cashew, the crops taken under cashew need to be grown as sole crop and compared with the intercropping system.
3. Under Ultra High Density Planting experiment, Spacing and varieties (NRCC- 2 and VRI- 3) should be uniform for all the centres as recommended by ICAR-DCR.
4. Correlation studies are required to be studied for yield and biomass production in UHDP experiment.
5. Soil analysis should be carried out in all experiment before laying out the experiments
6. In nutrient management trials, soil analysis should be carried out on regular basis every year
7. While compiling the data in nutrient experiments after the completion of the experiments the Physio – Chemical – Biological analysis to be included.

8. It is desirable to have economic analysis of each experiment while compiling the final results.
9. All centres should follow uniformity for recording the yield data and templates should be developed by ICAR – DCR, Puttur and circulate to the centres for recording data in uniform manner.
10. In all field experiments, nut yield may be presented uniformly as tons per hectare
11. Using the photographs taken by other centres without proper acknowledgment is a serious offence and should not be attempted henceforth.
12. ICAR-DCR should calculate economic viability of UHDP system in replacement of conventional system before recommending the system to the farmers.

CROP PROTECTION

General recommendations:

1. Technical programme of the experiments should not be modified without the knowledge of PC Cell.
2. The observation on physical parameters recorded in CSRB trial may be compiled and published.
3. Active principles in the effective treatments in botanical trial need to be worked out at the time of bringing out recommendation.

TECHNICAL SESSION I: CROP IMPROVEMENT

Chairman	:	Dr. M.R. Dinesh, Former Director, IIHR, Bengaluru
Rapporteurs	:	Dr. Kabita Sethi, Jr. Horticulturist, CRS, Bhubaneswar
		Mr. Naveen M Puttaswamy, Asst. Professor, HREC, Kanabargi, Belagavi

The technical session-I started at 9.30 AM with the introductory remarks by the Chairman and Director, DCR, Puttur. In all, there were 68 presentations in the session. The general recommendations and center wise recommendations are as follows:

Suggestions by Chairman for DCR, Puttur

1. Germplasm diversity fair needs to be conducted to obtain quality material and for promotion of farmers' variety
2. *In-situ* evaluation of germplasm for a minimum of three years may be encouraged to prevent collection of unwanted germplasm
3. Performance of F_1 progenies from different centers may be statistically analyzed to arrive at meaningful genetical studies
4. The cashew breeders of the project may be educated on the methodologies involved in selection of parents for the improvement programme
5. In perennial crops *in-situ* single plant evaluation for 8 years is enough for release of variety at state level.
6. Molecular markers for economical trait need to be developed and studied
7. Cashew apple volatile content needs to be analyzed for understanding the mechanism of tolerance /resistance of cashew to different biotic and abiotic stresses

Center wise recommendation

Bapatla

- Experiments must be concluded after completion of 6^{th} harvest or after 10^{th} year of planting
- Efforts should be taken for exploration of new areas across Andhra Pradesh for collection of germplasm

Bhubaneshwar

- Trait specific male and female parents should be selected for hybridization programme
- Number of crosses may be restricted to few as per breeding objective instead of going for large number of cross combinations
- Care should be taken for generating more number of F_1 progenies for creating maximum variability

Darisai

- Performance of the center needs to be improved

Hogalagere

- Data generated from MLTs should be analysed statistically and G x E interaction effect needs to be established
- Scions of required genotypes may be collected from different centers for laying out of the experiments

Jagdalpur

- Germplasm at the preliminary evaluation stage should not be subjected to statistical analysis
- Experiments should be maintained properly with good field boards

Jhargram

- Rechecking of the flower sex ratio using correct formula is to be done.
- Trait specific germplasm should be collected instead of going for random collection

Kanabargi

- Experiments must be concluded after completion of 6^{th} harvest or after 10^{th} year of planting
- Geo tagged photos must be used for each experiment

Madakkathara

- Grafts of genotype H-2917 should be collected from Vengurla center, which is an entry for polyclonal breeding trial
- Germplasm descriptor should be developed and published
- CNSL content of the collected germplasm needs to be quantified
- Evaluation of hybrids shouldn't be reported under Gen. 1 Germplasm collection, conservation, evaluation, characterization and cataloguing.
- Hybrids identified for specific traits and suitable for registration as superior genetic stock with NBPGR, can be given a separate accession identity and included in the germplasm block.
- *A. semicarpus* and *A. reniforme* may be planted at 10m x 10m / 15m x 15m, instead of 4m x 4m spacing.
- Hybridization programme to be initiated by selecting diverse germplasm/best performers as parents. Due consideration may be given for the characters like bold nut, cluster bearing and high yield while selecting germplasm as parents.

Paria

- Collect trait specific and unique germplasm instead of going for random collection
- All released varieties of cashew should be conserved in the gene bank
- Possibility of shifting experimental block to Dang district may be explored

Pilicode

- Characterization and cataloguing of germplasm should be completed
- Experiment CNSL free types needs to be initiated at the center

Tura

- Based on the performance of variety Bhaskara at Tura, large scale cultivation may be promoted in the state through KVKs
- Experiments are to be properly laid out instead of haphazard planting
- Full scape view of entire experimental plot need to be captured rather than single plant view
- Year of planting should be mentioned in each experiment
- Varieties need to be rechecked according to its fruit colour and other characters
- The MLT trial to be started afresh with new grafted plants of uniform age

- Director, ICAR Research Complex for NEH Region may be appraised for posting of regular staff in AICRP on Cashew, Tura center
- Carry forward the research work initiated by the scientists as the center is strategically very important for cashew research in NE region.
- Recording of damage to foliage during cold season in the conserved germplasm may be explored.

Goa

- Promising varieties may be recommended for release either through SVRC or CVRC

Vengurla

- Experiment on germplasm RFRS -195 needs to be concluded as it has completed 6 harvests
- Germplasm descriptor should be developed and published
- F_1 progenies shouldn't be included in germplasm conservation block, unless they are given a unique identity and identified for registration as superior genetic stock with NBPGR.

Vridhachalam

- Germplasm characterization and cataloguing is to be completed
- F_1 progenies evaluated since 2005 must be concluded
- The concluded report should be submitted to DCR, Puttur
- Initiation of new hybridization programme involving trait specific genotypes
- The plants of Rapid Poly Clonal hybrid evaluation trial need to be caged to avoid cross pollination from outside
- The scientists of the center are advised to contact PC Cell for implementation of trials
- Trial on CNSL free genotypes may be taken up.
- The local germplasm conserved at the center may be explored for identification of trait specific parental lines.
- Hybrid HC-6 with semi-dwarf habit may be taken up for high density planting.
- Hybrid HC-10 may be considered for varietal release/MLT at different centers.

Programmes allotted to different Centers of AICRP on Cashew for the year – 2022-23

Programmes		Centres
Gen.1.	Germplasm collection, conservation, evaluation, characterization and cataloguing	Bapatla, Bhubhaneswar, Darisai, Hogalagere, Jagdalpur, Jhargram, Madakkathara, Paria, Pilicode, Vengurle, Vridhachalam, Kanabargi, Tura and Goa
Gen.1a.	Evaluation of germplasm accessions with low CNSL content	Bapatla, Hogalagere, Madakkathara, Vengurla and Vridhachalam
Gen. 3.	Varietal evaluation trial	
	Multilocation trial–III (earlier MLT–2002) (Planted during 2003) (To be concluded)	Hogalagere
	Multilocation trial–V (performance of released varieties) (To be concluded after 6 harvests)	Bapatla, Hogalagere and Jagdalpur
	Multilocation trial–VI (Special MLT)	Darisai, Paria, Kanabargi and Tura
Gen. 4.	Hybridization and selection	Bapatla, Bhubhaneswar, Goa, Hogalagere, Jagdalpur, Jhargram, Madakkathara, Pilicode, Vengurla and Vridhachalam
	Rapid polyclonal hybrid evaluation trial	Bapatla, Bhubhaneswar, Hogalagere, Madakkathara, Vengurla and Vridhachalam
Gen. 5.	Characterization of germplasm for cashew apple (Experiments above 10 years may be concluded)	Bapatla and Pilicode
Gen. 6	Evaluation of promising bold nut, bigger size apple types and high yielding cashew genotypes	Bapatla, Bhubaneswar, Hogalagere, Jagdalpur, Jhargram, Goa, Kanabargi, Madakkathara, Pilicode, Goa, Vengurle and Vridhachalam
Gen. 7	Trial on Dwarf genotypes in cashew	Bapatla, Bhubaneswar, Hogalagere, Jagdalpur, Jhargram, Kanabargi, Pilicode, Madakkathara, Vengurle and Vridhachalam

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TECHNICAL SESSION II : CROP MANAGEMENT

Chairman : Dr. Ravi Bhat, Principal Scientist, ICAR-CPCRI, Kasaragod
Rappouteurs : Dr. Jaleja Menon, CRS, Madakkathara, KAU, Kerala
Dr. Mini Poduval, RRS, BCKV, Jhargram, West Bengal

Under crop management there were 42 experiments and 12 centres namely Bapatla, Bhubaneswar, Darisai, Jagdalpur, Jhargram, Hogalagere, Kanabargi, Madakkathara, Paria, Pilicode, Vengurla and Vridhachalam presented the results of experiments allotted during the year 2021.

Center wise recommendations

Bapatla

- B:C ratio values to be checked.
- In High Density Observational trial instead of limb pruning, diagonal thinning is recommended after 6th harvest.
- The HDP observational trial should be concluded and report should be submitted to ICAR-DCR, Puttur.

Bhubaneswar

- Organic matter and PH should not be mentioned as available nutrient and, Leaf nutrient contents should be in percentage.

Darisai

- Under split plot design, mean of main and sub plot effect should be presented in the table.
- Under Organic management trial specify T8 treatment as check.
- The photographs should be geo tagged.

Hogalagere

- In organic management trial the nutrient status of the manures applied should be measured, nutrients removed by leaf litter and recycled should be calculated.
- Economics of organic management trial should be calculated.
- The centre has to take guidance from DCR Puttur for nutrient analysis in organic trial.
- In the trial on fertilizer application in high density cashew plantations, mean of main and sub plot effect should be presented in the table along with interaction effect. In Drip irrigation trial soil moisture distribution pattern has to be studied and economics to be worked out.

Jagdalpur

- In High density planting - observational trial, T-test should be done for explaining the statistical significance.
- In drip irrigation trial, growth parameters should be recorded in initial years and presented.

Jhargram

- Inter cropping experiment should be initiated in Cashew planted under wider spacing.
- Soil analysis may be carried out in UHDP system to get the reason for low yield.

Kanabargi

- In intercropping trial, the data needs to be checked as the B:C ratio is more when cashew is grown as sole crop.
- VRI-3, NRCC- 2 and Vengurla – 9 varieties should be included in UHDP trial.
- Geo tagged photos should be presented.

Madakkathara

- The experimental results under UHDP system may be checked for CV values
- In UHDP a comparison of canopy spread v/s biomass removal may be included instead of annual canopy spread and biomass removal separately.
- The reason for low yield under UHDP may be checked and crop management practices may be adopted accordingly

Paria

- The yield of cashew plant should be critically checked.
- Under split plot design, mean of main and sub plot effect should be presented in the table.
- Price of intercrop and cashew should be given in the table.
- The experiment, on Spacing cum Fertilizer Trial should be dropped.

Vengurla

- The yield of some of the varieties in ultra-high density planting is lower than the farmer's field. Hence it was suggested to correlate the rainfall pattern and total rainfall data with the flowering and fruiting data for different varieties.

Vridhachalam

- Growth parameters for intercrops need not be studied.
- Geo tagging is necessary while presenting photographs.
- The compiled report of organic management trial should be submitted to ICAR- DCR, Puttur.
- High Density Observation trial is not required as it is already standardized for the centre.

Proposal of New experiment
Development of Cashew based cropping system

The Scientist-in-charge, Dr Mohana G.S. proposed a new experiment under crop management for developing Cashew based cropping system. An active discussion was held on the innovative proposal. It was finally decided to have a detailed discussion with experienced scientists and the region - specific combinations of crops will be decided and technical programme will be formulated accordingly.

Programmes allotted to different AICRP Cashew centers for the year – 2022-23

Programmes		Centres
Hort.1.	Nutrient management for yield maximization in cashew.	Bhubhaneswar, Hogalagere and Paria
Hort.2.	Fertilizer application in high density cashew plantations	Hogalagere
Hort.3.	Drip irrigation trial	Bhubaneswar, Hogalagere and Jagdalpur
Hort.4.	High density planting - observational trial	Jagdalpur
Hort.6.	Intercropping in cashew	Bapatla, Bhubaneswar, Darisai, Jagdalpur, Jhargram, Kanabargi, Madakkathara, Paria, Vengurla and Vridhachalam
Hort.7.	Organic management of cashew	Bapatla, Darisai and Hogalagere
Hort.8.	Spacing cum Fertilizer Trial	Darisai and Tura
Hort.9.	Evaluation of production potential of newly developed variety Jhargram-2 at different spacings.	Jhargram and Darisai
Hort.11.	Ultra high density cum Drip irrigation	Bapatla, Bhubaneswar, Hogalagere, Jagdalpur, Jhargram, Kanabargi, Madakkathara, Pilicode, Vengurle and Vridhachalam
Hort.12.	Pruning response of different cashew varieties	Hogalagere, Jhargram, Madakkathara, Vengurle and Vridhachalam

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TECHNICAL SESSION III : CROP PROTECTION

Chairman : Dr. P. Shivaram Bhat, Former Principal Scientist, IIHR, Bangalore
Rapporteurs : Dr. Yaspal Singh Nirala, Scientist (Ent.), AICRP on Cashew, Jagdalpur
Dr. N. Aswathanarayana Reddy, Scientist (Ent.), AICRP on Cashew, Hogalagere

In this session results of 39 experiments conducted at 8 different centres with different agro-climatic conditions were presented

CENTRE WISE RECOMMENDATIONS:

Bapatla Centre

- Contact Dr. K. Vanitha, Scientist (Ent.), ICAR-DCR, Puttur to develop pest distribution maps for cashew pests.
- Document of different spider population occurring in cashew ecosystem.

Bhubaneshwar

None of the entomology trials were conducted.

- Officer incharge of AICRP on Cashew suggested to take up entomology trials with the help of available entomologists.

Hogalagere

- Record spider species occurring in cashew ecosystem other than *Oxypus sweta.* Identify them to species level by using ICAR-DCR, Puttur technical bulletin/taxonomists working in this area.
- For insect taxonomic identification make use of services of ICAR-NBAIR & UAS, Bangalore.

Jagdalpur

- In chemical control trial, observations needs to be recorded at weekly intervals for pollinators.
- Cost economic analysis need to be worked out for different treatments in this trial.
- In botanical trial, ensure that the plant species included in the treatments should be available in surplus at the time of recommendations.
- Taxonomical identification pollinators of cashew need to be done.

Kanabargi

- Document different spider population occurring in cashew ecosystem.
- Taxonomic identification of thrips need to be done.

Madakkathara

- Pre-treatment data need to be recorded before taking up spray and data has to be recorded at 7 and 15 days after each spray.
- While reporting natural enemies, ensure its feeding on other host insects and those potential NEs only need to be reported.
- Take stock of earlier workers work and re-organise the data recorded.

Paria

- The content of NAU product (in botanical trial) has to be mentioned in the treatments.

Pilicode

- Composition of Kasargod dwarf cow urine including microbial analysis need to be taken up to know the active principle.
- In trials on control of TMB trial, data has to be recorded a day before treatment, 7 and 15 days after each spray separately.
- After incorporating all the suggestions submit the data to PC cell.

Vengurla

- Pre-treatment data need to be recorded before taking up spray and data has to be recorded at 7 and 15 days after each spray.
- In chemical trial data has to be re-checked especially for yield.

Programmes allotted to different AICRP Cashew centers for the year – 2022-23

Programmes		Centres
Ent.1. Chemical Control of pest complex in cashew.		
Expt 3. Evaluation of insecticides for the control of TMB and other insect pests		Bapatla, Bhubhaneswar, Jagdalpur, Jhargram, Kanabargi, Madakkathara, Paria, Vengurla and Vridhachalam.
Expt 4. Evaluation of Botanicals for the control of Tea Mosquito Bug and other insect pests		Bapatla, Hogalagere, Jagdalpur, Kanabargi, Madakkathara, Paria, Pilicode, Vengurla and Vridhachalam.
Ent. 2. Control of Cashew Stem and Root Borer		
Expt. 2. Curative trials		Bapatla, Bhubhaneswar, Hogalagere, Jagdalpur, Jhargram, Madakkathara, Vengurla and Vridhachalam.
Ent. 3.	Influence of biotic and abiotic factors on the incidence of pest complex of cashew	Bapatla, Bhubhaneswar, Hogalagere, Jagdalpur, Jhargram, Kanabargi, Madakkathara, Paria, Vengurla and Vridhachalam.
Ent. 4.	Screening of germplasm to locate tolerant / resistant types for major pests of the region	Bapatla, Bhubhaneswar, Hogalagere, Jagdalpur, Jhargram, Vengurla and Vridhachalam.

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TECHNICAL SESSION – IV : INTERACTION BETWEEN DEVELOPMENT DEPARTMENTS & RESEARCH CENTRES

Chairman : Dr. Venkatesh N. Hubballi, Director (DCCD), Kochi
Rapporteur : Mr. Vikas Ramteke, Jr. Horticulturist, SG CARS, Jagdalpur
Dr. Meera Manjusha, Jr. Horticulturist, RARS, Pilicode

In this session, the officers of line Dept., Govt. of Odisha, Andhra Pradesh, Karnataka, West Bengal; cashew entrepreneurs, farmers participated and presented their views and suggestions for development of Cashew sector in the country. Dr. Mohana G.S., Scientist-in-charge (PC Cell) made a comprehensive presentation on the issues hampering the cashew sector at various levels viz., farmers level, researchers' level, processors level and consumers level. The general recommendation emerged out of the session are as follows:

1. All AICRP centres should adopt the villages by the research station to develop into model farms as technologies and communication are not reaching the farmers.
2. Development of nondestructive sampling based moisture meter.
3. Development of mechanical device for separating nut and apple.
4. Discourage the plantation of single variety in cashew growing regions.
5. Cashew apple should be made as a part of nutritional mix which can be included in mid day meal programme.
6. Multi-cropping should be promoted in cashew for more return.
7. Awareness should be created among farmers on planting, canopy management and pest and disease management, through the line departments.
8. The high density planting (HDP) with plant population of plants 400/ ha in cashew needs to be promoted on large scale in the country to increase the production and meet the internal demand.
9. Crop insurance scheme in cashew growing areas for the farmers should be implemented.
10. Minimum support price should be fixed in cashew to encourage farmers to cultivate cashew.
11. Replanting in senile plantation should be promoted to increase the national production.

VARIETY RELEASE AND PLENARY SESSION

Chairman : Dr. B.K. Pandey, ADG (Hort.-II), ICAR, New Delhi
Co-chairman : Dr. T.N. Raviprasad, Director (Acting), ICAR-DCR, Puttur

Proposal was received by Regional Research Station, Jhargram from West Bengal for release of variety JGM-282. Dr. Mini Poduval, Scheme head of the Centre presented the variety release proposal of JGM-282 (Bonsai Kaju). This variety was identified as a pruning responsive high yielding cashew plant suitable for high and ultra-high density planting systems. After thorough discussion, it was found that there were some discrepancies with regard to yield data of the variety while evaluation under germplasm block. Further, under ultra-high density planting systems, the yield data of minimum three harvests is essential as per the standard variety release procedure. However, only two harvests data was available.

In addition to these, it was suggested by the Chairman that the current variety needs to be assessed as per the weighted score card meant for cashew varieties. Since the weighted score was not available for the variety proposed, it was suggested to develop the score card in consultation with ICAR- DCR, Puttur.

Finally, it was suggested that the variety proposal with all necessary data needs to be presented by the scientist during an interim meeting of AICRP workers which is likely to be scheduled during June 2022.

The Chairman appreciated the efforts of AICRP workers and called for concerted efforts in developing dwarf and high yielding cashew varieties. He also suggested taking up measures for improving the productivity of cashew in different agro-climatic conditions by adapting improved package of practices. He stressed the need for proper utilization of cashew fruits. Dr. TN Raviprasad, Director (Acting) thanked the Council and all the AICRP colleagues for their support and participation.

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