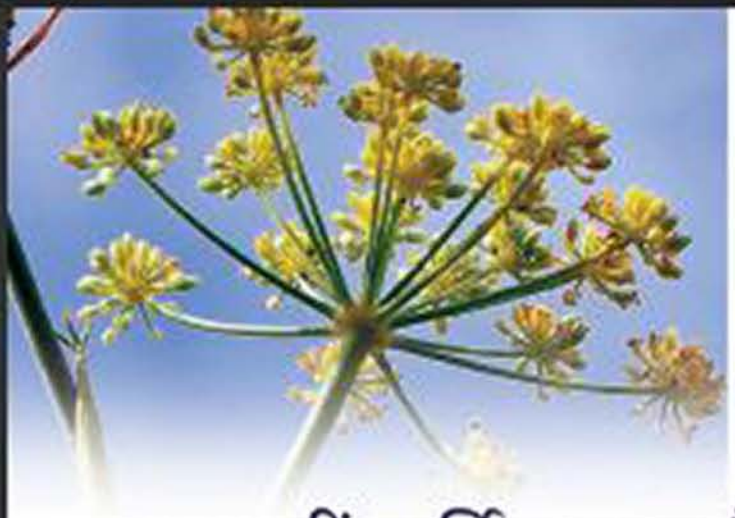

XXXII वीं वार्षिक समूह बैठक का कार्यवृत्त

Proceedings of XXXII Annual Group Meeting

भाकृअनुप-अखिल भारतीय समन्वित मसाला अनुसंधान परियोजना ए आई सी आर पी एस

ICAR-All India Coordinated Research Project on Spices

22-24 सितंबर 2021

आईसीएआर-आईआईएसआर, कोषिक्कोड

22-24 September 2021

ICAR-Indian Institute of Spices Research, Kozhikode,

भाकृअनुप-अखिल भारतीय समन्वित मसाला अनुसंधान परियोजना

ICAR- ALL INDIA COORDINATED RESEARCH PROJECT ON SPICES

भाकृअनुप-भारतीय मसाला फसल अनुसंधान संस्थान

ICAR-Indian Institute of Spices Research

कोषिक्कोड Kozhikode-673 012, केरल Kerala

PROCEEDINGS OF XXXII ANNUAL GROUP MEETING

ICAR- All India Coordinated Research Project on Spices

22 – 24 September 2021

ICAR-IISR, Kozhikode

ICAR- ALL INDIA COORDINATED RESEARCH PROJECT ON SPICES
ICAR-Indian Institute of Spices Research
Kozhikode-673 012, Kerala

November 2021

Complied & edited by
Mr. John George
Dr. Sharon Aravind
Dr. K.S. Krishnamurthy
Dr. E. Radha
Dr. J. Rema

Contents

XXXII Annual Group Meeting of ICAR-All India Coordinated Research Project on Spices

Venue: ICAR-IISR, Kozhikode (Virtual Meeting through Video Conference)

Date: 22 – 24 September 2021 (21September - Pre meeting)

Organized by: ICAR-AICRPS, ICAR-IISR, Kozhikode

INAUGURAL SESSION (10.00 AM – 11.30 AM)

10.00 AM – 10.05 AM ICAR song

10.05 AM - 10.10 AM	Welcome address	**Dr. J. Rema** Project Co-ordinator (Spices) ICAR-IISR, Kozhikode
10.10 AM - 10.20 AM	Address by Guest of Honour	**Dr. Vikramaditya Pandey** Asst. Director General (HS I) ICAR, New Delhi
10.20 AM - 10.35 AM	Presidential address	**Dr. A. K. Singh** Deputy Director General (HS), ICAR, New Delhi
10.35 AM - 11.00 AM	Inaugural address	**Prof. Jeet Singh Sandhu** Vice Chancellor, SKNAU, Jobner
11.00 AM – 11.25 AM	Felicitations	**Dr. Homey Cheriyan** Director, DASD Kozhikode **Dr. S. N. Saxena** Acting Director ICAR-NRC on Seed Spices, Ajmer
11.25 AM - 11.30 AM	Vote of thanks	**Dr. K.S. Krishnamurthy** Principal Scientist ICAR-IISR, Kozhikode
	Rapporteurs:	**Dr. Biju C. N** **Dr. M. Alagupalamuthirsolai**

TECHNICAL SESSIONS

22 September 2021

SESSION I : Genetic Resources & Crop Improvement 11.30 AM - 4.30 PM

Chairpersons: **1. Dr. E.V.D. Sastry,** Professor, CAU, Imphal
2. Dr. B. Sasikumar, Former Head, Division of CI&B, ICAR-IISR, Kozhikode
3. **Dr. J. Rema**, Director, IISR & Project Co-ordinator, AICRPS

Rapporteurs: **1. Mr. V. A. Mohammed Nissar**, ICAR-IISR, Kozhikode
2. Dr. Akshitha H. J., ICAR-IISR Regional Station, Appangala

Presentations:

1	Black pepper	Dr. V. Sivakumar, Dr. YSRHU, Chintapalle
2	Large cardamom	Dr. Amit Kumar, ICAR RC-NEHR, Regional Station, Gangtok
3	Small cardamom	Dr. Sreekrishna Bhat, ICRI, Sakhleshpur
4	Ginger	Dr. Parsuram Sial, HARS, OUAT, Pottangi
5	Turmeric	Dr. B. Senthamizh Selvi, TNAU, Coimbatore
6	Tree spices	Dr. P. C. Mali, BSKKV, Dapoli
7	Nutmeg	Dr. Mini Raj, KAU, Vellanikkara (Project Mode Centre)
8	Coriander	Dr. Shrikant Sawargaonkar, IGKV, Raigarh
9	Cumin	Dr. Surabhi S Chauhan, SDAU, Jagudan
10	Fennel	Dr. R.S. Meena, ICAR-NRC on Seed Spices, Ajmer
11	Fenugreek	Dr. K. Giridhar, Dr Y.S.R, Hort. Univ., Guntur
12	Ajwain	Dr. S.S. Meena, ICAR-NRCSS, Ajmer
13	Nigella	Dr. S.S. Meena, ICAR-NRCSS, Ajmer
14	Saffron& kalazeera	Dr. Basheer Ahamed, SKUAST, Kashmir (Project Mode Centre)

23 September 2021

SESSION II :	**Crop Management**	**9.30 AM –11.30 AM**

Chairpersons: 1. Dr. S. N. Saxena, Director, ICAR-NRC on Seed Spices, Ajmer
2. Dr. C. K. Thankamani, Head, Crop Production & PHT, ICAR-IISR, Kozhikode
3. Dr. Ankegowda S. J., Head, ICAR-IISR Regional Station, Appangala

Rapporteurs: 1. Dr. K. Anees, ICAR-IISR, Kozhikode
2. Mrs. Sona Charles, ICAR-IISR, Kozhikode

Presentations:

1	Black pepper	Dr. Airina, C. K, PRS, Panniyur
2	Small cardamom	Dr. M. Shivaprasad, ZAHRS (UAHS), Mudigere
3	Large cardamom	Dr. Amit Kumar, ICAR RC-NEHR, Regional Station, Gangtok
4	Ginger	Dr. V. Sivakumar, Dr. YSRHU, Chintapalle
5	Cumin	Dr. A. C. Shivran, SKNAU, Jobner
6	Seed spices new trial (Proj. Code: SS/CM/4.1)	Dr. A. C. Shivran, SKNAU, Jobner
7	Fenugreek	Dr. S.K. Tehlan, CCSHAU, Hisar
8	Fennel	Dr. T. P. Malik, CCSHAU, Hisar

SESSION III :	**Crop Protection**	**11.30 AM-01.30 PM**

Chairpersons: 1. Dr. S. Devasahayam, Former Head, Division of Crop Protection, ICAR-IISR, Kozhikode
2. Dr. Y. K. Sharma, Principal Scientist, ICAR-NRCSS, Ajmer
3. Dr. Santhosh J. Eapen, Head, Division of Crop Protection, ICAR-IISR, Kozhikode

Rapporteurs: 1. Dr. A. Jeevalatha, ICAR-IISR, Kozhikode
2. Dr. Balaji Rajkumar, ICAR-IISR Regional Station, Appangala

Presentations:

1	Black pepper	Dr. C. K. Yamini Varma, PRS, Panniyur
2	Small cardamom	Dr. K. A. Saju, ICRI, Myladumpara
3	Ginger	Dr. Anamika Debnath, UBKV, Pundibari
4	Turmeric	Dr. B. Mahender, SKLTSHU, Kammarpalli
5	Coriander	Dr. Ajit Kumar Singh, IGKV, Raigarh
6	Cumin	Dr. N. R. Patel, SDAU, Jagudan
8	Seed spices new trial (Project Code: SS/CP/7.1)	Sh. G. L. Kumawat, SKNAU, Jobner

SESSION IV :	Variety Release	2.30 PM–5.00 PM

Chairpersons: 1.Dr. Vikramaditya Pandey, Asst. Director General (HS I), ICAR, New Delhi
2. Dr. K. Nirmal Babu, Former PC & Director, ICAR-IISR, Kozhikode
3. **Dr. Dhirendra Singh,** Former Sr. Breeder, SKNAU, Jobner

Rapporteurs: 1. Dr. C. Sarathambal, ICAR-IISR, Kozhikode
2. Dr. M. S. Shivakumar, ICAR-IISR Regional Station, Appangala

24 September 2021

SESSION V :	Transfer of Technology	9:30 AM – 11.30 AM

Chairpersons: 1. Dr. Gopal Lal, Former Director, ICAR-NRCSS, Ajmer &Member (Agriculture),Cauvery Water Management Authority, Ministry of Jal Shakthi, GOI
2. Dr. Homey Cheriyan, Director, DASD, Kozhikode
3. Dr. A.B. Remashree, Director (Research), Spices Board, Kochi

Rapporteurs: **1. Dr. Divya P. S.**, ICAR-IISR, Kozhikode
2. Dr. Aarthi S, ICAR-IISR, Kozhikode

SESSION VI	Plenary Session	11:30 AM – 1.00 PM

Chairpersons : 1. Dr. N.K. Krishna Kumar, Former DDG (Hort.) ICAR, New Delhi & Chairman, RAC ICAR-IISR, Kozhikode
2. Dr. Indiresh K. M.,Vice Chancellor, UHS, Bagalkot

Rapporteurs : 1. Ms. R. Sivaranjani, ICAR-IISR, Kozhikode
2. Dr. Muhammed Faisal Peeran, ICAR-IISR Regional Station, Appangala

11:30 am	Presentation by Rapporteurs of different sessions	
12:00 pm	Address by the Chairpersons	**Dr. Indiresh K.M.** Vice Chancellor UHS, Bagalkot **Dr. N.K. Krishna Kumar** Former DDG (Hort.) ICAR, New Delhi& Chairman, RAC ICAR-IISR, Kozhikode
12.50 pm	Vote of Thanks	**Dr. Sharon Aravind** Scientist ICAR-IISR, Kozhikode
	National Anthem	

INAUGURALSESSION

The XXXII Annual Group Meeting (AGM) of ICAR-All India Coordinated Research Project on Spices (AICRPS) was conducted during 22-24 September 2021 at ICAR- Indian Institute of Spices Research, Kozhikode through virtual platform. The workshop was inaugurated by Prof. Jeet Singh Sandhu, Hon'ble Vice Chancellor, Sri Karan Narendra Agriculture University (SKNAU), Jobner, Rajasthan on 22 September 2021. In his inaugural address, Prof. Sandhu highlighted the necessity of holding deliberations with organizations such as Agricultural and Processed Food Products Export Development Authority (APEDA). He also emphasised the role of KVKs in popularizing technologies on seed spices and mechanization as well as strengthening research endeavours on natural pollinators like honey bees. Dr. J. Rema, Director & Project Co-ordinator (Spices), ICAR-IISR, Kozhikode welcomed the gathering and presented the achievements of different centres under AICRP on Spices and action taken report on recommendations emanated from the XXXI Group Meeting with emphasis on various on-going research activities, new initiatives and flagship programmes pertaining to NE regions, SCSP and TSP.

Dr. A. K. Singh, Deputy Director General (HS), ICAR, New Delhi presided over the function and in his presidential address, he opined that productivity of spices can be increased with strategic interventions based on innovative technologies and streamlined policy frameworks. He suggested to formulate appropriate research initiatives to unravel alterations in medicinal and nutraceutical profile of spices under fluctuating soil nutrient status, microbial dynamics and climatic variations in future. He also advised to take efforts for mapping and subsequent expansion of areas in spices particularly in non-traditional areas without imparting stress to the natural resources and also to concentrate on bio-fortification programmes in spices. Transfer of technology programmes to be further strengthened in order to bridge the gap between technologies developed and its flawless dissemination for enhancing spice production especially in Leh-Ladakh and North Eastern region. He further suggested to strengthen the existing supply chain system by amalgamating related schemes operational under the aegis of various ministries and also to develop alternative chemicals in order to minimise residue as well as toxins in spice produces for increasing the export value. He also emphasized on the development of eco-friendly technologies based on bio-pesticides.

Dr. Vikramaditya Pandey, Asst. Director General (HS I), ICAR, New Delhi was the guest of honour during the occasion. In his address, he insisted on identifying the yield gap in spice varieties cultivated across different agro-climatic zones and to develop ecological and cropping system-based technologies to achieve doubling farmer's income and also suggested to define the clear-cut stress level for drought and temperature stresses as well as to delineate the reasons for emergence of new pests and diseases in spices. He also insisted to explore the possibilities for popularizing asafoetida cultivation in India.

Ten booklets/pamphlets on spices production technologies in English and local languages from different AICRPS centres were released during the occasion and felicitations were offered to Dr. J. Rema, Dr. Santhosh J. Eapen, Dr. R. Ramakrishnan Nair, Dr. Miniraj and Dr. E. Radha, personnel due for superannuation from service and who rendered service to AICRPS for decades.

During this inaugural session, various spices-based products developed by Spizaar Private Ltd, a start-up company supported by the ITM-BPD unit under ICAR-IISR, Kozhikode, were launched for promoting business incubation.

Dr. Homey Cheriyan, Director, DASD, Kozhikode and Dr. S. N. Saxena, Acting Director, ICAR-NRC on Spices, Ajmer in their felicitation address mentioned that production and export of spices have increased during the COVID pandemic period. Dr. Homey Cheriyan emphasised on developing and publicizing package for integrated disease management in ginger and identifying suitable regions for production of high curcumin turmeric varieties. The inaugural session was concluded with a vote of thanks by Dr. K. S. Krishnamurthy, Principal Scientist, ICAR-IISR, Kozhikode.

TECHNICAL SESSION: I

GENETIC RESOURCES AND CROP IMPROVEMENT

General Recommendations:

- Unique germplasm accessions have to be registered with ICAR-NBPGR, New Delhi
- Comprehensive CVT data in two-way master table has to be presented for performance evaluation.
- Indexing of varieties based on weighted parameters should be developed for all the crops which help in short listing of best performing varieties.
- The age of the plant has to be provided while presenting yield data of perennial spices.
- All the trial data should be presented with proper statistical analysis including CD and CV values.
- PC unit may prepare a time frame for activities and it should be reviewed periodically.
- All seed spices centres have to send their samples to NRCSS, Ajmer for quality analysis.
- In all CVT in seed spices, pooled statistically analyzed data on performance of varieties over the locations have to be presented which helps in ranking of varieties.
- New trials have to be laid out only after thorough discussion to avoid ambiguity at later stages.

Specific recommendations

Black pepper

PEP/CI/1.1: Germplasm collection, characterization, evaluation and conservation (Ambalavayal, Chintapalle, Dapoli, Sirsi, Panniyur, Pundibari, Yercaud)

- Quality data (piperine, oleoresin and bulk density) has to be included along with the data on yield and yield contributing characters.
- Ecosystem surveys of different varieties i.e., carbon foot print and co-benefits of varieties may be studied.

Large cardamom

LCA/CI/1.1: Germplasm collection and evaluation of large cardamom (ICAR Regional Station, Gangtok, ICRI Regional Research Station, Gangtok)

- Centres have to initiate characterization and evaluation of existing germplasm accessions.

Ginger

GIN/CI/1.1: Germplasm collection, characterization, evaluation and conservation (Barapani, Dholi, Kammarpally, Kumarganj, Pundibari, Pottangi, Raigarh, Solan)

- All the centers should record the data on crude fibre content, dry recovery along with yield and other parameters.

- CVT can be initiated from the best performing accessions from IET for specific traits *viz.,* oleoresin, oil etc. from different centres.

Turmeric

TUR/CI/1.1: Germplasm collection, characterization, evaluation and conservation (Barapani, Coimbatore, Dholi, Guntur, Kammarpally, Kumarganj, Solan, Pasighat, Pottangi, Pundibari, Raigarh)

- Germplasm data should be collected in uniform format at all the centres.
- Data on dry recovery and curcumin content needs to be included along with morphology and yield data.

Coriander

COR/CI/2.7: Coordinated Varietal Trial on coriander 2018- Series X (Ajmer, Coimbatore, Dholi, Guntur, Hisar, Jabalpur, Kota, Jagudan, Jobner, Kumarganj, Navsari, Pantnagar, Raigarh)

- Trial is concluded and proposals pertaining to best performing varieties may be presented in the varietal release session.

Cumin

CUM/CI/2.4: Coordinated Varietal Trial – 2017 (Ajmer, Jagudan, Jobner, Mandor)

- Trial is concluded and proposals pertaining to best performing varieties may be presented in the varietal release session.

Fennel

FNL/CI/1.1 Germplasm collection, characterization, evaluation, conservation and screening against diseases (Dholi, Hisar, Jagudan, Jobner, Kumarganj)

- In germplasm evaluation trials, there should be atleast a minimum of three check varieties.

FNL/CI/2.7: Coordinated Varietal Trial on Fennel 2018– Series X (Ajmer, Dholi, Hisar, Jabalpur, Jagudan, Jobner, Kumarganj, Pantnagar)

- Trial is concluded and proposals pertaining to best performing varieties may be presented in varietal release session.

Fenugreek

FGK/CI/2.4: Coordinated Varietal Trial of fenugreek 2018– Series X (Ajmer, Coimbatore, Dholi, Guntur, Hisar, Jagudan, Jabalpur, Jobner, Kumarganj, Pantnagar, Navsari, Raigarh, Kota)

- Trial is concluded and proposals pertaining to best performing varieties may be presented in varietal release session.

Project code	Title	Centres	Comments
Black pepper			
PEP/CI/1	**Genetic Resources**		
PEP/CI/1.1	Germplasm collection, characterization, evaluation and conservation	Ambalavayal, Chintapalle, Dapoli, Sirsi, Panniyur, Pundibari, Yercaud	Continued
PEP/CI/3	**Coordinated**		
PEP/CI/3.5	CVT 2015 on Farmers varieties of black pepper– Series VII	Chintapalle, Sirsi, Panniyur, Dapoli, Yercaud	Continued
PEP/CI/3.6	CVT on blackpepper2015 – Series VIII	Chintapalle, Sirsi, Panniyur, Dapoli, Yercaud, Kahikuchi	Continued
PEP/CI/3.7	CVT 2018 on black pepper - Series IX	Ambalavayal, Chintapalle, Sirsi, Panniyur, Kozhikode, Dapoli, Yercaud	Continued
Small cardamom			
CAR/CI/1	**Genetic Resources**		
CAR/CI/1.1	Germplasm collection, characterization, evaluation and conservation	Mudigere, Pampadumpara	Continued
CAR/CI/3	**Coordinated Varietal Trial**		
CAR/CI/3.7	CVT on drought tolerance in cardamom– Series VII	Appangala, Mudigere, Sakaleshpur, Myladumpara Pampadumpara	Continued
CAR/CI/3.8	CVT 2015 on farmers varieties of cardamom- Series VIII	Appangala, Mudigere, Pampadumpara, Sakleshpur Myladumpara,	Continued
CAR/CI/3.9	CVT on hybrids of small cardamom-2018 – Series IX	Appangala, Mudigere, Sakleshpur, Myladumpara, Pampadumpara	Continued
CAR/CI/4	**Varietal Evaluation Trial (VET)**		
CAR/CI/4.4	Multi location evaluation of thrips tolerant cardamom lines	Appangala, Mudigere, Pampadumpara, Myladumpara, Sakleshpur	Continued

CAR/CI/4.5	MLT of leaf blight tolerant lines of small cardamom 2018	Appangala, Mudigere, Pampadumpara, Myladumpara, Sakleshpur	Continued
Large cardamom			
LCA/CI/1.1	Germplasm collection and evaluation of large cardamom	ICAR Regional Station, Gangtok, ICRI Regional Research Station, Gangtok	Continued
Ginger			
GIN/CI/1	**Genetic Resources**		
GIN/CI/1.1	Germplasm collection, characterization, evaluation and conservation	Barapani, Dholi, Kammarpally, Kumarganj, Pundibari, Pottangi, Raigarh, Solan	Continued
GIN/CI/2	**Coordinated Varietal Trial (CVT)**		
GIN/CI/2.5	CVT on disease tolerance in ginger	Barapani, Chintapalle, Kozhikode, Pundibari, Pottangi, Nagaland, Gangtok, Raigarh	Continued
GIN/CI/4	**Quality Evaluation Trial**		
GIN/CI/4.3	Evaluation of genotypes of ginger for vegetable purpose (observational trial)	Kozhikode, Mizoram, Gangtok, Chintapalle, Pottangi, Pundibari,	Continued
Turmeric			
TUR/CI/1	**Genetic Resources**		
TUR/CI/1.1	Germplasm collection, characterization, evaluation and conservation	Barapani, Coimbatore, Dholi, Guntur, Kammarpally, Kumarganj, Solan, Pasighat, Pottangi, Pundibari, Raigarh	Continued
TUR/CI/2	**Coordinated Varietal Trial**		
TUR/CI/2.7	CVT on mango ginger	Ambalavayal, Pottangi, Kozhikode, Dholi, Barapani, Pundibari, Raigarh, Navsari	Continued
TUR/CI/2.8	CVT on high yield and high curcumin	Kozhikode, Coimbatore, Guntur, Kammarpally, Pottangi, Kanke, Pasighat, Raigarh, Navsari	Continued
TUR/CI/2.9	CVT on light yellow colour turmeric for specialty market	Kozhikode, Coimbatore, Guntur, Kammarpally, Pottangi, Kanke, Pasighat	Continued
TUR/CI/2.10	CVT on aromatic turmeric	Kozhikode, Coimbatore,	New

	Curcuma aromatica	Kammarpally, Pottangi, Pundibari, Navsari, Kalyani, Ambalavayal, Barapani	
TUR/CI/2.11	CVT on black turmeric *Curcuma caesia*	Kozhikode, Solan, Sirsi, Coimbatore, Kumarganj, Pottangi, Pundibari, Raigarh, Navsari, Chintapalli, Mizoram	New
TUR/CI/3	**Varietal Evaluation Trial**		
TUR/CI/3.9	Initial Evaluation Trial 2018	Guntur	Continued
Tree spices			
TSP/CI/1	**Genetic Resources**		
TSP/CI/1.1	Germplasm collection, characterization, evaluation and conservation of clove, nutmeg and cinnamon	Dapoli, Pechiparai	Continued
TSP/CI/1.2	Collection of unique germplasm in tree spices	Dapoli, IISR, KAU Thrissur, Pechiparai	Continued
TSP/CI/2	**Coordinated Varietal Trial**		
TSP/CI/2.2	CVT2001-Nutmeg	Dapoli, Pechiparai	Continued
TSP/CI/2.4	Coordinated Varietal Trial on farmer's varieties of nutmeg	Dapoli, Pechiparai, KAU Thrissur	Continued
TSP/CI/5.1	Evaluation of nutmeg genotypes	KAU Thrissur	Continued
Coriander			
COR/CI/1	**Genetic Resources**		
COR/CI/1.1	Germplasm collection, description, characterization, evaluation, conservation and screening against diseases	Coimbatore, Dholi, Guntur, Hisar, Jagudan, Jobner, Kumarganj, Raigarh	Continued
COR/CI/1.3	Identification of drought/ alkalinity tolerant source in coriander	Jobner	Continued
COR/CI/2	**Coordinated Varietal Trial**		

COR/CI/2.7	Coordinated Varietal Trial of coriander 2018-SeriesX	Ajmer, Coimbatore, Dholi, Guntur, Hisar, Jabalpur, Kota, Jagudan, Jobner, Kumarganj, Navsari, Pantnagar, Raigarh	Concluded
COR/CI/2.8	Coordinated varietal trial on coriander–2021- Series XI	Ajmer, Coimbatore, Dholi, Guntur, Hisar, Jabalpur, Jagudan, Jobner, Kumarganj, Navsari, Pantnagar, Kota, Raigarh, Kalyani, Sanand	New
COR/CP/2.9	Screening of coriander varieties against stem gall disease (shifted from CP)	Dholi, Kumarganj, Kota, Hisar, Jabalpur	Continued
COR/CI/4	**Quality Evaluation Trial**		
COR/CI/4.1	Quality evaluation in coriander	Jobner	Concluded
Cumin			
CUM/CI/1	**Genetic Resources**		
CUM/CI/1.1	Germplasm collection, characterization, evaluation, conservation and screening against diseases	Jagudan, Jobner, Mandor, Sanand	Continued
CUM/CI/1.3	Identification of drought tolerance	Jobner	Continued
CUM/CI/2	**Coordinated Varietal Trial**		
CUM/CI/2.4	Coordinated Varietal Trial – 2017	Ajmer, Jagudan, Jobner, Mandor	Concluded
CUM/CI/2.5	Coordinated varietal trial on cumin–2021	Ajmer, Jagudan, Jobner, Mandor, Sanand	New
CUM/CI/4	**Quality Evaluation Trial**		
CUM/CI/4.1	Quality evaluation in cumin	Jobner	Concluded
Fennel			
FNL/CI/1	**Genetic Resources**		
FNL/CI/1.1	Germplasm collection, characterization, evaluation, conservation and screening against diseases	Dholi, Hisar, Jagudan, Jobner, Kumarganj	Continued
FNL/CI/2	**Coordinated Varietal Trial**		

FNL/CI/2.7	Coordinated Varietal Trial on Fennel 2018– Series X	Ajmer, Dholi, Hisar, Jabalpur, Jagudan, Jobner, Kumarganj, Pantnagar	Concluded
FNL/CI/2.8	Coordinated varietal trial on fennel–2021 Series XI	Ajmer, Dholi, Hisar, Jabalpur, Jagudan, Jobner, Kumarganj, Pantnagar, Navsari	New
FNL/CI/4	**Quality Evaluation Trial**		
FNL/CI/4.1	Quality Evaluation in fennel	Jobner	Concluded
Fenugreek			
FGK/CI/1	**Genetic Resources**		
FGK/CI/1.1	Germplasm collection, characterization, evaluation, conservation and screening against diseases	Dholi, Guntur, Hisar, Jagudan, Jobner, Kumarganj, Raigarh	Continued
FGK/CI/1.3	Identification of drought tolerance source in fenugreek	Jobner	Continued
FGK/CI/2	**Coordinated Varietal Trial**		
FGK/CI/2.4	Coordinated Varietal Trial of fenugreek 2018– Series X	Ajmer, Coimbatore, Dholi, Guntur, Hisar, Jagudan, Jabalpur, Jobner, Kumarganj, Pantnagar, Navsari, Raigarh, Kota	Concluded
FGK/CI/2.5	Coordinated varietal trial on fenugreek–2021 Series XI	Ajmer, Dholi, Hisar, Jabalpur, Jagudan, Jobner, Kumarganj, Navsari, Pantnagar, Kota, Raigarh, Kalyani	New
FGK/CI/3.7	Chemo-profiling for identification of industrial types among the released varieties of fenugreek	Ajmer, Coimbatore, Guntur, Dholi, Hisar, Jobner, Kumarganj	Continued
Ajwain			
AJN/CI/2	**Coordinated Varietal Trial**		
AJN/CI/2.1	Coordinated Varietal Trial-2019	Ajmer, Guntur, Hisar, Jobner, Jagudan, Kumarganj, Raigarh	Continued
Nigella			
NGL/CI/2	**Coordinated Varietal Trial**		

NGL/CI/2.1	Coordinated Varietal Trial-2019	Ajmer, Hisar, Kota, Kalyani, Kumarganj, Raigarh, Pantnagar	Continued
Saffron			
SF/CI/5.1	Conservation, evaluation and utilization of exotic and indigenous saffron germplasm lines	Pampore	Continued
Kalazeera			
KZ/CI/5.1	Exploration, collection and conservation of kalazeera from high altitudes of northern Himalayas	Pampore	Continued

TECHNICAL SESSION:II

CROP MANAGEMENT

General recommendations

- Thrust should be given on organic production and micronutrient application and their effect on quality aspects of spices
- Bio-safety and economical viability of spices needs to be linked with all experiments under crop management
- PC cell need to ensure that multi-location trials are undertaken with an uniform experimental design in all the centres
- Before finalizing the technical programme of the experiment, a consent is to be taken from the participating centers considering the facility available at respective places
- Concluded experiments should result in research articles and technologies.

Specific recommendations

Black pepper

PEP/CM/4.7: Black pepper based mixed cropping system for sustainable productivity and food security (Ambalavayal, Sirsi, Panniyur, Dapoli)

- Photographs of all experimental fields to be presented in future
- Intercrops needs to be region-specific
- Poor yield of pepper vine needs to be improved through better agronomic practices

Small cardamom

CAR/CM/5.5: Effect of micronutrients on growth and yield of small cardamom (Appangala, Mudigere, Pampadumpara, Myladumpara, Sakleshpur)

- The design of the experiment should be uniform in all centers [including only T1 (RFD) and T2 (RFD + cardamom special MN from IISR)] using three different varieties in a newly established plantation.
- Bio 20 need not be included in the experiment.

CAR/CM/5.6: Site specific nutrient recommendation for varying yield target of cardamom (Mudigere, Pampadumpara, Myladumpara, Sakleshpur)

- Chairman appreciated the uniformity of the trial imposed under the study
- Special management care needs to be taken to achieve the targeted yield along with nutrient application.

Large cardamom

LAC/CM/5.1: Effect of mulching on yield of large cardamom (ICAR Gangtok, ICRI Gangtok, Pasighat)

- Two centers (Pasighat and ICRI Gangtok) did not start the experiment yet. Hence a discussion for the future course of action needs to be initiated soon in consultation with PC cell.

Ginger

GIN/CM/4.1: Evaluation of different ginger based intercropping system for higher yield and income (Pottangi, Chintapalle, ICAR Gangtok, Solan, Dholi, Pundibari, Kanke, Nagaland, Kalyani, Mizoram)

- Leafy coriander variety to be included in place of coriander for better BC ratio.

The new trials (Use of *B.safensis* for P solubilization in ginger and turmeric, Use of *B. safensis* for Zn solubilization in ginger and turmeric, INM for ginger and turmeric) are approved in principle with following modifications

- The varieties to be used for both turmeric and ginger needs to be finalized in consultation with PC cell
- Treatments and observations to be taken needs to be finalized before executing the project

Cumin

CUM/CM/5.5: Micronutrient management in cumin (Jobner, Jagudan, Mandor and Ajmer)

- Impact of micronutrient application on quality of cumin needs to be studied

Fenugreek

FGK/CM/5.9: Standardization of drip irrigation interval and method of micronutrient fertigation in fenugreek (Ajmer, Coimbatore, Jobner, Pantnagar)

- Impact of drip irrigation and micronutrient application on quality of fenugreek needs to be studied

Fennel

FNL/CM/5.1: Response of foliar application of iron and zinc on growth, yield and quality of fennel (Jagudan, Jobner, Hisar, Dholi, Kumarganj, Mandor)

- Quality aspect of fennel including essential oil, total oil and fiber may be done at NRCSS Ajmer

Seed spices

SS/CM/4.1: Intercropping of seed spices with vegetables for higher yield and income **(**Jobner, Dholi, Kumarganj, Raigarh, Jagudan, Jabalpur**)**

- Three centers (Hisar, Mandor and Pantnagar) need not join the project as all other centers have completed first season crop.

Project code	Title	Centres	Commen
Black pepper			
PEP/CM/4.7	Black pepper based mixed cropping system for sustainable productivity and food security	Ambalavayal, Sirsi, Panniyur, Dapoli	Continued
Small cardamom			
CAR/CM/5.5	Effect of micro nutrients on growth and yield of small cardamom	Appangala, Mudigere, Pampadumpara, Myladumpara, Sakleshpur	Continued
CAR/CM/5.6	Site specific recommendation for varying yield target of cardamom.	Mudigere, Myladumpara, Pampadumpara and Sakleshpur	Continued
Large cardamom			
LAC/CM/5.1	Effect of mulching on yield of large cardamom	ICAR Gangtok, ICRI Gangtok, Pasighat	Continued
Ginger			
GIN/CM/4.1	Evaluation of different ginger based intercropping systems for higher yield and income	Pottangi, Chintapalle, ICAR Gangtok, Solan, Dholi, Pundibari, Kanke, Nagaland, Kalyani, Mizoram	Continued
GIN/CM/5.1	Evaluation of Plant Growth Promoting Rhizobacteria, *Bacillus safensis* for Phosphorus (P) solubilization potential in Ginger	Chintapalli, Kammarpally, Pundibari, Kumarganj, Solan, Kalyani, Kozhikode, Pasighat, Ambalavayal, Pottangi, Raigarh	New
GIN/CM/5.2	Evaluation of Plant Growth Promoting Rhizobacteria, *Bacillus safensis* for Zinc (Zn) solubilization potential in Ginger	Chintapalli, Kammarpally, Pottangi, Solan, Kalyani, Pasighat, Ambalavayal, Kumarganj, Raigarh, Kozhikode	New
Turmeric			
TUR/CM/5.1	Evaluation of Plant Growth Promoting Rhizobacteria, *Bacillus safensis* for Phosphorus (P) solubilization potential in Turmeric	Chintapalli, Pundibari, Raigarh, Solan, Pasighat, Kahikuchi, Coimbatore, Kammarpally, Pottangi, Kalyani, Kozhikode, Kumarganj	New

TUR/CM/5.2	Evaluation of Plant Growth Promoting Rhizobacteria, *Bacillus safensis* for Zinc (Zn) solubilization potential in Turmeric	Chintapalli, Kozhikode, Dholi, Kammarpally, Pottangi, Pundibari, Pasighat, Kahikuchi, Kanke, Coimbatore, Kumarganj, Kalyani, Raigarh	New
Cumin			
CUM/CM/ 5.5	Micro nutrient management in cumin	Jobner, Mandor, Ajmer	Continued
Fenugreek			
FGK/CM/5.9	Standardization of drip irrigation interval and method of micro nutrient fertigation in fenugreek	Ajmer, Coimbatore, Jobner, Pantnagar	Continued
Fennel			
FNL/CM/5.1	Response of foliar application of iron and zinc on growth, yield and quality of fennel	Jagudan, Jobner, Hisar, Dholi, Kumarganj, Mandor	Continued
Seed spices			
SS/CM/4.1	Intercropping of seed spices with vegetables for higher yield and income	Jobner, Dholi, Kumarganj, Raigarh, Jagudan, Jabalpur	Continued

TECHNICAL SESSION: III
CROP PROTECTION

General recommendations

- In all crop protection trials priority should be given for monitoring of pests/pathogens rather than recording of secondary data like growth parameters and yield.
- New fungicide molecules should be evaluated against major pathogens of ginger and turmeric.
- In pesticide evaluation trials, data on incidence of pollinators and natural enemies should be recorded and samples should be checked for pesticide residue, aflatoxins and artificial colouring agents.
- The concentrations of all pesticides used in various trials must be indicated in percentage taking into consideration the percentage of active ingredient in the product.
- Recommendation of pesticides should be given only after residue analysis and which should be under acceptable limits.
- Focus of new trials should be on biocontrol agents along with compatible pesticides.

Specific recommendations

Black pepper

PEP/CP/5.8: Evaluation of strobilurin fungicides and actinomycetes for the management of foot rot and slow decline in black pepper (Panniyur, Dapoli, Sirsi, Yercaud, Appangala)

- Disease incidence and pathogen and nematode populations should be recorded by all the centres.

PEP/CP/5.10: Observational trial on efficacy of *Trichoderma asperellum* and *Pochonia* for the management of *Phytophthora* foot rot and nematodes in black pepper (Sirsi, Appangala, Panniyur)

- The name *Trichoderma asperellum* should be used for *Trichoderma harzianum* strain MTCC5179 from ICAR-IISR, Kozhikode

Small Cardamom

CAR/CP/6.11: Evaluation of fungicides against rhizome rot in small cardamom (Appangala, Mudigere, Pampadumpara, Myladumpara)

- Any difficulty in purchasing or availability of fungicides should be informed to the PC Cell well in advance, so that the PC Cell will try to arrange the same. The lead centre may ensure that all the centres have taken up the spray schedule in time.
- Observations on insect pest incidence taken in fungicide trials need not be presented under this trial.

Ginger

GIN/CP/6.15: Priming of rhizomes for enhanced germination, vigour and storage rot suppression in ginger (Chintapalli, Dholi, Barapani, Kammarpally, Pundibari, Raigarh, Solan, Kalyani, Pasighat, Kanke, Nagaland, Ambalavayal)

- All centres should record the incidence of storage rot under various treatments.

Turmeric

TUR/CP/7.8: Priming of rhizomes for enhanced germination, vigour and storage rot suppression in turmeric (Chintapalli, Dholi, Kammarpally, Pundibari, Raigarh, Solan, Pasighat, Ambalavayal, Mizoram, Kahikuchi, Kanke)

- All centres should record the incidence of storage rot under various treatments.

Coriander

COR/CP/6.7: Integrated pest and disease management in coriander (Ajmer, Coimbatore, Dholi, Hisar, Jabalpur, Raigarh, Jobner, Jagudan, Kumarganj, Navsari, Pantnagar, Kota)

- Experimental data which are available uniformly across the centres may be taken for pooled analysis and the experiment may be concluded.
- Recommendations of pesticides should be given only after residue analysis and which should be under acceptable limits.

COR/CP/7.1: Screening of coriander varieties against stem gall disease (Dholi, Kumaraganj, Kota, Hisar, Jabalpur)

- The project may be shifted to/reported under the Crop Improvement section.

Cumin

CUM/CP/6.8: Integrated pest and disease management in cumin (Ajmer, Jobner, Jagudan, Mandor)

- The pesticide residue data generated should be critically examined and recommendations of pesticides should be given if they are within acceptable limits.
- Biocontrol agents which are performing on par or closer with best treatments should be reviewed for inclusion in recommendations.

Seed spices

SS/CP/7.1: Survey and monitoring of diseases and insect pests of seed spices for development of prediction models (Jobner, Jagudan, Guntur, Kumaraganj, Raigarh, Dholi, Kalyani, Sanand, Coimbatore, Kammarpally)

- Observations should be taken at weekly intervals and the species identity of insects and pathogens should be confirmed with the help of taxonomists.
- The survey should be carried out adopting standard procedures and the geographical coordinates of the surveyed areas should be recorded.

Project code	Title	Centres	Comments
Black pepper			
PEP/CP/5.8	Evaluation of strobilurin fungicide and actinomycetes for the management of foot rot and slow decline in black pepper	Panniyur, Dapoli, Sirsi, Yercaud, Appangala	Continued
PEP/CP/5.10	Observational trial on efficacy of *Trichoderma asperellum* and *Pochonia* for the management of *Phytophthora* foot rot and nematodes in black pepper	Sirsi, Appangala, Panniyur	Continued
PEP/CP/7.1	Screening of insecticides for pollu beetle, *Lanka ramakrishnai* in black pepper	Panniyur, Ambalavayal, Pampadumpara, Appangala	Continued
Small cardamom			
CAR/CP/6.11	Evaluation of fungicides against rhizome rot in small cardamom	Appangala, Mudigere, Pampadumpara Myladumpara	Continued
CAR/CP/6.12	Evaluation of fungicides against leaf blight in small cardamom	Appangala, Mudigere, Pampadumpara, Myladumpara	Continued
CAR/CP/6.13	Observational trial on the efficacy of *Trichoderma asperellum* and *Pochonia chlamydosporia* for the management of rhizome rot and nematode in small cardamom	Pampadumpara, Myladumpara	Continued
Ginger			
GIN/CP/6.15	Priming of rhizomes for enhanced germination, vigour and storage rot suppression in ginger	Chintapalle, Dholi, Barapani, Kammarpally, Pundibari, Raigarh, Solan, Kalyani, Kanke Ambalavayal Pasighat, Nagaland, Pottangi	Continued
GIN/CP/7.1	Spray schedule optimization of effective insecticides for shoot borer (*Conogethes punctiferalis*) in ginger	Pottangi, Kahikuchi, Sirsi, Mudigere, Pundibari, Mizoram, Nagaland, Pasighat, Barapani, Ambalavayal, Kanke	Continued

GIN/CP/7.2	Observational trial on the efficacy of *Trichoderma asperellum* and *Pochonia chlamydosporia* for the management of rhizome rot and nematode in ginger	Kozhikode, Chintapalli, Pottangi, Barapani	Continued
Turmeric			
TUR/CP/7.8	Priming of rhizomes for enhanced germination, vigour and storage rot suppression in turmeric	Chintapalle, Coimbatore, Dholi, Kammarpally, Pundibari, Raigarh, Solan, Pasighat, Ambalavayal, Mizoram, Kahikuchi, Kanke, Kumarganj, Pottangi	Continued
TUR/CP/7.9	Spray schedule optimization of effective insecticides for shoot borer (*Conogethes punctiferalis*) in turmeric	Pottangi, Kahikuchi, Sirsi, Mudigere, Pundibari, Mizoram, Pasighat, Barapani, Pantnagar, Kammarpally, Guntur, Ambalavayal, Kanke	Continued
TUR/CP/7.10	Observational trial on the efficacy of *Trichoderma asperellum* and *Pochonia chlamydosporia* for the management of rhizome rot and nematode in turmeric	Kozhikode, Coimbatore, Guntur, Barapani	Continued
Coriander			
COR/CP/6.7	Integrated pest and disease management in coriander	Ajmer, Coimbatore, Dholi, Hisar, Jabalpur, Raigarh, Jobner, Jagudan, Kumarganj, Navsari, Pantnagar, Kota	Concluded
Cumin			
CUM/CP/6.8	Integrated pest and disease management in cumin	Ajmer, Jobner, Jagudan, Mandor	Concluded
Seed spices			
SS/CP/7.1	Survey and monitoring of diseases and insect pests of seed spices for development of prediction models	Ajmer, Jobner, Jagudan, Guntur, Kumarganj, Raigarh, Dholi, Kalyani, Sanand, Coimbatore, Kammarpally	Continued

TECHNICAL SESSION: IV

VARIETY RELEASE

During the session on variety release, the following six varieties were recommended for release

Crop	Variety	Centre	Salient features	Recommendations
Fennel	RF-289 (Karan Saunf 1)	SKNAU, Jobner	High yield, high volatile (>2%), moderately resistant to *Ramularia* blight	• Recommended. for release in fennel growing tracts of India • DNA Finger printing data need to included
Coriander	CG Raigarh Dhania-3	IGKV, Raigarh	High yield, high volatile oil (>0.47%), moderately resistant to diseases, bold seed.	• Recommended. for release in coriander growing tracts of India • DNA finger printing data need to included • Region wise POP need to be followed
Fenugreek	Hisar Methi-273	CCSHAU, Hisar	High yield, resistant to downy mildew and moderately resistant to powdery mildew.	• Recommended. for release in fenugreek growing tracts of India • Quality analysis need to be done and diosgenin content should be specifically included in the proposal • DNA finger printing data also need to included
Fenugreek	Gujarat Methi-3	SDAU, Jagudan	High yield, more number of seeds per pod, lodging resistance	• Recommended for release in fenugreek growing tracts of India except Rajasthan • Data related to quality, lodging shall be included • DNA finger printing data need to included
Ajwain	LAM Ajwain-3	Dr Y.S.R.HU, Guntur	High yield, high volatile oil, bold seed with attractive brown colour.	• Recommended. for Andhra Pradesh, Rajasthan and Gujarat • DNA finger printing data need to included
Turmeric	CG Raigarh Haldi-3	IGKV, Raigarh	High yield, early maturity, bold rhizome with dark colour.	• Recommended for Chhattisgarh, Andhra Pradesh, West Bengal, Uttar Pradesh, Odisha, Gujarat and Tamil Nadu • Revised proposal with addition of data may be submitted.

General recommendations:

- ❖ Important unique characters of the variety should be highlighted in the proposal.
- ❖ Quality traits data should be included in the proposal.
- ❖ Distinguishing traits of the proposed variety should be studied and recorded to identify the variety.

TECHNICALSESSIONV

TRANSFER OF TECHNOLOGY

Five technologies were presented in the session. The summary of the technologies and the decisions thereof are given below.

Sl. No.	Crop	Technology	Technical details	Decisions
1	Cumin	Integrated pest & disease management in cumin- SDAU, Jagudan	Three foliar sprays of kresoxym methyl 44.3 SC @ 0.044% (first spray at initiation of disease and subsequent sprays at an interval of 15 days after first spray) and two foliar sprays of thiamethoxam 25WG @ 0.0084% (first spray at initiation of aphid and the second spray after 10 days of the first spray) were found effective for integrated management of pests and diseases in cumin with lower blight and aphid index as well as higher seed yield and B:C ratio.	The technology is recognized as effective; however, the combination with biologicals need to be looked in to. A committee with Dr. S.J. Eapen as chairman may give final recommendation after looking in to residue data
2	Turmeric	Management of turmeric foliar diseases - leaf spot (*Colletotrichum capsici*) and leaf blotch (*Taphrina maculans*) - TNAU, Coimbatore	Rhizome treatment with propiconazole (0.1%) and foliar spray of propiconazole (0.1) significantly mitigated the leaf spot and leaf blotch diseases. Further, the presence of fungicide residue was below the detectable limit (BDL) in the turmeric rhizomes.	Technology is accepted
3	Coriander	Management of coriander powdery mildew (*Erysiphe polygoni*) using new generation fungicide- TNAU, Coimbatore	The foliar spray of propiconazole (0.1 %) at the initiation of the disease and second spray at 15 days after first spray mitigated the powdery mildew disease (5.22 PDI) as against the control (86.37 PDI) and improved the seed yield. Further, the presence of fungicide residue was below the detectable limit (BDL).	Technology is accepted
4	Coriander	Management of stem gall disease of coriander- RPCAU,	A ready mixture of fungicidal formulation containing Azoxystrobin 11% + tebuconazole 18.3% SC has been developed.	The technology is recommended and the active ingredients of the recommended

		Dholi		chemicals may be relooked. The accepted recommendation should be in understandable format for farmers
5	Cumin	Management of powdery mildew in cumin through new chemicals- SKNAU, Jobner	Foliar spray of hexaconazole 5% SC @ 0.1% or dinocap 48% EC @ 0.1% at the time of initial appearance of disease and second spray at 15 days thereafter was economical and effective in management of cumin powdery mildew.	A committee with Dr. S.J. Eapen as chairman may give final recommendation after looking in to residue data

PLENARY SESSION

The Plenary Session of the XXXII Annual AICRPS Group Meeting was held on 24 September 2021 at 11.00 AM.The session was jointly chaired by Dr. N.K. Krishna Kumar, Former DDG (Hort.) ICAR, New Delhi & Chairman, RAC ICAR-IISR, Kozhikode and Dr. K.M. Indiresh, Vice Chancellor, UHS Bagalkot.

Recommendation of the preceeding five technical sessions were presented by Dr. Sharon Aravind.

Session 1: Plant genetic resources and crop improvement

1. Recommendations should be categorised crop-wise under plant genetic resources, crop improvement, crop production, crop protection and post-harvest technology section
2. In case of plant genetic resources, if a unique germplasm is identified by the breeder, the preliminary data along with its unique characteristics should be submitted/ registered with NBPGR. Before the next group meeting, breeders in charge of each spice crops should complete the cataloguing of the unique germplasm available in their respective spice crops.
3. Director, IISR should facilitate the conduct of a training programme on statistical analysis of field data for the breeders/scientists involved in the AICRPS trials. The necessary help from IASRI and IIHR can be taken for the same.
4. The indexing of varieties using weighted parameters (both qualitative and quantitative parameters) should be taken up. ICAR – NRCSS will take up the work for seed spices and ICAR- IISR will take up the responsibility for the other spices. Before next workshop, indexing of at least half of the varieties should be completed.
5. Traded characteristics of each spices like boldness, lustre, unique flavour etc. should be included in the weighted parameters.
6. The breeder responsible for seed spices should visit all the centres while crops are in the flowering season and pollen from the unique germplasm should be collected for cryopreservation.
7. Trait-specific elite/rare germplasm associated with large cardamom, kalazeera and asafoetida should be recorded and the same can be maintained at NBPGR centre at Srinagar for evaluation.

Session 2: Crop Production

1. The trials on organic production of spices should include the package of practices which is fully organic (pesticide and fertilizer-free).
2. Crop-specific and region-specific micronutrient recommendations should be prepared for each spice.
3. The use of water-soluble fertilizer along with micronutrients in the production of spices should be taken up at ICAR-IISR (major spices) and NRCSS (seed spices) initially. At

AICRPS centres, wherever possible or wherever the infrastructure is available, the trial can be initiated on the use of water-soluble fertilizers with micronutrients.

4. The sustainability aspects also should be included in any AICRPS trial along with bio-safety and economic viability.

Session 3: Crop Protection

1. An index of pesticides recommended and available for use in all spices should be prepared for comparing the safety data of newly recommended pesticides
2. In all pesticide trials, safety of that pesticide to pollinators or natural enemies in the eco-system should be noted.
3. Along with pesticide analysis, the data on other contaminants like aflatoxins, artificial colourants, dust, animal excreta and other admixtures in the market samples should be recorded.
4. New fungicide molecules should be evaluated against major pathogens of ginger and turmeric
5. ICAR Sikkim centre should do continuous monitoring and reporting of chirke and blight diseases of large cardamom
6. ICAR-AICPRS can do internal deliberations about whether to include/initiate any post-harvest technology trial in AICRPS

Session 4: Variety release

1. All the recommended varieties will be released subjected to the fulfilment of submission of all necessary data like DNA fingerprinting and quality analysis with the competent authority
2. Weightage score of each features of the variety should be prepared and compared for the release of each variety and if possible SWOT analysis for the same can be included
3. The salient features of each variety (top five) should be presented in the plenary session for better understanding
4. Photographs, IC Nos. and DNA fingerprinting data, national check used and area recommended for cultivation should be added along with salient features before release

Session 5: Transfer of technology

1. Residue and biosafety should be included in pesticide trials
2. More technologies with respect to production, productivity and post-harvest technology aspects should come in the next meeting
3. Data from each AICRPS trial should be consolidated and published in the scientific journals

Dr. J. Rema thanked the chairman for his exemplary suggestions during the session and the XXXII AICRPS Group Meeting came to an end at 14:10 hrs with the formal vote of thanks by Dr. Sharon Aravind.

ACTION TAKEN REPORT 2021-22

Sl. No	Recommendation	Action taken
1	Collaborative germplasm exploration with ICAR–NBPGR and other centres have to be undertaken for collection of seed spices and only trait-specific collections need to be undertaken.	Trait specific germplasm accessions have been collected in turmeric (18), fennel (4), kalazeera, saffron and a few other crops. However, collection will be intensified once the Covid 19 situation improves.
2	IC number should be obtained for each accession and originality of entries must be maintained.	IC numbers were obtained for 135 coriander and 37 ajwain accessions. IC numbers were obtained for black pepper and cardamom accessions also. IC numbers will be obtaining for the remaining accessions.
3	AICRPS centres should give high priority to IET and CVT.	High priority is being given to ongoing IET and CVT experiments. Promising IET entries are promoted to the new CVT trials proposed and 7entries from the ongoing CVTs are proposed for variety release in the current Group Meeting.
4	Before finalizing the technical programme of the experiment, a consent to be taken from the participating centers considering the facility available at respective places.	Technical details of new trials are discussed thoroughly during the Group Meeting and new trials are allotted to centres based on available manpower and required infrastructural facilities.
5	Concluded experiments should result in research articles and technologies.	Some results are included in PoPs, some as technologies and very few are converted into research articles. Priority will be given for paper publications.
6	New pest, diseases and natural enemies need to be documented by scientists working under AICRP Centers.	At Pampadumpara, three new plant pathogens in cardamom were identified and their *in vitro* management trial reports has been published. New experiment on survey and diagnostics has been designed in crop protection which takes

		care of this aspect also.
7	Residue data need to be generated for all crops involving pesticide trials and seed samples immediately after harvest need to be send to ICAR-IISR, Kozhikode.	Samples of all the crops from most of the centres were collected by PC cell and were sent to Pesticide residue Lab at KAU, Vellayani for residue analysis. Residue data will be presented during presentations.
8	Clarification from APEDA and Agriculture Department in Sikkim may be obtained regarding acceptability of Spinosad in organic farming for large cardamom.	Clarification is yet to be received.
9	Application of organic manures and bio-fertilizers for yield enhancement of ginger has to be continued for one more year to confirm the consistency of the data and other information on nutrient uptake, data on rhizome rot and oil content may be recorded.	Experiment was conducted for one more year and the results were confirmed.
10	The stem gall disease technology may be tested at Kota centre. Also, residue analysis should be carried out. The data maybe presented in the next workshop.	The technology was tested at Dholi centre, KVKs and in farmer's fields during 2020-21. Residue analysis was also carried out at our centre. The results will be presented during Transfer of Technology session.
11	Seed spices centres should undertake quality analysis of spices.	Most of the centres are currently under taking oil and oleoresin analysis. Facility for oil and oleoresin estimation is being developed in other centres.

NEW RESEARCH PROGRAMMES

GENETIC RESOURCESAND CROPIMPROVEMENT

Project Code: TUR/CI/2.10	Title: CVT on aromatic turmeric *Curcuma aromatica*
Crop	Turmeric
Centres	Kozhikode, Coimbatore, Kammarpally, Pottangi, Pundibari, Navsari, Kalyani, Ambalavayal, Barapani
Year of start	2021
No. of treatments/genotypes	9Genotypes 1. NVMG 23 (Navsari) 2. NVMG 32 (Navsari) 3. SCP 07 (Pundibari) 4. SCP 09 (Pundibari) 5. PCA 9 (Pottangi) 6. PCA 10 (Pottangi) 7. Ac. 1025 (IISR) 8. CL 261 (Coimbatore) 9. CL 276 (Coimbatore)
Design	Randomized Block Design
No. of replications	Three replications
Plot size/spacing	3×1m, spacing- 25x 25 cm
Observations to be taken	✓ Sprouting percentage ✓ Plant population at 50 DAS ✓ Plant height (cm) ✓ Number of tillers per clump ✓ Fresh weight of clump (g) ✓ Fresh rhizome yield /ha (t) ✓ Dry rhizome yield /ha (t) ✓ Dry recovery (%) ✓ Oleoresin (%) ✓ Essential oil (%) Disease (rhizome rot) and pest (shoot borer) incidence, if any

Project Code: TUR/CI/2.11	Title: CVT on black turmeric *Curcuma caesia*
Crop	Turmeric
Centres	Kozhikode, Coimbatore, Kumarganj, Pottangi, Pundibari, Navsari, Raigarh, Chintapalli, Sirsi, Solan, Mizoram
Year of start	2021
No. of treatments/genotypes	4 Genotypes 1. NBT 1 (Navsari) 2. NBT 2 (Navsari) 3. BT 162 (Pundibari) 4. PCC1 (Pottangi) 5. NDHCc1 (Kumarganj) 6. Acc. 292 (IISR) 7. Acc.751 (IISR) 8. CL 262 (Coimbatore) 9. CL 277 (Coimbatore)
Design	Randomized Block Design
No. of replications	Three replications
Plot size/spacing	3×1m, spacing- 25x 25 cm
Observations to be taken	✓ Sprouting percentage ✓ Plant population at 50 DAS ✓ Plant height (cm) ✓ Number of tillers per clump ✓ Fresh weight of clump (g) ✓ Fresh rhizome yield /ha (t) ✓ Dry rhizome yield /ha (t) ✓ Dry recovery (%) ✓ Oleoresin (%) ✓ Essential oil (%) ✓ Disease (rhizome rot) and pest (shoot borer) incidence, if any

Project Code: COR/CI/2.8	Title: Coordinated varietal trial on coriander–2021- Series XI
Crop	Coriander
Centre	Ajmer, Coimbatore, Dholi, Guntur, Hisar, Jabalpur, Jagudan, Jobner, Kumarganj, Navsari, Pantnagar, Kota, Raigarh, Kalyani, Sanand
Year of start	2021
No. of treatments/genotypes	1. NCOR 102 (Navsari) 2. LCS-19-1 (Guntur) 3. SCr 24 (Sanand) 4. DH 316 (Hisar) 5. JCr 16-02 (Jagudan) 6. UD 565 (Jobner) 7. PD 7 (Pantnagar) 8. NDCor 22 (Kumarganj) 9. CS 46 (Coimbatore) 10. ICS 15 (Raigarh) 11. ACr 6 (Ajmer) 12. Hisar Anand (check) 13. RCr 728 (NC)
Design	Randomized Block Design
No. of replications	Three replications
Plot size/spacing	4×2.4m, spacing 30x 20 cm, 240plants/plot
Observations to be taken	✓ Germination % ✓ Days to 50% flowering ✓ Plant height (cm) ✓ Branches per plant ✓ Days to maturity ✓ Umbels per plant ✓ Umbellets per umbel ✓ Seeds per umbel ✓ Test weight (g) ✓ Seed yield (kg/ha) ✓ Incidence of pests (mites, aphids) ✓ Incidence of diseases (wilt, powdery mildew, stem gall, blight) ✓ Quality

Project Code: CUM/CI/2.5	Project title: Coordinated varietal trial on cumin–2021
Crop	Cumin
Centres	Ajmer, Jagudan, Jobner, Mandor, Sanand
Year of start	2021
No. of treatments/genotypes	1. CZC- 94 (CAZRI) 2. CZC- 135 (CAZRI) 3. MCU 73 (Mandor) 4. MCU 105 (Mandor) 5. JC 18-10(Jagudan) 6. JC 18-09(Jagudan) 7. UC 350 (Jobner) 8. UC 257 (Jobner) 9. UC 250 (Jobner) 10. SPS/166/2-3 (Ajmer) 11. BC 13 (Ajmer) 12. GC 4 (check)
Design	Randomized Block Design
No. of replications	Three replications
Plot size/spacing	3 x 2.4 m spacing : 30x5 cm
Observations to be taken	✓ Germination % ✓ Days to 50% flowering ✓ Plant height (cm) ✓ No. of primary branches per plant ✓ No. of secondary branches per plant ✓ Days to 50% flowering ✓ No. of pods per plant ✓ No. of grains per pod ✓ Length of pod (cm) ✓ Days to maturity ✓ Test weight (g) ✓ Seed yield (q/ha) ✓ Oil content (%) ✓ Diseases (blight, wilt, powdery mildew) and Pest (cumin aphid, thrips) incidence, if any

Project Code: FNL/CI/2.8	Title: Coordinated varietal trial on fennel–2021 Series XI
Crop	Fennel
Centre	Ajmer, Dholi, Hisar, Jabalpur, Jagudan, Jobner, Kumarganj, Pantnagar, Navsari
Year of start	2021
No. of treatments/genotypes	1. HF 192 (Hisar) 2. HF 256 (Hisar) 3. JF 18-13 (Jagudan) 4. JF 18-03 (Jagudan) 5. UF 231 (Jobner) 6. UF 230 (Jobner) 7. AF 87 (Ajmer) 8. AF 17 (Ajmer) 9. RF 67 (Dholi) 10. NDF 59 (Kumarganj) 11. NDF 46 (Kumarganj) 12. RF-101 (check) 13. RF 205 (check)
Design	Randomized Block Design
No. of replications	Three replications
Plot size/spacing	4x2.7 m Spacing: 45x45 cm
Observations to be taken	✓ Germination % ✓ Days to 50% flowering ✓ Plant height (cm) ✓ Branches per plant ✓ Umbels per plant ✓ Umbellets per umbel Seeds per umbel ✓ Test weight (g) ✓ Seed yield per plant (g) ✓ Seed yield (kg/ha) ✓ Incidence of pests (aphids) ✓ Incidence of diseases (leaf blight, powdery mildew, gall, bacterial soft rot) ✓ Quality

Project Code: FGK/CI/2.5	Project Title: Coordinated varietal trial on fenugreek–2021 Series XI
Crop	Fenugreek
Centres	Ajmer, Dholi, Hisar, Jabalpur, Jagudan, Jobner, Kumarganj, Navsari, Pantnagar, Kota, Raigarh, Kalyani
Year of start	2021
No. of treatments/genotypes	1. HM 242 (Hisar) 2. HM 560 (Hisar) 3. JFg-17-02 (Jagudan) 4. JFg-17-06 (Jagudan) 5. NFG 201 (Navsari) 6. NFG 202 (Navsari) 7.UM 259 (Jobner) 8. UM 233 (Jobner) 9. PM 4 (Pantnagar) 10. AFg 9 (Ajmer) 11. AFg 10 (Ajmer) 12. IFGS6 (Raigarh) 13. KFG 12 (Kota) 14. KFG 17 (Kota) 15. NDM 119 (Kumarganj) 16. Hisar Sonali (check) 17. RMt 361 (check)
Design	Randomized Block Design
No. of replications	Three replications
Plot size/spacing	4 x 2.4 m spacing : 30x10 cm
Observations to be taken	✓ Germination % ✓ Days to 50% flowering ✓ Plant height (cm) ✓ Branches per plant ✓ No. of pods ✓ Pod length (cm) ✓ Seeds per pod ✓ Test weight (g) ✓ Seed yield per plant (g) ✓ Seed yield (kg/ha) ✓ Incidence of pests (aphids, leaf eating caterpillar, pod borer) ✓ Incidence of diseases (powdery mildew, downy mildew, damping off, rust, root rot, leaf spot) ✓ Quality

CROP PRODUCTION

Project Code: GIN/CM/5.1	Title: Evaluation of plant growth promoting rhizobacteria, *Bacillus safensis* for phosphorus (P) solubilization potentialin ginger
Crop	Ginger
Centres	Kozhikode, Chintapalli, Kammarpally, Pundibari, Kumarganj, Solan, Kalyani, Pasighat, Ambalavayal, Pottangi, Raigarh
Duration	3 years
Plan of work	Treatments: T1- 100% recommended phosphorus(P) fertilizer T2- 75% phosphorus(P) fertilizer T3- 75% phosphorus(P) fertilizer and *Bacillus safensis* T4- 50% phosphorus(P) fertilizer T5- 50% phosphorus(P) fertilizer and *Bacillus safensis* T6-*Bacillussafensis* alone T7-Control without P Crop variety: Popular improved variety of respective centre/area. • Experimental design: RBD • Treatments : 7 • Replications: 4 • Bed size: 3 x1m • Spacing: 15x30 cm • Total no. of beds: 28
Methodology to be adopted	Bacteria application as soil drench : At the time of planting, 30 days after planting (DAP), 60 days after planting(DAP) Fertilizer application:- As per the recommendation except P which may be taken up as per the treatment
Observations to be recorded	• Growth parameters (90 & 120 DAP) • Soil nutrients analysis –Available P & other major &minor nutrients(120DAP) • Nutrient uptake (harvest)- Leaf and rhizome • Yield and quality analysis • Economics

Project Code: GIN/CM/5.2	Title: Evaluation of plant growth promoting rhizobacteria, *Bacillus safensis* for zinc (Zn) solubilization potentialin ginger
Crop	Ginger
Centers	Kozhikode, Chintapalli, Kammarpally, Pottangi, Solan, Kalyani, Pasighat, Ambalavayal, Kumarganj, Raigarh
Duration	3 years
Plan of work	Treatments: T1- 100% recommended zinc (Zn) fertilizer T2- 50% zinc (Zn) fertilizer and *Bacillus safensis* T3- 50% zinc (Zn) fertilizer alone T4- *Bacillus safensis* alone T5- control without Zn Crop variety: Popular improved variety of respective centre/area. • Experimental design: RBD • Treatments : 5 • Replication: 5 • Bed size: 3 x1m • Spacing: 15x30 cm • Total no. of beds: 25
Methodology to be adopted	Bacteria application as soil drench : At the time of planting, 30 days after planting (DAP), 60 days after planting(DAP) Fertilizer application:- As per the recommendation
Observations to be recorded	• Growth parameters (90 & 120 DAP) • Soil nutrients analysis –Available Zn& other major &minor nutrients(120DAP) • Nutrient uptake (harvest)- Leaf and rhizome • Yield and quality analysis • Economics

Project Code: TUR/CM/5.1	Title: Evaluation of plant growth promoting rhizobacteria, *Bacillus safensis* for phosphorus (P) solubilization potentialin turmeric
Crop	Turmeric
Centres	Kozhikode, Chintapalli, Pundibari, Raigarh, Solan, Pasighat, Kahikuchi, Coimbatore, Kammarpally, Pottangi, Kalyani
Duration	3 years
Plan of work	Treatments: T1- 100% recommended phosphorus(P) fertilizer T2- 75% phosphorus(P) fertilizer T3- 75% phosphorus(P) fertilizer and *Bacillus safensis* T4- 50% phosphorus(P) fertilizer T5- 50% phosphorus(P) fertilizer and *Bacillus safensis* T6-*Bacillus safensis* alone T7-Control without P Crop variety: Popular improved variety of respective centre/area. • Experimental design: RBD • Treatments : 7 • Replications: 4 • Bed size: 3 x1m • Spacing: 15x30 cm • Total no. of beds: 28
Methodology to be adopted	Bacteria application as soil drench :At the time of planting, 30 days after planting (DAP), 60 days after planting(DAP) Fertilizer application:- As per the recommendation except P which may be taken up as per the treatment
Observations to be recorded	• Growth parameters (90 & 120 DAP) • Soil nutrients analysis –Available P & other major &minor nutrients(120DAP) • Nutrient uptake (harvest)- Leaf and rhizome • Yield and quality analysis • Economics

Project Code: TUR/CM/5.2	Title: Evaluation of plant growth promoting rhizobacteria, *Bacillus safensis* for zinc (Zn) solubilization potential in turmeric
Crop	Turmeric
Centres	Kozhikode, Chintapalli, Dholi, Kammarpally, Pottangi, Pundibari, Pasighat, Kahikuchi, Kanke, Coimbatore, Kumarganj, Kalyani, Raigarh
Duration	3 years
Plan of work	Treatments: T1- 100% recommended zinc (Zn) fertilizer T2- 50% Zinc (Zn) fertilizer and *Bacillus safensis* T3- 50% Zinc (Zn) fertilizer alone T4- *Bacillus safensis* alone T5- Control without Zn Crop variety: Popular improved variety of respective centre/area. • Experimental design: RBD • Treatments : 5 • Replication: 5 • Bed size: 3 x1m • Spacing: 15x30 cm • Total no. of beds: 25
Methodology to be adopted	Bacteria application as soil drench : At the time of planting, 30 days after planting (DAP), 60 days after planting(DAP) Fertilizer application:- As per the recommendation
Observations to be recorded	• Growth parameters (90 & 120 DAP) • Soil nutrients analysis –Available Zn& other major &minor nutrients(120DAP) • Nutrient uptake (harvest)- Leaf and rhizome • Yield and quality analysis

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105.	Dr. Basheer Ahamed, Professor &Head

Annexure-I

Research programme at a glance (crop-wise)

	Crop Improvement			Crop Management			Crop Protection			Total
Crop	**Ongoing projects**	**Closed projects**	**New projects**	**Ongoing projects**	**Closed projects**	**New projects**	**Ongoing projects**	**Closed projects**	**New projects**	**Ongoing 2021-22**
Black pepper	4	-	-	1	-	-	3	-	-	8
Small cardamom	6	-	-	2	-	-	3	-	-	11
Large cardamom	1	-	-	1	-	-	-	-	-	2
Ginger	3	-	-	1	-	2	3	-	-	9
Turmeric	5	-	2	-	-	2	3	-	-	12
Tree spices	5	-	-	-	-	-	-	-	-	5
Coriander	3	2	1	-	-	-	-	1	-	4
Cumin	2	2	1	1	-	-	-	1	-	4
Fennel	1	2	1	1	-	-	-	-	-	3
Fenugreek	3	1	1	1	-	-	-	-	-	5
Ajwain	1	-	-	-	-	-	-	-	-	1
Nigella	1	-	-	-	-	-	-	-	-	1
Saffron	1	-	-	-	-	-	-	-	-	1
Kalazeera	1	-	-	-	-		-	-	-	1
Seed spices	-	-	-	1	-	-	1	-	-	2
Total	37	7	6	9	-	4	13	2	-	69

Annexure-II

Research programme at a glance (Centre-wise)

Sl. No.	Centre	Scientist (s)	List of projects involved
REGULAR CENTRES			
1	**Pampadumpara (KAU)**	Dr. Nimisha Mathews	CAR/CI/1.1, CAR/CI/3.7, CAR/CI/3.8, CAR/CI/3.9, CAR/CI/4.4, CAR/CI/4.5, CAR/CM/5.5, CAR/CM/5.6, CAR/CP/6.11, CAR/CP/6.12,CAR/CP/6.13, PEP/CP/7.1(12)
2	**Panniyur (KAU)**	Dr. Yamini Varma Dr. Airina, C.K.	PEP/CI/1.1, PEP/CI/3.5, PEP/CI/3.6, PEP/CI/3.7, PEP/CM/4.7, PEP/CP/5.8,PEP/CP/5.10, PEP/CP/7.1 (8)
3	**Mudigere (UAHS)**	Dr. M. Shivaprasad	CAR/CI/1.1, CAR/CI/3.7, CAR/CI/3.8 , CAR/CI/3.9, CAR/CI/4.4, CAR/CI/4.5, CAR/CM/5.5, CAR/CM/5.6, CAR/CP/6.11, CAR/CP/6.12, GIN/CP/7.1,TUR/CP/7.9(12)
4	**Sirsi (UHS)**	Mr. Sudheesh Kulkarni	PEP/CI/1.1, PEP/CI/3.5, PEP/CI/3.6, PEP/CI/3.7, PEP/CM/4.7, PEP/CP/5.8,PEP/CP/5.10, GIN/CP/7.1, TUR/CP/7.9 (9)
5	**Yercaud (TNAU)**	Dr. P. R. Kamalkumaran	PEP/CI/1.1, PEP/CI/3.5, PEP/CI/3.6 , PEP/CI/3.7, PEP/CP/5.8 (5)
6	**Coimbatore (TNAU)**	Dr. R. Senthamizh Selvi Dr. S. Sundravadana	TUR/CI/1.1, TUR/CI/2.8, TUR/CI/2.9,TUR/CI/2.10, TUR/CI/2.11, COR/CI/1.1, COR/CI/2.8, FGK/CI/3.7, TUR/CM/5.1, TUR/CM/5.2,FGK/CM/5.9, TUR/CP/7.8,TUR/CP/7.10, SS/CP/7.1 (14)
7	**Chintapalle (Dr YSRHU)**	Dr. V. Sivakumar	PEP/CI/1.1, PEP/CI/3.5, PEP/CI/3.6, PEP/CI/3.7, GIN/CI/2.5, GIN/CI/4.3, GIN/CM/4.1, GIN/CM/5.1, GIN/CM/5.2, TUR/CM/5.1, TUR/CM/5.2, GIN/CP/6.15, GIN/CP/7.2, TUR/CP/7.8 (14)
8	**Kammarpally (SKLTSHU)**	Dr. B. Mahender Dr. P. Srinivas	GIN/CI/1.1, TUR/CI/1.1, TUR/CI/2.8, TUR/CI/2.9,TUR/CI/2.10, TUR/CI/2.11, GIN/CM/5.1, GIN/CM/5.2, TUR/CM/5.1, TUR/CM/5.2, GIN/CP/6.15, TUR/CP/7.8, TUR/CP/7.9, SS/CP/7.1 (14)
9	**Guntur (Dr**	Dr. K. Giridhar Dr. Tanuja Priya	TUR/CI/1.1, TUR/CI/2.8, TUR/CI/2.9, TUR/CI/3.9,TUR/CI/2.10, TUR/CI/2.11, COR/CI/1.1,

	YSRHU)		COR/CI/2.8, FGK/CI/1.1, FGK/CI/3.7, AJN/CI/2.1, TUR/CP/7.9,TUR/CP/7.10, SS/CP/7.1 (14)
10	**Solan (YSPUHF)**	Dr. Meenu Gupta	GIN/CI/1.1, TUR/CI/1.1, GIN/CM/4.1, GIN/CM/5.1, GIN/CM/5.2, TUR/CM/5.1, TUR/CM/5.2, GIN/CP/6.15, TUR/CP/7.8 (9)
11	**Pottangi (OUAT)**	Dr. Parshuram Sial	GIN/CI/1.1, GIN/CI/2.5, GIN/CI/4.3, TUR/CI/1.1, TUR/CI/2.7, TUR/CI/2.8, TUR/CI/2.9, TUR/CI/2.10, TUR/CI/2.11, GIN/CM/4.1, GIN/CM/5.1, GIN/CM/5.2, TUR/CM/5.1, TUR/CM/5.2, GIN/CP/6.15, GIN/CP/7.1,GIN/CP/7.2, TUR/CP/7.8, TUR/CP/7.9 (19)
12	**Jobner (SKNAU)**	Dr. S. S. Punia Dr. A.C. Shivran Mr. G.L. Kumawat	COR/CI/1.1, COR/CI/1.3,COR/CI/2.8, CUM/CI/1.1,CUM/CI/1.3, CUM/CI/2.5, FNL/CI/1.1,FNL/CI/2.8,FGK/CI/1.1, FGK/CI/1.3,FGK/CI/2.5, FGK/CI/3.7, AJN/CI/2.1, CUM/CM/ 5.5, FGK/CM/5.9, FNL/CM/5.1, SS/CM/4.1, SS/CP/7.1(18)
13	**Jagudan (SDAU)**	Dr. N. R. Patel Dr. Surabhi S. Chauhan	COR/CI/1.1, COR/CI/2.8, CUM/CI/1.1, CUM/CI/2.5, FNL/CI/1.1, FNL/CI/2.8,FGK/CI/1.1, FGK/CI/2.5,AJN/CI/2.1, FNL/CM/5.1,SS/CM/4.1,SS/CP/7.1 (12)
14	**Hisar (HAU)**	Dr. S. K. Tehlan Dr. T. P. Malik	COR/CI/1.1,COR/CI/2.8, FNL/CI/1.1,FNL/CI/2.8, FGK/CI/1.1,FGK/CI/2.5, FGK/CI/3.7, AJN/CI/2.1, NGL/CI/2.1, FNL/CM/5.1, COR/CP/7.1 (11)
15	**Dholi (RAU)**	Dr. A.K. Mishra Dr. C. Mukhim	GIN/CI/1.1,TUR/CI/1.1,TUR/CI/2.7,COR/CI/1.1, COR/CI/2.8,FNL/CI/1.1, FNL/CI/2.8,FGK/CI/1.1 FGK/CI/2.5, FGK/CI/3.7,GIN/CM/4.1, GIN/CM/5.1, GIN/CM/5.2, TUR/CM/5.1, TUR/CM/5.2, FNL/CM/5.1,SS/CM/4.1,GIN/CP/6.15,TUR/CP/7.8, COR/CP/7.1,SS/CP/7.1(21)
16	**Kumarganj (NDUAT)**	Dr. Pradip Kumar Dr. C. N. Ram	GIN/CI/1.1, TUR/CI/1.1,TUR/CI/2.11,COR/CI/1.1,COR/CI/2.8, FNL/CI/1.1, FNL/CI/2.8, FGK/CI/1.1, FGK/CI/2.5, FGK/CI/3.7, AJN/CI/2.1, NGL/CI/2.1, TUR/CM/5.1, TUR/CM/5.2, FNL/CM/5.1,SS/CM/4.1,TUR/CP/7.9, COR/CP/7.1,SS/CP/7.1 (19)
17	**Pundibari**	Dr. Anamika Debnath	PEP/CI/1.1,GIN/CI/1.1,GIN/CI/2.5,GIN/CI/4.3,TUR/CI/1.1, TUR/CI/2.7, TUR/CI/2.10, TUR/CI/2.11, TUR/CM/5.1,

	(UBKVV)		TUR/CM/5.2, GIN/CM/4.1, GIN/CM/5.1, GIN/CM/5.2, GIN/CP/6.15,GIN/CP/7.1,TUR/CP/7.8, TUR/CP/7.9 (17)
18	**Dapoli (KKV)**	Dr. P. C. Mali	PEP/CI/1.1, PEP/CI/3.5, PEP/CI/3.6, PEP/CI/3.7, TSP/CI/1.1, TSP/CI/1.2, TSP/CI/2.2, TSP/CI/2.4, PEP/CM/4.7,PEP/CP/5.8(10)
19	**Raigarh (IGKVV)**	Dr. Ajit Kumar Singh Dr. Shrikant Laxmikant Sawargaonkar	GIN/CI/1.1, GIN/CI/2.5, TUR/CI/1.1, TUR/CI/2.7, TUR/CI/2.8, TUR/CI/2.10, TUR/CI/2.11,COR/CI/1.1,COR/CI/2.8, FGK/CI/1.1, FGK/CI/2.5, AJN/CI/2.1, NGL/CI/2.1, GIN/CM/5.1, GIN/CM/5.2, TUR/CM/5.1, TUR/CM/5.2, SS/CM/4.1,GIN/CP/6.15, TUR/CP/7.8, SS/CP/7.1 (21)
CO-OPTING CENTRES			
20	**Ambalavayal (KAU)**	Dr. Najeeb Naduthodi	PEP/CI/1.1,PEP/CI/3.7, TUR/CI/2.7, PEP/CM/4.7,GIN/CM/5.1, GIN/CM/5.2, TUR/CM/5.1, TUR/CM/5.2, PEP/CP/7.1, GIN/CP/6.15,GIN/CP/7.1, TUR/CP/7.8, TUR/CP/7.9 (13)
21	**Pechiparai (TNAU)**	Dr. Jaya Jasmine	TSP/CI/1.1, TSP/CI/1.2, TSP/CI/2.2, TSP/CI/2.4 (4)
22	**Gangtok (ICRI)**	Dr. Ashuthosh Goutam	LCA/CI/1.1, LCA/CM/5.1(2)
23	**Sakleshpur (ICRI)**	Dr. Sreekrishna Bhat	CAR/CI/3.7, CAR/CI/3.8, CAR/CI/3.9, CAR/CI/4.4, CAR/CI/4.5, CAR/CM/5.5, CAR/CM/5.6 (7)
24	**Myladumpara (ICRI)**	Dr. K. Pradip Kumar Dr. K.A. Saju	CAR/CI/3.7, CAR/CI/3.8, CAR/CI/3.9, CAR/CI/4.4, CAR/CI/4.5, CAR/CM/5.5, CAR/CM/5.6, CAR/CP/6.11, CAR/CP/6.12, CAR/CP/6.13 (10)
25	**ICAR R C NEHR, Barapani**	Dr, Veerendra Varma Dr. M. B. Devi	GIN/CI/1.1, GIN/CI/2.5, TUR/CI/1.1, TUR/CI/2.7, GIN/CM/5.1, GIN/CM/5.2, GIN/CP/6.15, GIN/CP/7.1, GIN/CP/7.2, TUR/CP/7.9, TUR/CP/7.10 (11)
26	**ICAR R C NEHR, Mizoram**	Dr.Jeetendra Kumar Soni	GIN/CI/4.3, GIN/CM/4.1,GIN/CP/7.1, TUR/CM/5.1, TUR/CM/5.2, TUR/CP/7.8,TUR/CP/7.9 (7)
27	**ICAR R C NEHR, Gangtok**	Dr. Amit Kumar	LCA/CI/1.1, GIN/CI/2.5, GIN/CI/4.3, LC/CM/5.1, GIN/CM/4.1 (5)
28	**Nagaland**	Dr. C. S. Maiti	GIN/CI/2.5, GIN/CM/4.1,GIN/CM/5.1, GIN/CM/5.2, GIN/CP/6.15, GIN/CP/7.1 (6)

	(Nagaland AU)		
29	**Kahikuchi (AAU)**	Dr. Kusum Kr. Deka	PEP/CI/3.6, TUR/CM/5.1, TUR/CM/5.2, GIN/CP/7.1,TUR/CP/7.8, TUR/CP/7.9 (6)
30	**Pasighat (CAU)**	Dr. Chandra Deo	TUR/CI/1.1, TUR/CI/2.8, TUR/CI/2.9, TUR/CI/2.10, TUR/CI/2.11, LC/CM/5.1, GIN/CM/5.1, GIN/CM/5.2, TUR/CM/5.1, TUR/CM/5.2, GIN/CP/6.15, GIN/CP/7.1,TUR/CP/7.8, TUR/CP/7.9 (14)
VOLUNTARY CENTRES			
31	**Pantnagar (GBPUAT)**	Dr. Dhirendra Singh	COR/CI/2.8, FNL/CI/2.8, FGK/CI/2.5, NGL/CI/2.1, FGK/CM/5.9,TUR/CP/7.9(6)
32	**Kanke(BIRSAAU)**	Dr. Arun Kumar Tiwari	TUR/CI/2.8, TUR/CI/2.9, GIN/CM/4.1,GIN/CM/5.1, GIN/CM/5.2, TUR/CM/5.1, TUR/CM/5.2, GIN/CP/6.15,GIN/CP/7.1, TUR/CP/7.8, TUR/CP/7.9 (11)
33	**Kalyani (BCKVV)**	Dr. Anupam Pariari	COR/CI/2.8, FGK/CI/2.5, NGL/CI/2.1, GIN/CM/5.1, GIN/CM/5.2, GIN/CP/6.15,GIN/CM/4.1,SS/CP/7.1 (8)
34	**Kota(AUK)**	Dr. Preethi Verma	COR/CI/2.8, FGK/CI/2.5, NGL/CI/2.1, COR/CP/7.1 (4)
35	**Navasari (NAU)**	Dr. Ritesh K. Patel	TUR/CI/2.7, TUR/CI/2.8, TUR/CI/2.10, TUR/CI/2.11,COR/CI/2.8, FNL/CI/2.8,FGK/CI/2.5(7)
36	**Jabalpur (JNKVV)**	Dr. Reena Nair	COR/CI/2.8, FNL/CI/2.8, FGK/CI/2.5, SS/CM/4.1,COR/CP/7.1 (5)
37	**Mandor (AUJ)**	Dr. Motilal Mehriya	CUM/CI/1.1,CUM/CI/2.5, CUM/CM/ 5.5, FNL/CM/5.1 (4)
38	**Sanand (AAU)**	Dr. T.T. Patel	COR/CI/2.8, CUM/CI/1.1, CUM/CI/2.5, SS/CP/7.1 (4)
PROJECT MODE CENTRES			
39	**Thrissur (KAU)**	Dr. Mini Raj	TSP/CI/1.2, TSP/CI/2.4, TSP/CI/5.1 (3)
40	**Pampore (SRS)**	Dr. Basheer Ahamed Dr. Mudasir H. Khan	SAF/CI/5.1, KZ/CI/5.1 (2)

- **New projects are marked in red**