Proceedings of XXXIII Annual Group Meeting

ICAR-All India Coordinated Research Project on Spices

ANDUAT, Kumarganj, Ayodhya (U.P.)

13-15 October 2022

ALL INDIA COORDINATED RESEARCH PROJECT ON SPICES
INDIAN INSTITUTE OF SPICES RESEARCH
KOZHIKODE- 673012, KERALA, INDIA

PROCEEDINGS OF XXXIII ANNUAL GROUP MEETING

ICAR- All India Coordinated Research Project on Spices

13 – 15 October 2022

Venue: ANDUA&T, Kumarganj, Ayodhya (UP)

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

2022

December 2022

Compiled & edited by

Dr. M. Alagupalamuthirsolai
Mr. Mukesh Sankar. S
Dr. K.S. Krishnamurthy
Dr. Sharon Aravind
Mr. John George
Dr. C.K. Thankamani

XXXIII Annual Group Meeting of ICAR-All India Coordinated Research Project on Spices
Venue: ANDUA&T, Kumarganj, Ayodhya (UP)
Date: 13 – 15 October 2022
Organized by: ICAR-AICRPS, ICAR-IISR, Kozhikode

INAUGURAL SESSION : 14 October 2022 (10.00 AM – 11.30 AM)

10.00 AM – 10.02 AM Lighting of lamp, Garlanding of Acharya Narendra Deva Statue

10.03 AM – 10.09 AM University Kulgeet and ICAR Song

10.10 AM - 10.19 AM	Welcome address	**Dr. C. K. Thankamani** Project Coordinator (Spices) & Director ICAR-IISR, Kozhikode
10.20 AM - 10.30 AM	Address by Guest of Honour	**Dr. V. A. Parthasarathy** Former Director & PC (Spices), ICAR-IISR, Kozhikode
10.26 AM - 10.40 AM	Presidential address	**Dr. Bijendra Singh** Vice-Chancellor ANDUAT, Kumarganj
10.41 AM - 10.55 AM	Inaugural address	**Dr. N.K. Krishna Kumar** Former DDG (HS) ICAR, New Delhi
10.56 AM – 11.05 AM	Presentation of awards and release of publications	
11.06 AM – 11.25 AM	Felicitations	**Dr. J. Rema** Former Director & PC (Spices), ICAR-IISR, Kozhikode **Dr. Homey Cheriyan** Director DASD, Kozhikode **Dr. Sanjay Pathak** Dean, College of Horticulture, ANDUAT, Kumarganj **Dr. S.N. Saxena** Acting Director ICAR-NRC on Seed Spices, Ajmer, Rajasthan **Dr. A. B. Remashree** Director (Research) Spices Board, Kochi
11.26 AM – 11.30 AM	Vote of thanks	**Dr. K. S. Krishnamurthy** Principal Scientist ICAR-IISR, Kozhikode
	Rapporteurs	**Dr. M. Alagupalamuthirsolai**
National Anthem		

TECHNICAL SESSIONS

13 October 2022

SESSION I : Genetic Resources & Crop Improvement 2.00 PM - 6.00 PM

Chairperson : Dr. J. Rema, Former Director & Project Coordinator, ICAR-IISR, Kozhikode
Co- Chairperson : Dr. S. N. Saxena, Acting Director, ICAR-NRC on Seed Spices, Ajmer

Rapporteurs: **1. Dr. M.S. Shivakumar**, ICAR-IISR Regional Station, Appangala
2. Dr. B. Tanuja Priya, HRS, Guntur

Presentations:

1	Coriander	Dr. Shrikant Sawargaonkar, IGKV, Raigarh
2	Fennel	Dr. R.S. Meena, ICAR-NRCSS, Ajmer
3	Fenugreek	Dr. K. Giridhar, Dr. YSRHU, Guntur
4	Cumin	Dr. Surabhi S Chauhan, SDAU, Jagudan
5	Ajwain	Dr. S.S. Meena, ICAR-NRCSS, Ajmer
6	Nigella	Dr. S.S. Meena, ICAR-NRCSS, Ajmer
7	Saffron & Kalazeera	Dr. M.A. Khan, SKUAST, Srinagar
8	Tree spices	Dr. P. C. Mali, Dr. BSKKV, Dapoli
9	Nutmeg	Dr. Vikram H. C., KAU, Vellanikkara
10	Turmeric	Dr. B. Senthamizh Selvi, TNAU, Coimbatore
11	Ginger	Dr. Parsuram Sial, HARS, OUAT, Pottangi
12	Small cardamom	Dr. Pradip Kumar, ICRI, Myladumpara
13	Large cardamom	Dr. Amit Kumar, ICAR RC-NEHR, Regional Station, Gangtok
14	Black pepper	Dr. V. Sivakumar, Dr. YSRHU, Chintapalle

14 October 2022

SESSION II :	**Crop Management**	**12.00 PM –1.30 PM**

Chairperson : Dr. C. K. Thankamani, Director, ICAR-IISR & PC (Spices), Kozhikode
Co- Chairperson : Dr. Homey Cheriyan, Director, DASD, Kozhikode

Rapporteurs: 1. Dr. Alagupalamuthirsolai, ICAR-IISR, Kozhikode
2.Dr. Jeetendra Kumar Soni, ICAR-NEHR, RC Mizoram

Presentations:

1	Seed Spices (SS/CM/4.1)	Dr. A. C. Shivran, SKNAU, Jobner
2	Fennel	Dr. Ravindra Singh, ICAR-NRCSS, Ajmer
3	Fenugreek	Dr. Ravindra Singh, ICAR-NRCSS, Ajmer
4	Cumin	Dr. A. C. Shivran, SKNAU, Jobner
5	Turmeric	Dr. Jeetendra Kumar Soni, ICAR RC-NEHR, Regional Station, Mizoram
6	Ginger	Dr. Jeetendra Kumar Soni, ICAR RC-NEHR, Regional Station, Mizoram
7	Small cardamom	Dr. M. Shivaprasad, ZAHRS (UAHS), Mudigere
8	Large cardamom	Dr. Amit Kumar, ICAR RC-NEHR, Regional Station, Gangtok
9	Black pepper	Mr. Sudheesh Kulkarni, HREC, Sirsi

SESSION III :	**Crop Protection 2.30 PM – 4.00 PM**

Chairperson : Dr. N.K. Krishna Kumar, Former DDG (Hort.) ICAR, New Delhi
Co- Chairperson : Dr. A. Ishwara Bhat, Head, Crop Protection, ICAR-IISR, Kozhikode

Rapporteurs : 1. Dr. R. Praveena, ICAR-IISR, Kozhikode
2. Dr. Meenu Gupta, Dr YSPUHF, Solan

Presentations:

1	Coriander	Dr. A. K. Mishra, RPCAU, Dholi
2	Seed Spices (SS/CP/7.1)	Mr. G. L. Kumawat, SKNCOA, Jobner
3	Turmeric	Dr. B. Mahender, SKLTSHU, Kammarpalli
4	Ginger	Dr. Anamika Debnath, UBKV, Pundibari
5	Small cardamom	Dr. K. A. Saju, ICRI, Myladumpara
6	Black pepper	Dr. C. K. Yamini Varma, PRS, Panniyur

SESSION IV :	Variety Release	4.00 PM–5.00 PM

Chairperson : Dr. V.A. Parthasarathy, Former Director, ICAR-IISR, Kozhikode
Co- Chairperson : Dr. N.K. Krishna Kumar, Former DDG (Hort.), ICAR, New Delhi

Rapporteurs : **1. Dr. Sharon Aravind**, ICAR-IISR, Kozhikode
2. Dr. H.C. Vikram, KAU, Thrissur

15 October 2022

SESSION V :	Transfer of Technology	9.30 AM – 11.00 AM

Chairperson : Dr. Vikramaditya Pandey, Asst. Director General (HS I), ICAR, New Delhi
Co- Chairperson : Dr. A.B. Remashree, Director (Research), Spices Board, Kochi

Rapporteurs: **1. Dr. H.J. Akshitha**, ICAR-IISR Regional Station, Appangala
2. Dr. B. Senthamizh Selvi, TNAU, Coimbatore

SESSION VI	Plenary Session	11.30 AM – 2.00 PM

Chairpersons : 1.Dr. N.K. Krishna Kumar, Former DDG (Hort.) ICAR, New Delhi
2. Dr. V. A. Parthasarathy, Former PC &Director, ICAR-IISR, Kozhikode
3. Dr. Vikramaditya Pandey, Asst. Director General (HS I), ICAR, New Delhi

Rapporteurs: 1. Dr. V. Sivakumar, Horticultural Research Station, Chintapalle
2. Dr. Muhammed Faisal Peeran, ICAR-IISR Regional Station, Appangala

Welcome	**Dr. C.K. Thankamani**
Presentation of Rapporteurs Reports and Recommendations:	**Dr. K.S. Krishnamurthy**
Address by the Chairpersons	**Dr. N.K. Krishna Kumar** **Dr. V. A. Parthasarathy** **Dr. Vikramaditya Pandey**
Vote of Thanks	**Dr. Pradip Kumar** Scientist ANDUAT, Kumarganj
National Anthem	

INAUGURAL SESSION

The XXXIII Annual Group Meeting (AGM) of ICAR-All India Coordinated Research Project on Spices (AICRPS) was conducted during 13-15 October 2022 at Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya, Uttar Pradesh. The inaugural session of the AICRPS Group meeting was initiated on 14 October 2022 with the lighting of lamp by the dignitaries, and garlanding the statue of Shri. Narendra Dev in whose name university is being titled, followed by the ICAR song. In his inaugural address, Dr. N.K. Krishna Kumar highlighted the need for strengthening the market potential and also creating market intelligence for quality spice trade in India. He also advised to conduct one day workshop for individual spice crops in their respective growing regions focusing mainly on production and market intelligence.

Dr. C. K. Thankamani, Director & Project Co-ordinator (Spices), ICAR-IISR, Kozhikode welcomed the gathering and highlighted the achievements of different centres under AICRP on Spices and action taken on recommendations that emanated during the XXXII Group Meeting with emphasis on various on-going research activities, new initiatives and flagship programmes pertaining to NE regions, SCSP and TSP. Dr. Bijendra Singh, Vice-Chancellor, ANDUAT, Kumarganj presided over the function and in his presidential address, he emphasised upon the importance of growing spices as intercrop for doubling the farmers income. He suggested to formulate appropriate research initiatives on natural farming of spices under fluctuating soil nutrient status, microbial dynamics and climatic variations in future to boost up the economy.

Dr. V. A. Parthasarathy, Former Director & PC (Spices), ICAR-IISR, Kozhikode was the guest of honour during the occasion. In his address, he emphasized on the growth of spices cultivation in scientific way over the last three decades and insisted to identify the potential of high curcumin turmeric and high capsaicin chillies germplasm from NEH regions. Also, he appreciated the initiatives of CVRC for fixing guidelines for variety proposal like stability analysis, DNA finger printing and assigning IC number for the germplasm. Ten extension booklets/pamphlets on spices production technologies in English and regional languages from different AICRPS centres were released during the occasion. During this inaugural session, different AICRPS centres exhibited their various crop varieties.

Dr. J. Rema, Former Director & PC (Spices), ICAR-IISR, Kozhikode, Dr. Homey Cheriyan, Director DASD, Kozhikode, Dr. Sanjay Pathak, Dean, College of Horticulture, ANDUAT, Kumarganj, Dr. S.N. Saxena, Acting Director, ICAR-NRC on Seed Spices, Ajmer, Rajasthan and Dr. A. B. Remashree, Director (Research), Spices Board, Kochi in their felicitation address emphasised on developing a regulatory framework for export of quality spices, value chain development in spices, quality-centric rather than production-centric research focus and enhancing the quality with respect to international standards, Geographical Indication (GI), creation of unique brands etc. 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:

- Data recording and units of the parameters should be presented uniformly
- More CVTs have to be initiated under seed spices
- Quality parameters under various experiments should be recorded without fail
- Score card pertaining to screening for various biotic and abiotic stress has to be developed by ICAR-NRCSS, Ajmer with due discussions with ICAR-AICRPS, Kozhikode
- All the centers should ensure the germination percentage and seed viability before submitting the samples for CVT
- Data on screening for pest and disease resistance (in brief) has to be presented in this session
- Title of all the CVT should be clear by emphasizing the trait/purpose for which the trial was initiated
- Navsari centre may identify attributes for vegetable turmeric and evaluate genotypes for vegetable purpose based on the identified attributes

Specific recommendations

Black pepper

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

- Germplasm characterization may be concluded at the Chintapalle centre

PEP/CI/3.5: CVT 2015 on Farmers varieties of black pepper- Series VII (Chintapalle, Sirsi, Panniyur, Dapoli, Yercaud)

- The trial should be continued for two more years

PEP/CI/3.6: CVT on black pepper 2015 – Series VIII (Chintapalle, Sirsi, Panniyur, Dapoli, Yercaud, Kahikuchi)

- Nil

PEP/CI/3.7: CVT 2018 on black pepper - Series IX (Ambalavayal, Chintapalle, Sirsi, Panniyur, Kozhikode, Dapoli, Yercaud)

- Nil

Small cardamom

CAR/CI/1.1: Germplasm collection, characterization, evaluation and conservation. (Mudigere, Pampadumpara)

- Nil

CAR/CI/3.7: CVT of drought tolerance in cardamom – Series VII. (Appangala, Mudigere, Sakaleshapura, Myladumpara Pampadumpara)

- The trial has been concluded and the centers are advised to submit the conclusion report.

CAR/CI/3.8: CVT 2015 on Farmers varieties of cardamom-Series VIII. (Appangala, Mudigere, Pampadumpara, Sakleshapura, Myladumpara)

- Nil

CAR/CI/3.9: CVT on hybrids of small cardamom-2018 – Series IX. (Appangala, Mudigere, Sakaleshapura, Myladumpara, Pampadumpara)

- Nil

CAR/CI/4.4: Multi location evaluation of thrips tolerant cardamom lines. (Appangala, Mudigere, Pampadumpara, Myladumpara, Sakaleshapura)

- Uniform management practices should be followed by all the centers
- Schedule of spraying has to be formulated and communicated to all the centers by ICAR-IISR, Kozhikode for screening purpose

CAR/CI/4.5: MLT on leaf blight tolerant lines of small cardamom 2018. (Appangala, Mudigere, Pampadumpara, Myladumpara, Sakaleshapura)

- Uniform management practices should be followed by all the centers
- Schedule of spraying has to be formulated and communicated to all the centers by ICAR-IISR, Kozhikode for screening purpose

Large cardamom

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

- CVT may be initiated after thorough discussion between ICAR & ICRI large cardamom centres, Sikkim. ICRI may provide the material.

Ginger

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

- Nil

GIN/CI/2.5: CVT on disease tolerance in ginger 2019. (Barapani, Chintapalle, Kozhikode, Pundibari, Pottangi, Nagaland, Gangtok, Raigarh)

- Nil

GIN/CI/4.3: Evaluation of genotypes of ginger for vegetable purpose (observational trial) (Kozhikode, Mizoram, Gangtok, Chintapalle, Pottangi, Pundibari, Nagaland)

- All the quality parameters *viz*., boldness, fibre and oil content should be analyzed during the current year and the superior genotype may be proposed for release in the ensuing workshop

Turmeric

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

- Nil

TUR/CI/2.7: CVT on mango ginger. (Ambalavayal, Pottangi, Kozhikode, Dholi, Barapani, Pundibari, Raigarh, Navsari)

- Nil

TUR/CI/2.8: CVT on high yield and high curcumin. (Kozhikode, Coimbatore, Guntur, Kammarpally, Pottangi, Kanke, Pasighat, Raigarh, Navsari).

- The samples of entries under CVT should be submitted to ICAR-IISR, Kozhikode for curcumin estimation

TUR/CI/2.9: CVT on light yellow colour turmeric for specialty market (Kozhikode, Coimbatore, Guntur, Kammarpally, Pottangi, Kanke, Pasighat)

- The samples of entries under CVT should be submitted to ICAR-IISR, Kozhikode for curcumin estimation

TUR/CI/2.10: CVT on aromatic turmeric, *Curcuma aromatica*. (Kozhikode, Coimbatore, Kammarpally, Pottangi, Pundibari, Navsari, Kalyani, Barapani)

- Nil

TUR/CI/2.11: CVT on black turmeric *Curcuma caesia*. (Kozhikode, Sirsi, Coimbatore, Kumarganj, Pottangi, Pundibari, Navsari, Mizoram)

- Nil

TUR/CI/3.9: Initial Evaluation Trial 2018. (Guntur).

- Nil

Tree Spices

TSP/CI/1.1: Germplasm collection, characterization, evaluation and conservation of clove, nutmeg and cinnamon. (Dapoli, Pechiparai)

- Nil

TSP/CI/1.2: Collection of unique germplasm in tree spices. (Dapoli, IISR, Thrissur, Pechiparai)

- Nil

TSP/CI/2.2: CVT 2001- Nutmeg. (Dapoli, Pechiparai)

- The ongoing project may be closed, as the yield level is very low and a new CVT may be proposed
- The trial has been concluded and the centers are advised to submit the conclusion report.

TSP/CI/2.4: Coordinated Varietal Trial on farmer's varieties of nutmeg. (Dapoli, Pechiparai, Thrissur)

- Nil

Project Mode: Evaluation of nutmeg genotypes. (Thrissur)

- Nil

Coriander

COR/CI/1.1: Germplasm collection, description, characterization, evaluation, conservation and screening against diseases. (Coimbatore, Dholi, Guntur, Hisar, Jagudan, Jobner, Kumarganj, Raigarh)

- Nil

COR/CI/1.3: Identification of drought/ alkalinity tolerant source in coriander. (Jobner)

- Nil

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)

- Nil

COR/CI/4.1: Quality evaluation in coriander. (Jobner)

- Nil

Fennel

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

- Nil

FNL/CI/2.8: Coordinated varietal trial on fennel–2021 Series XI. (Ajmer, Dholi, Hisar, Jabalpur, Jagudan, Jobner, Kumarganj, Pantnagar, Navsari)

- Nil

Fenugreek

FGK/CI/1.1: Germplasm collection, characterization, evaluation, conservation and screening against diseases. (Dholi, Guntur, Hisar, Jagudan, Jobner, Kumarganj, Raigarh)

- Nil

FGK/CI/1.3: Identification of drought tolerance source in fenugreek. (Jobner)

- CVT has to be proposed by the Jobner centre with the available data

FGK/CI/2.5: Coordinated varietal trial on fenugreek–2021 Series XI. (Ajmer, Dholi, Hisar, Jabalpur, Jagudan, Jobner, Kumarganj, Navsari, Pantnagar, Kota, Raigarh, Kalyani)

- Nil

FGK/CI/3.7: Chemo-profiling for identification of industrial types among the released varieties of fenugreek. (Ajmer, Coimbatore, Guntur, Dholi, Hisar, Jobner, Kumarganj)

- All the centers should submit the samples of released varieties and entries under CVT to ICAR-NRCSS, Ajmer for chemo-profiling.

Cumin

CUM/CI/1.1: Germplasm collection, characterization, evaluation, conservation and screening against diseases. (Jagudan, Jobner, Mandor, Sanand)

- Nil

CUM/CI/1.3: Identification of drought tolerance. (Jobner)

- CVT has to be proposed by the Jobner centre with the available data

CUM/CI/2.5: Coordinated varietal trial on cumin–2021. (Ajmer, Jagudan, Jobner, Mandor, Sanand)

- Nil

Tree spices

TSP/CI/2.2: CVT 2001- Nutmeg (Dapoli, Pechiparai)

- The ongoing project may be closed, as the yield level is very low and a new CVT may be proposed

Ajwain

AJN/CI/2.2: Coordinated Varietal Trial-2019. (Ajmer, Guntur, Hisar, Jobner, Jagudan, Kumarganj, Raigarh)

- Nil

Nigella

NGL/CI/2.2: Coordinated Varietal Trial-2019. (Ajmer, Hisar, Kota, Kalyani, Kumarganj, Raigarh, Pantnagar)

- Nil

Saffron

SF/CI/5.1: Conservation, evaluation and utilization of exotic and indigenous saffron germplasm lines. (Pampore)

- Nil

Kalazeera

KZ/CI/5.1: Exploration, collection and conservation of kalazeera from high altitudes of northern Himalayas. (Pampore)

- Nil
- Asafoetida trial may be initiated by the Pampore center subject to the availability of funds

Project code	Title	Centres	Comments
Black pepper			
PEP/CI/1.1	Germplasm collection, characterization, evaluation and conservation	Ambalavayal , Chintapalle, Dapoli, Sirsi, Panniyur, Pundibari, Yercaud	Continued
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 black pepper 2015 – 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
Large cardamom			
LCA/CI/1.1	Germplasm collection and evaluation of large cardamom	ICAR Regional Station, Gangtok, ICRI Regional Research Station, Gangtok	Continued
Small cardamom			
CAR/CI/1.1	Germplasm collection, characterization, evaluation and conservation	Mudigere, Pampadumpara	Continued
CAR/CI/3.7	CVT of drought tolerance in cardamom – Series VII	Appangala, Mudigere, Sakaleshapura, Myladumpara Pampadumpara	Concluded
CAR/CI/3.8	CVT 2015 on Farmers varieties of cardamom-Series VIII	Appangala, Mudigere, Pampadumpara, Sakleshapura, Myladumpara	Continued
CAR/CI/3.9	CVT on hybrids of small cardamom-2018 – Series IX	Appangala, Mudigere, Sakaleshapura, Myladumpara, Pampadumpara	Continued
CAR/CI/4.4	Multi location evaluation of thrips tolerant cardamom lines	Appangala, Mudigere, Pampadumpara, Myladumpara, Sakaleshapura	Continued
CAR/CI/4.5	MLT on leaf blight tolerant lines of small cardamom 2018	Appangala, Mudigere, Pampadumpara, Myladumpara, Sakaleshapura	Continued
Ginger			
GIN/CI/1.1	Germplasm collection, characterization, evaluation and conservation	Barapani, Dholi, Kumarganj, Pundibari, Pottangi, Raigarh, Solan	Continued

GIN/CI/2.5	CVT on disease tolerance in ginger 2019	Barapani, Chintapalle, Kozhikode, Pundibari, Pottangi, Nagaland, Gangtok, Raigarh	Continued
GIN/CI/4.3	Evaluation of genotypes of ginger for vegetable purpose (observational trial)	Kozhikode, Mizoram, Gangtok, Chintapalle, Pottangi, Pundibari, Nagaland	Continued
GIN/CI/2.6	CVT on bold ginger	Kozhikode, Pottangi, Raigarh, Sikkim, Appangala	New
GIN/CI/2.7	CVT on high essential oil ginger genotypes	Kozhikode, Pottangi, Nagaland, Umiam, Appangala	New
Turmeric			
TUR/CI/1.1	Germplasm collection, characterization, evaluation and conservation	Barapani, Coimbatore, Dholi, Guntur, Kammarpally, Kumarganj, Solan, Pasighat, Pottangi, Pundibari, Raigarh	Continued
TUR/CI/2.7	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, *Curcuma aromatica*	Kozhikode, Coimbatore, Kammarpally, Pottangi, Pundibari, Navsari, Kalyani, Barapani	Continued
TUR/CI/2.11	CVT on black turmeric *Curcuma caesia*	Kozhikode, Sirsi, Coimbatore, Kumarganj, Pottangi, Pundibari, Navsari, Mizoram	Continued
TUR/CI/3.9	Initial Evaluation Trial 2018	Guntur	Continued
Tree spices			
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, Thrissur, Pechiparai	Continued
TSP/CI/2.2	CVT 2001- Nutmeg	Dapoli, Pechiparai	Concluded
TSP/CI/2.4	Coordinated Varietal Trial on farmer's varieties of nutmeg	Dapoli, Pechiparai, Thrissur	Continued
Project Mode	Evaluation of nutmeg genotypes	Thrissur	Continued

Coriander			
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/2.8	Coordinated varietal trial on coriander–2021- Series XI	Ajmer, Coimbatore, Dholi, Guntur, Hisar, Jabalpur, Jagudan, Jobner, Kumarganj, Navsari, Pantnagar, Kota, Raigarh, Kalyani, Sanand	Continued
COR/CI/4.1	Quality evaluation in coriander	Jobner	Continued
Fennel			
FNL/CI/1.1	Germplasm collection, characterization, evaluation, conservation and screening against diseases	Dholi, Hisar, Jagudan, Jobner, Kumarganj	Continued
FNL/CI/2.8	Coordinated varietal trial on fennel–2021 Series XI	Ajmer, Dholi, Hisar, Jabalpur, Jagudan, Jobner, Kumarganj, Pantnagar, Navsari	Continued
Fenugreek			
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/2.5	Coordinated varietal trial on fenugreek–2021 Series XI	Ajmer, Dholi, Hisar, Jabalpur, Jagudan, Jobner, Kumarganj, Navsari, Pantnagar, Kota, Raigarh, Kalyani	Continued
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
Cumin			
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/2.5	Coordinated varietal trial on cumin–2021	Ajmer, Jagudan, Jobner, Mandor, Sanand	Continued
Ajwain			
AJN/CI/2.2	Coordinated Varietal Trial-2019	Ajmer, Guntur, Hisar, Jobner, Jagudan, Kumarganj, Raigarh	Continued

Nigella			
NGL/CI/2.2	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

- Uniform management practices with schedule of spraying in small cardamom trial should be communicated to all the centres by ICAR-IISR, Kozhikode for screening purpose
- Score card pertaining to screening for various biotic and abiotic stress in seed spices developed by NRCSS, Ajmer may be utilized in seed spices experimental trials with due discussions with ICAR-AICRPS, Kozhikode
- All the quality parameters *viz*., boldness, fibre and oil content in ginger should be analyzed during the current year and the superior variety may be proposed for release in the ensuing workshop
- Qualitative parameters have to be observed in all the trials
- Soil fertility should be analyzed in all the nutrient experimental trial
- Proper statistical analysis should be carried out for the interactive effect.
- Replicated data have to be send to the ICAR-AICRPS cell from all the trials
- Scientist should approach Spices Board for additional funds to initiate asafoetida experimental trial.

Specific recommendations

Black pepper

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

- Black pepper based mixed cropping system should be closed since sufficient data have not recorded.
- The trial has been concluded and the centers are advised to submit the conclusion report.

Large cardamom

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

- Large cardamom: Pesticide residue should be carried out in large cardamom capsules growing from Darjeeling Belt.

Small cardamom

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

- Nil

CAR/CM/5.6: Site specific recommendation for varying yield target of cardamom. (Mudigere, Pampadumpara, Appangala, Myladumpara, and Sakleshpura)

- Nil

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, Kalyani Nagaland, Mizoram, Sirsi)

- Nil

GIN/CM/5.1: Evaluation of Plant Growth Promoting Rhizobacteria, *Bacillus safensis* for phosphorus (P) solubilization potential in ginger.(Chintapalli, Kammarpally, Pundibari, Kumarganj, Kalyani, Pasighat, Raigarh Ambalavayal, Pottangi)

- Nil

GIN/CM/5.2: Evaluation of Plant Growth Promoting Rhizobacteria, *Bacillus safensis* for zinc (Zn) solubilization potential in ginger. (Chintapalli, Kammarpally, Pottangi, Kalyani, Pasighat, Kumarganj, Raigarh)

- Nil

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)

- Nil

TUR/CM/5.2 Evaluation of Plant Growth Promoting Rhizobacteria, *Bacillus safensis* for zinc (Zn) solubilization potential in turmeric. (Chintapalli, Kozhikode, Dholi, Kammarpally, Solan Pottangi, Pundibari, Pasighat, Kahikuchi, Kanke, Coimbatore, Kumarganj, Kalyani, Raigarh)

- Nil

Seed spices

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

- Quality parameters have to be analyzed during the final year of experimental trial

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, Pantnagar)

- The soil nutrient analysis should be carried out during initial and final stage of the crop
- The interaction effect of factors Zn and Fe should be included

- Jagudan Centre: The experimental trial needs to be re-visit to address the problem in experimental results.

Fenugreek

FGK/CM/5.9: Standardization of drip irrigation interval and method of micro nutrient fertigation in fenugreek. (Ajmer, Coimbatore, Hisar, Jagudan, Jabalpur, Jobner, Kumarganj, Kota, Raigarh, Pantnagar, Navsari)

- The interaction effect of drip and micro-nutrient in the experiment should be included with CV value
- Quality parameters should be included

Cumin

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

- Soil parameters, Quality parameters and interaction effects should be included.
- The recommendation has to be clear with exact figures and the replicated data should be submitted to the PC cell.

Project code	Title	Centres	Comments
Black pepper			
PEP/CM/4.7	Black pepper based mixed cropping system for sustainable productivity and food security	Ambalavayal, Sirsi, Dapoli Panniyur	Concluded
Large cardamom			
LAC/CM/5.1	Effect of mulching on yield of large cardamom	Pasighat, ICAR Gangtok, ICRI Gangtok	Continued
Small cardamom			
CAR/CM/5.5	Effect of micronutrients 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, Pampadumpara, Appangala, Myladumpara, and Sakleshpura	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, Kalyani Nagaland, Mizoram, Sirsi	Continued
GIN/CM/5.1	Evaluation of Plant Growth Promoting Rhizobacteria, *Bacillus safensis* for phosphorus (P) solubilization potential in ginger	Chintapalli, Kammarpally, Pundibari, Kumarganj, Kalyani, Pasighat, Raigarh Ambalavayal, Pottangi,	Continued
GIN/CM/5.2	Evaluation of Plant Growth Promoting Rhizobacteria, *Bacillus safensis* for zinc (Zn) solubilization potential in ginger	Chintapalli, Kammarpally, Pottangi, Kalyani, Pasighat, Kumarganj, Raigarh	Continued
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	Continued
TUR/CM/5.2	Evaluation of Plant Growth Promoting Rhizobacteria, *Bacillus safensis* for zinc (Zn) solubilization potential in turmeric	Chintapalli, Kozhikode, Dholi, Kammarpally, Solan Pottangi, Pundibari, Pasighat, Kahikuchi, Kanke, Coimbatore, Kumarganj, Kalyani, Raigarh	Continued
Seed spices			
SS/CM/4.1	Intercropping of seed spices with vegetables for higher yield and income	Jobner, Dholi, Kumarganj, Raigarh, Jagudan, Jabalpur, Hisar, Mandor, Pantnagar	Continued

Coriander			
COR/CM/5.1	Growth and yield of coriander as influenced by AMF (Arbuscular Mycorrhizal Fungi)	Dholi, Guntur, Kota, Ajmer	New
COR/CM/6.1	Effect of modern growth regulators on yield and quality of coriander	Jobner, Hisar, Jabalpur, Guntur, Kota	New
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, Pantnagar	Continued
Fenugreek			
FGK/CM/5.9	Standardization of drip irrigation interval and method of micro nutrient fertigation in fenugreek	Ajmer, Coimbatore, Hisar, Jagudan, Jabalpur, Jobner, Kumarganj, Kota, Raigarh, Pantnagar, Navsari	Continued
FGK/CM/5.1	Growth and yield of Fenugreek as influenced by AMF (Arbuscular Mycorrhizal Fungi)	Dholi, Mandor, Kota, Jabalpur, Guntur	New
FGK/CM/6.1	Effect of modern growth regulators on yield and quality of fenugreek	Jobner, Hisar, Kota Ajmer, Dholi	New
Cumin			
CUM/CM/5.5	Micronutrient management in cumin	Jobner, Jagudan, Mandor, Ajmer	Continued

TECHNICAL SESSION: III
CROP PROTECTION

General recommendations

- Scientific names of insect pests and diseases need to be mentioned in all crop Protection trials.
- Bt based formulations and neem based biopesticides need to be included as treatments for comparison in insecticide spray schedule optimization trials on ginger and turmeric.
- In small cardamom and black pepper fungicide evaluation trials, observations on weather variables like as precipitation, relative humidity, and soil moisture during the season must be recorded.
- Nematodes and their population need to be recorded in observational trials of black pepper, cardamom, ginger and turmeric with the help of a nematologist. If any centre is facing difficulties in this regard, samples may be sent to ICAR-IISR.
- New diseases including viral, phytoplasma and insect pests observed during the period need to be documented and presented.
- Observations on scale insect incidence during storage of seed rhizomes of ginger and turmeric have to be recorded in priming experiment

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)

- Nil

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

- Nil

PEP/CP/7.1: Screening of insecticides for pollu beetle, *Lanka ramakrishnai* in black pepper. (Panniyur, Ambalavayal, Pampadumpara, Appangala)

- High altitude station such as Ambalavayal and Pampadumpara can terminate the trial, where the pest incidence is least.

Small cardamom

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

- Explore the fungicides which is effective when the soil moisture reaches beyond saturation capacity.

CAR/CP/6.12: Evaluation of fungicides against leaf blight in small cardamom. (Appangala, Mudigere, Pampadumpara, Myladumpara).

- Nil

CAR/CP/6.13: Observational trial on the efficacy of *Trichoderma asperellum* and *Pochonia chlamydosporia* for the management of rhizome rot and nematodes in small cardamom. (Pampadumpara, Myladumpara, Appangala)

- Nil

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)

- Nil

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)

- Nil

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, Chintapalle, Pottangi, Barapani)

- Incidence of insect pests, disease pathogens and nematodes and their population need to be recorded in observational trials of ginger and turmeric with the help of an expert (Pathologist/Entomologist/Nematologist). If any centre is facing difficulties in this regard, samples may be sent to ICAR-IISR.

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)

- Observations on scale insect incidence during storage of seed rhizomes of turmeric have to be recorded in priming experiment

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)

- Bt based formulations and neem based biopesticides need to be included as treatments for comparison in insecticide spray schedule optimization trials on turmeric.

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)

- Nil

Coriander

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

- Yield data need to be included while conducting the trial
- Explore the possibility of azoxy + tebuconazole fungicide for recommendation for stem gall disease.

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)

- For seed spices, entomologist and pathologist working on seed spices should invited to attend the review meeting.

Project code	Title	Centres	Comments
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	Continued
PEP/CP/5.10	Observational trial on efficacy of *Trichoderma asperellum* and Pochonia *chlamydosporia* for the management of *Phytophthora* foot rot and nematodes in	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 nematodes in small cardamom	Pampadumpara, Myladumpara, Appangala	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, Chintapalle, 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/7.1	Screening of coriander varieties against stem gall disease	Dholi, Hisar, Kota, Jabalpur, Kumarganj	Continued
Cumin			
CUM/CP/7.1	Eco-friendly management of cumin blight	Jagudan, Jobner and Mandor	New
Fenugreek			
FGK/CP/ 7.1	Bio-efficacy of fungicides aganist powdery mildew of fenugreek	Jobner, Jagudan, Kota, Hisar, Jabalpur, Coimbatore	New
Nigella			
NGL/CP/7.1	Management of root rot of nigella	Dholi, Kumarganj & Raigarh	New
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 varieties were recommended for release

Crop	Variety	Centre	Salient features	Recommendations
Small cardamom	Appangala 3 (IC 349537)	ICAR-IISR, RS, Appangala	Moisture stress tolerant, 360 kg dry capsules yield/ha, essential oil 8.84 % and 50 % of the capsules are > 8 mm (under moisture stress)	The proposed variety has been recommended for release. Suitable for cardamom growing tracts of Karnataka and Kerala
Fennel	Gujarat Fennel 13 (JF 2013-19)	SDAU, Jagudan	High yielding 2112 kg/ha, high volatile oil yield (40.75 litre/ha) and Moderately resistant to *Ramularia* blight disease	The proposed variety is recommended subject to submission of revised proposal indicating tolerance to *Ramularia* blight by stability analysis. Project coordinator can take action if the tolerance is stable.

General Recommendations

- As per CVRC proforma, check list, POP, clear color photographs should be included in the proposal.
- In future, co-dominant markers such as SSR markers may be used instead of ISSR and RAPD markers and molecular profiling should be compared with parental genotype.

TECHNICAL SESSION V
TRANSFER OF TECHNOLOGY

Three technologies were presented in the session. The summary of the technologies and the decisions there of are given below.

Sl. No.	Crop	Technology	Technical details	Decisions
1.	Cumin	Micronutrient management in Cumin - SKNAU, Jobner	Application of half recommended dose of zinc, iron, manganese and boron as soil application along with their foliar spray is recommended for obtaining higher yield (684.6 kg/ha) with a high benefit cost ratio of 3.96 in cumin.	Recommended: Additional data on role of micronutrients on quality parameters need to be included. Soil test based micro nutrient recommendation need to be adopted
2.	Fenugreek	Standardization of drip irrigation interval and method of micro nutrient fertigation in fenugreek - SKNAU, Jobner and ICAR-NRCSS, Ajmer	Drip irrigation at four-day interval along with fertigation of all micronutrients is recommended for higher yield (1802 and 2516 kg/ha), higher economic returns (2.22 and 2.34 BC ratio) and higher water use efficiency (7.93 and 8.98 kg/ha-mm) at Jobner and Ajmer respectively	Technology is recommended for Rajasthan. Available soil moisture should also be integrated in irrigation scheduling.
3.	Cumin	Integrated pest & disease management in cumin by 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 infestation and the second spray after 10 days of the first spray) were found effective for getting higher yield, net realization and ICBR with less blight and aphid incidence.	Technology for blight control is recommended. Technology for aphid control is deferred for one more year with substantiated data on population of aphids, coccinellids and pollinators.

PLENARY SESSION

The Plenary Session of the XXXIII Annual AICRPS Group Meeting was held on 15 October 2022 at 11.30 AM. The session was jointly chaired by Dr. N.K. Krishna Kumar, Former DDG (Hort.) ICAR, New Delhi, Dr. V. A. Parthasarathy, Former PC & Director, ICAR-IISR, Kozhikode and Dr. Vikramaditya Pandey, Asst. Director General (HS I), ICAR, New Delhi.

Recommendation of the preceding five technical sessions were presented by Dr. K.S. Krishnamurthy.

Session 1: Plant genetic resources and crop improvement

- More CVTs for abiotic stress (eg. Moisture stress, frost, terminal heat) should be initiated
- Metabolic indexing/trait-specific profiling of released varieties and promising genotypes of seed spices through AICRPS need to be initiated (ICAR-NRCSS will lead)
- Weighted parameter indexing/score card (including quality parameters) for seed spices developed by ICAR-NRCSS should be refined and to be used during variety identification
- CVT on large cardamom should be initiated with promising genotypes available at ICRI, Spices Board and ICAR-RC NEH (Genotypes from virus-free zone need to be collected and conserved)
- CVT on green leafy coriander may be initiated (Focus must be on stem characters)

Session 2: Crop management

- All the quality parameters *viz*., boldness, fibre and oil content in ginger should be analyzed during the current year and the superior variety may be proposed for release in the ensuing workshop
- Quality parameters need to be observed in all the trials
- Soil fertility should be analyzed in all the nutrient experiments
- Proper statistical analysis should be carried out for the interaction effect and replicated data of all the trials need to be sent to the PC unit
- Large cardamom capsules from Darjeeling may be analyzed for pesticide residue.
- Scientists from Pampore centre may approach Spices Board for additional funds to conduct trial on asafoetida

Session 3: Crop protection

- Scientific names of insect pests and diseases need to be mentioned in all crop protection trials
- BT formulations and neem based biopesticides should be included as treatments for comparison in insecticide trials on ginger and turmeric
- Observations on weather parameters *viz*., precipitation, RH and soil moisture during the season have to be recorded in small cardamom and black pepper fungicide evaluation trials

- Nematodes and their population have to be recorded in observational trials of black pepper, cardamom, ginger and turmeric with the help of nematologist. Samples may be sent to ICAR-IISR, Kozhikode in case of non-availability of nematologists in the centres
- New diseases including virus, Phytoplasma and insect pests observed during the period should be documented and presented
- Observations on scale insect incidence during storage of seed rhizomes of ginger and turmeric have to be recorded in priming experiment

Session 4: Variety release

- As per CVRC proforma, check list, POP, clear colour photographs should be included in the proposal
- In future, codominant markers such as SSR markers may be used instead of ISSR and RAPD markers and molecular profiling should be compared with the parent genotype

Session 5: Transfer of technology

- All the recommended technologies need to demonstrated in SCSP and TSP programmes

Dr. C. K. Thankamani thanked the chair persons for their critical suggestions during the session and the XXXIII AICRPS Group Meeting came to an end at 2.00 PM with the formal vote of thanks by Dr. Pradip Kumar.

ACTION TAKEN REPORT 2021-22

Sl. No	Recommendation	Action taken
1.	Unique germplasm accessions have to be registered with ICAR-NBPGR, New Delhi	One nutmeg accession and two unique cumin accessions were registered with NBPGR. Five turmeric germplasm accessions were deposited with NAGS for registration under NBPGR. One high yielding and one disease tolerant accessions of large cardamom were collected. These will be registered after evaluation.
2.	Indexing of varieties based on weighted parameters should be developed for all the crops which help in short listing of best performing varieties	Parameters and their weightage have been fixed for indexing varieties in black pepper and cardamom. The same will be taken up for other crops also.
3.	Thrust should be given on organic production and micronutrient application and their effect on quality aspects of spices	Organic production and micronutrient application trials were conducted in all the ginger and turmeric centres and quality aspect was taken care of. In general, there was 5-10 % increase in essential oil and oleoresin contents in these trials.
4.	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	Observations on pest and disease incidence during critical stages of crop growth have been included in crop protection experiments.
5.	New molecules should be evaluated against major pests and pathogens of ginger and turmeric	New molecules such as Flubendamide Chlorantraniliprole, Spinosad (insecticides) and Tebuconazole, Fenamidone + Mancozeb (Fungicides) have been included in the trials. More new green label molecules will be tried for disease management.
6.	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.	In integrated pest and disease management trial in coriander and cumin, the population of predatory coccinellids at 3 and 7 days after second spray revealed that untreated control had more population, though the reduction was not drastic in pesticide treatments. Natural enemies will be monitored in other experiments also. Population of honey bees and natural enemies were found to be reduced by around 15-20% in case of cumin and coriander
7.	Recommendation of pesticides should be given only after residue analysis and which should be under acceptable limits	In technologies where pesticides/ fungicides/chemicals are involved, technologies are recommended only after confirming that pesticide levels are within the acceptable limits. Samples are sent to Kerala Agri. University for residue analysis. In the last AGM, technology on integrated pests and disease management in cumin and management of powdery mildew in cumin using new fungicide molecules were

		withheld for reconfirmation of pesticide residue levels
8.	PC unit may prepare a time frame for activities and it should be reviewed periodically	PC unit is monitoring the experimental trials and transfer of technology activities through online review meetings, visit to centres and through monthly report from the centres.

NEW RESEARCH PROGRAMMES

GENETIC RESOURCESAND CROP IMPROVEMENT

Project Code: GIN/CI/2.6	Title: CVT on bold ginger
Crop	Ginger
Centre	Kozhikode, Pottangi, Raigarh, Sikkim, Appangala
Year of start	2023
No. of treatments/genotypes	11 Genotypes 1. IISR 1 2. IISR 2 3. IISR 3 4. IISR 4 5. IISR 5 6. IISR 6 7. IISR 7 8. ICAR RC NER 1 9. ICAR RC NER 2 10. Bhaise (Control) 11. Nadia (Control)
Design	Randomized Block Design
No. of replications	Three
Plot size/spacing	3×1 m, spacing- 25x 25 cm
Observations to be taken	✓ Sprouting percentage ✓ Plant population at 50 DAP ✓ 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 (%) ✓ Fibre content (%) ✓ Oleoresin (%) ✓ Essential oil (%) Disease (rhizome rot, bacterial wilt) and pest (shoot borer) incidence, if any

Project Code: GIN/CI/2.7	Title: CVT on high essential oil ginger genotypes
Crop	Ginger
Centre	Kozhikode, Pottangi, Nagaland, Umiam, Appangala
Year of start	2023
No. of treatments/genotypes	9 Genotypes 1. IISR NE 1 2. IISR NE 2 3. IISR NE 3 4. IISR KG 1 5. IISR KG 2 6. IISR KG 3 7. SASARD 1 8. SASARD 2 9. Local (control)
Design	Randomized Block Design
No. of replications	Three
Plot size/spacing	3×1 m, spacing- 25x 25 cm
Observations to be taken	✓ Sprouting percentage ✓ Plant population at 50 DAP ✓ 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, bacterial wilt) and pest (shoot borer) incidence, if any

CROP PRODUCTION

Project Code: COR/CM/5.1	Title: **Growth and yield of coriander as influenced by AMF (Arbuscular Mycorrhizal Fungi)**
Crop	Coriander
Centres	Dholi, Guntur, Kota, Ajmer
Year of start	2022-23
No. of treatments/genotypes	9 Treatment combinations + 1 control (absolute control) Factor 1: Phosphorus level 1. 100% RDP 2. 75% RDP 3. 50% RDP Factor 2: Mode of application 1. Seed treatment 2. Soil application (20 days after sowing (@ 5 kg/acre) 3. Seed treatment (@ 100g/kg of seed at the time of sowing) + soil application (20 days after sowing (@ 5 kg/acre)
Design	FRBD
No. of replications	Three
Plot size/spacing	4 x 2.4 m, Spacing- 30 x 10 cm
Observations to be taken	✓ Vigour (Plant height in cm) ✓ No. of days to 50% flowering ✓ No. of primary branches/plant ✓ No. of secondary branches/plant ✓ No. of umbels/plant ✓ No. of umbellets/umbel ✓ No. of seeds/umbel ✓ Duration (No. of days to maturity) ✓ Yield (q/ha) ✓ Essential oil (%) ✓ Soil and plant P uptake ✓ Economics and B:C ratio

Project Code: FGK/CM/5.1	Title: **Growth and yield of fenugreek as influenced by (Arbuscular Mycorrhizal Fungi)**
Crop	Fenugreek
Year of start	2022-23
Centres	Dholi, Mandor, Kota, Jabalpur, Guntur
No. of treatments/genotypes	9 Treatment combinations + 1 control (absolute control) Factor 1: Phosphorus level 1. 100% RDP 2. 75% RDP 3. 50% RDP Factor 2: Mode of application 1. Seed treatment (@ 100g/kg of seed) 2. Soil application- (20 days after sowing (@ 5 kg/acre) 3. Seed treatment + soil application
Design	FRBD
No. of replications	Three
Plot size/spacing	4 x 2.4 m, Spacing- 30 x 10 cm
Observations to be taken	✓ Plant height (cm) ✓ No. of days to 50% flowering ✓ No. of pods/plant ✓ Length of pod (cm) ✓ No. of seeds/pod ✓ Weight of 1000 seeds ✓ Duration ✓ Yield (q/ha) ✓ Diosgenin content (mg/100g) ✓ Soil and plant P uptake ✓ Economics and B:C ratio

Project Code: COR/CM/6.1	Title: Effect of modern growth regulators on yield and quality of coriander
Crop	Coriander
Centres	Jobner, Hisar, Jabalpur, Guntur, Kota
Year of start	2022-23
No. of treatments/genotypes	9 Treatments 1. Salicylic acid @ 50 ppm 2. Salicylic acid @ 100 ppm 3. Jasmonic acid @ 50 ppm 4. Jasmonic acid @ 100 ppm 5. Benzyl adenine @ 10 ppm 6. Benzyl adenine @ 20 ppm 7. Brassinosteroid @ 0.50 ppm 8. Brassinosteroid @ 1.00 ppm 9. Water spray
Design	Randomized Block Design
No. of replications	Three
Plot size/spacing	4 x 2.4 m, Spacing- 30 x 10 cm
Observations to be taken	✓ Vigour (Plant height in cm) ✓ No. of days to 50% flowering ✓ No. of primary branches/plant ✓ No. of secondary branches/plant ✓ No. of umbels/plant ✓ No. of umbellets/umbel ✓ No. of seeds/umbel ✓ Duration (No. of days to maturity) ✓ Yield (q/ha) ✓ Essential oil (%) ✓ Economics and B:C ratio

Project Code: FGK/CM/6.1	Title: Effect of modern growth regulators on yield and quality of fenugreek
Crop	Fenugreek
Centres	Jobner, Hisar, Kota, Ajmer, Dholi
Year of start	2022-23
No. of treatments/genotypes	8 Treatments 1. Salicylic acid @ 50 ppm 2. Salicylic acid @ 100 ppm 3. Jasmonic acid @ 50 ppm 4. Jasmonic acid @ 100 ppm 5. Benzyl adenine @ 10 ppm 6. Benzyl adenine @ 20 ppm 7. Brassinosteroid @ 0.50 ppm 8. Brassinosteroid @ 1.00 ppm 9. Water spray
Design	Randomized Block Design
No. of replications	Three
Plot size/spacing	4 x 2.4 m, Spacing- 30 x 10 cm
Observations to be taken	✓ Plant height (cm) ✓ No. of days to 50% flowering ✓ No. of pods/plant ✓ Length of pod (cm) ✓ No. of seeds/pod ✓ Weight of 1000 seeds ✓ Duration ✓ Yield (q/ha) ✓ Diosgenin content (mg/100g) ✓ Economics and B:C ratio

CROP PROTECTION

Project Code: CUM/CP/7.1		Project title: Eco-friendly management of cumin blight
Centers		Jagudan, Jobner and Mandor
Period		Rabi 2022 to Rabi 2024
Crop & variety		Cumin, Gujarat Cumin 4 (GC 4)
Design, Replication, Plot size Spacing and Seed rate		Randomized Block Design**,** Three (03), 4.0 m x 3.0 m(Gross), 3.0 m x 24 m (Net), 30 cm row spacing, 10-12 kg/ha
Treatments		**:** Eleven (11)
T1	Seed treatment	*Pseudomonas fluorescens* 1.15 WP (1x10^8 cfu/g) @ 10 g / kg seed
	Precautionary sprays (4 sprays)	*Pseudomonas fluorescens* 1.15 WP (1x10^8 cfu/g) @ 50 g / 10 L water
T2	Seed treatment	*Pseudomonas fluorescens* 1.15 WP (1x10^8 cfu/g) @ 10 g / kg seed + *Trichoderma harzianum* 1.15 WP (2x10^6 cfu/g) @ 10 g / kg seed
	Precautionary sprays (4 sprays)	*Pseudomonas fluorescens* 1.15 WP (1x10^8 cfu/g) @ 50 g / 10 L water + *Trichoderma harzianum* 1.15 WP (2x10^6 cfu/g) @ 50 g / 10 L water
T3	Seed treatment	*Pseudomonas fluorescens* 1.15 WP (1x10^8 cfu/g) @ 10 g / kg seed + *Trichoderma viride* 1.15 WP (2x10^6 cfu/g) @ 10 g / kg seed
	Precautionary sprays (4 sprays)	*Pseudomonas fluorescens* 1.15 WP (1x10^8 cfu/g) @ 50 g / 10 L water + *Trichoderma viride* 1.15 WP (2x10^6 cfu/g) @ 50 g / 10 L water
T4	Seed treatment	*Trichoderma harzianum* 1.15 WP (2x10^6 cfu/g) @ 10 g / kg seed
	Precautionary sprays (4 sprays)	*Trichoderma harzianum* 1.15 WP (2x10^6 cfu/g) @ 50 g / 10 L water
T5	Seed treatment	*Trichoderma viride* 1.15 WP (2x10^6 cfu/g) @ 10 g / kg seed
	Precautionary sprays (4 sprays)	*Trichoderma viride* 1.15 WP (2x10^6 cfu/g) @ 50 g / 10 L water
T6	Seed treatment	*Bacillus subtilis* 1.15 WP (1x10^8 cfu/g) @ 10 g / kg seed
	Precautionary sprays (4 sprays)	*Bacillus subtilis* 1.15 WP (1x10^8 cfu/g) @ 40 g / 10 L water
T7	Seed treatment	*Bacillus subtilis* 1.15 WP (1x10^8 cfu/g) @ 10 g / kg seed + *Trichoderma harzianum* 1.15 WP (2x10^6 cfu/g) @ 10 g / kg seed
	Precautionary sprays (4 sprays)	*Bacillus subtilis* 1.15 WP (1x10^8 cfu/g) @ 40 g / 10 L water + *Trichoderma harzianum* 1.15 WP (2x10^6 cfu/g) @ 50 g / 10 L water

T8	Seed treatment	*Bacillus subtilis* 1.15 WP ($1x10^8$ cfu/g) @ 10 g / kg seed + *Trichoderma viride* 1.15 WP ($2x10^6$ cfu/g) @ 10 g / kg seed
	Precautionary sprays (4 sprays)	*Bacillus subtilis* 1.15 WP ($1x10^8$ cfu/g) @ 40 g / 10 L water + *Trichoderma viride* 1.15 WP ($2x10^6$ cfu/g) @ 50 g / 10 L water
T9	Seed treatment	*Bacillus subtilis* 1.15 WP ($1x10^8$ cfu/g) @ 10 g / kg seed + *Pseudomonas fluorescens* 1.15 WP ($1x10^8$ cfu/g) @ 10 g / kg seed
	Precautionary sprays (4 sprays)	*Bacillus subtilis* 1.15 WP ($1x10^8$ cfu/g) @ 40 g / 10 L water + *Pseudomonas fluorescens* 1.15 WP ($1x10^8$ cfu/g) @ 50 g / 10 L water
T10	Standard chemical Check (3 sprays)	Three sprays of kresoxim- methyl 44.3 SC @ 0.044 % (10 ml/10 L water) (First spray at 35 days after germination and subsequent two spays at 10 days interval after first spray)
T11	Control	Water spray
		Note: Common furrow application of neem cake @ 1 t/ha will be made at the time of sowing
	Observations	✓ Percent disease intensity (PDI) after last spray ✓ Seed yield (q/ha) ✓ 1000 seed weight ✓ Volatile oil (%) ✓ Fungicide residue analysis, if requires ✓ Economics and cost benefit ratio

Project Code : FGK/CP/ 7.1	Bio-efficacy of fungicides aganist powdery mildew of fenugreek
Centres	Jobner, Jagudan, Kota, Hisar, Jabalpur, Coimbatore
Date/Year of start	*Rabi* 2022-23
Duration of the Project	Three years (will be concluded in *Rabi* 2024-25)
Background information	Powdery mildew is a serious problem in fenugreek. Hence it is proposed to find out suitable chemical control measures for the management of powdery mildew in fenugreek.
Objective(s)	To find out the safer, suitable and most effective chemical control measures for the control of powdery mildew diseases in fenugreek.
Design	R.B.D.
No. of replications	Three
Plot size/spacing	3 x 2.5 m spacing : 30 x 10 cm
No. of plants/plot/treatment	250
No. of treatments/genotypes with details	T_1 = Two foliar spray of Azoxystrobin 23 % EC @ 0.1% T_2 = Two foliar spray of Tebuconazole 25.9 % EC @ 0.1% T_3 = Two foliar spray of Hexaconazole 5% SC @ 0.1% T_4 = Two foliar spray of Propiconazole 25% EC @ 0.1% T_5 = Two foliar spray of Myclobutanil 10% WP @ 0.05% T_6 = Package of respective SAUs (Standard check) T_7 = Control Note: Fungicides will be sprayed twice at 15 days interval starting from the appearance of the disease.
Lay-out plan	As per the requirement of the design
Methodology & procedure to be adopted	The aforesaid treatments will be applied twice at 15 days interval starting from the appearance of the disease.
Observations to be recorded	The following observations will be recorded to evaluate the trial. i. Per cent disease intensity (PDI) (Powdery mildew) ii. Test weight 1000 seeds(g) iii. Seed yield (q/ha) iv. Residue analysis v. Economics (ICBR Ratio)

Project Code: NGL/CP/7.1	Title: Management of root rot of nigella
Crop	Nigella
Year of start	*Rabi*, 2022-23
Duration	Three years (2022-23 to 2024-25)
Centres	Dholi, Kumarganj & Raigarh
Plan of work	Design: RBD; Treatment: 7; Replication: 3 Plot size: 3.0 x 1.0 m; Spacing: 30 × 10cm **Treatment details:** T_1: Soil application with Talc based *Trichoderma viride* @2.5kg multiplied in minimum 250kg FYM per ha. T_2: Soil application with Mustard oil cake @1 ton per ha. T_3: Soil application with Neem cake @1 ton per ha. T_4: Soil application with Castor oil cake @1 ton per ha. T_5: Soil drenching with Boscalid (25.2%) + Pyraclostrobin (12.8%) WG @0.2%. T_6: Soil drenching with Azoxystrobin (20%) + Difenoconazole (12.5%) SC @0.2%. T_7: Control. **Method of soil drenching:** 2.0g or 2.0ml of fungicides should be mixed per lit. of water. 3.0 lit. of thus prepared fungicidal solution should be applied per bed ($3m^2$) for soil drenching. **Schedule of soil drenching (3 times):** Ist - One week prior to sowing; 2nd - 45DAS & 3rd – 60DAS.
Observations to be recorded	✓ Date of observation of 1st disease incidence ✓ Per cent disease incidence (PDI) ✓ Yield (kg/ha) ✓ Incremental Cost Benefit Ratio (ICBR) ✓ Fungicide Residue Analysis in seeds after harvest. ✓ $Per\ cent\ disease\ incidence\ (PDI) = \frac{\text{No.of disease plants}}{Total\ no.of\ plants} x100$ ✓ $Incremental\ Cost\ Benefit\ Ratio\ (ICBR) = \frac{\text{Income from yield increased over control/ha}}{Expenditure\ incured\ for\ sparying/ha} x100$

LIST OF PARTICIPANTS

Indian Council of Agricultural Research, Pusa, KAB-II, New Delhi-110 012	
1.	Dr. A.K. Singh, Deputy Director General (Hort. Science)
2.	Dr. Vikramaditya Pandey, Assistant Director General i/c (HS I.)
Special Invitees	
3.	Dr. Bijendra Singh, Vice-Chancellor, ANDUAT, Kumarganj, U.P.
4.	Dr. N. K. Krishna Kumar, Former DDG (Hort. Science), ICAR & Chairman, RAC, ICAR-IISR, Kozhikode
5.	Dr. V. A. Parthasarathy, Former Director & PC (Spices), ICAR-IISR, Kozhikode
6.	Dr. J. Rema, Former Director & PC (Spices), ICAR-IISR, Kozhikode
7.	Dr. Homey Cheriyan, Director, Directorate of Arecanut & Spices Development, Kozhikode
8.	Dr. Sanjay Pathak, Dean, College of Horticulture, ANDUAT, Kumarganj
9.	Dr. A. B. Remashree, Director (Research), Spices Board, Kochi
ICAR-Indian Institute of Spices Research, Kozhikode-673 012, Kerala	
10.	Dr. C.K. Thankamani, Director, ICAR-IISR & Project Coordinator (AICRPS)
11.	Dr. V. Srinivasan, Principal Scientist
12.	Dr. A. Ishwara Bhat, Principal Scientist
13.	Dr. N.K. Leela, Principal Scientist
14.	Dr. D. Prasath, Principal Scientist
15.	Dr. C.M. Senthil Kumar, Principal Scientist
16.	Dr. R. Praveena, Scientist
17.	Dr. Sharon Aravind, Scientist
Project Coordinator's Unit	
18.	Dr. K.S. Krishnamurthy, Principal Scientist
19.	Dr. Alagupalamuthirsolai, Scientist
ICAR-IISR Regional Station, Appangala-571 201, Coorg Dist., Karnataka	
20.	Dr. S. J. Ankegowda, Head
21.	Dr. Muhammed Faisal Peeran, Scientist
22.	Dr. M. S. Shivakumar, Scientist
23.	Dr. H. J. Akshitha, Scientist
ICAR-NRC on Seed Spices, Ajmer-305206, Rajasthan	
24.	Dr. S. N. Saxena, Acting Director
25.	Dr. Shyam Sunder Meena, Principal Scientist (Plant Breeding)
26.	Dr. Ravindra Singh, Principal Scientist (Agronomy)
27.	Dr. R S Meena, Principal Scientist (Plant Breeding)
28.	Dr. S S Meena, Principal Scientist (Horticulture)
COORDINATING CENTRES	
Cardamom Research Station (Kerala Agricultural University), Pampadumpara – 685 553, Dist. Idukki, Kerala	
29.	Dr. Nimisha Mathews, Asst. Professor (Agron/Hort.)
Pepper Research Station, (Kerala Agricultural University), PB No. 113, Kanjirangadu (P.O.), Karimbam (via), Taliparamba, Panniyur – 670 142, Kannur Dist., Kerala	
30.	Dr. Yamini Varma, C. K., Professor (Plant Pathology) & Head
31.	Dr. Reshmy Paul, Assistant Professor (Horticulture)
32.	Dr. Sudha. B, Assistant Professor (Agronomy)
Zonal Agricultural & Horticultural Research Station, AICRP on Spices, Mudigere-577 132	
33.	Dr. M. Shivaprasad, ADR & OIC- AICRPS
Horticultural Research Station, (University of Horticultural Sciences, Bagalkot), Sirsi	
34.	Mr. Sudheesh Kulkarni, Asst. Professor (Spices & Plantation crops)
Horticultural Research Station, (TNAU), Yercaud, Tamil Nadu	

35.	Dr. V. A. Sathiyamurthy, Professor & Head
Dept. of Spices and Plantation Crops, HC & RI, Tamil Nadu Agricultural University, Coimbatore-641 003, Tamil Nadu	
36.	Dr. R. Senthamizh Selvi, Asst. Professor (Horticulture)
37.	Dr. S. Maruthasalam, Asst. Professor. (Plant Pathology)
Turmeric Research Station (SKLTHU), Kammarpally-503 308, Nizamabad Dist., Telangana	
38.	Dr. B. Mahender, Scientist (Plant Pathology), OIC-AICRPS
39.	Dr. P. Srinivas, Scientist (Hort)
Horticultural Research Station, Dr. Y.S.R. Horticultural University, Chintapalle, 531 111, AP	
40.	Dr. V. Sivakumar, Asst. Professor (Hort.)
Horticultural Research Station, Dr. Y.S.R. Horticultural University, Guntur, 522 034, AP	
41.	Dr. K. Giridhar, Principal Scientist & Breeder
42.	Dr. Tanuja Priya, Scientist (H)
Department of Vegetable Science, College of Horticulture (Dr YS Parmar Univ. of Horticulture & Forestry), Solan-173 230, Himachal Pradesh	
43.	Dr. Meenu Gupta, Jr. Plant Pathologist
High Altitude Research Station, (Odisha Univ. of Agrl. & Technology), Pottangi-764 039, Dist. Koraput, Odisha	
44.	Dr. Parshuram Sial, ADR
Dept. of Plant Breeding & Genetics, SKN College of Agriculture (Sri Karan Narendra Agricultural University), Jobner-303 329, Dist. Jaipur, Rajasthan	
45.	Dr. A.C. Shivran, Sr. Horticulturist
46.	Dr. S.S. Punia, Sr. Breeder
47.	Dr. G.L. Kumawat, Asst. Plant Pathologist
48.	Dr. S.S Rajput, Assistant Professor (Plant Breeding)
49.	Dr. G.K. Mithal, Assistant Professor
Centre for Research on Seed Spices (CRSS), Sardarkrushinagar Dantiwada Agricultural University (SDAU), Jagudan – 382 710, Dist. Mehsana, Gujarat	
50.	Dr. N R Patel, Associate Research Scientist (Pl. Pathology)
51.	Dr. Surabhi S Chauhan, Jr. Breeder
52.	Dr. P.J Patel, Associate Research Scientist
Department of Vegetable Science, (Chaudhary Charan Singh Haryana Agril. University), Hisar – 125 004, Haryana	
53.	Dr. T.P. Malik, Principal Scientist & Head
54.	Dr. S. K. Tehlan, Principal Scientist (Pl. Pathology)
Department of Horticulture, Tirhut College of Agriculture (Rajendra Agrl. University), Dholi - 843 121, Musaffarpur, Bihar	
55.	Dr. A.K. Mishra, Jr. Plant Pathologist
Department of Vegetable Science, (Narendra Deva University of Agril. & Technology), Narendra Nagar Post, Kumarganj, Faizabad - 224 229, Uttar Pradesh	
56.	Dr. Pradip Kumar, Jr. Pathologist
Faculty of Horticulture, Uttara Banga Krishi Vishwavidyalaya, North Bengal Campus, Pundibari P.O, Dist. Cooch Behar, West Bengal – 736 165	
57.	Dr. Anamika Debnath, Asst. Professor (Plant Pathology)
58.	Dr. Ramkrishna Sarkar, Assoc. Prof and In-Charge of AICRPS
Department of Horticulture, (Konkan Krishi Vidyapeeth), Dapoli-415 712	
59.	Dr. P. C. Mali, Associate Professor
60.	Dr. A. V. Bhuwad, Jr. Breeder
Regional Agril. Research Station, (Indira Gandhi Agricultural University), Boirdadar Farm, Raigarh – 496 001, Dist. Raigarh, Chhattisgarh	
61.	Dr. Ajit Kumar Singh, Jr. Pathologist, OIC, AICRPS

62.	Dr. Shrikant Lakxmikant Sawargaonkar, Jr. Breeder
CO-OPTING CENTRES	
Indian Cardamom Research Institute, Myladumpara, Kailasanadu – 685 553, Idukki Dist.	
63.	Dr. K. Pradip Kumar, Scientist-C
64.	Dr. K.A. Saju, Scientist-C
Indian Cardamom Research Institute, Sakleshpur	
65.	Dr. Sreekrishna Bhat, Scientist-C
ICRI Regional Station (Spices Board), Yakthung, Tadong, Gangtok – 737 102, Sikkim	
66.	Dr.T. N. Deka, (Scientist-C) and In-Charge, AICRPS
Regional Agricultural Research Station, (Kerala Agril. University), Ambalavayal – 673 593, Kerala	
67.	Dr. Najeeb Naduthodi, Asst. Professor
Horticultural Research Station (TNAU), Pechiparai – 629 161, Kanyakumari Dist., Tamil Nadu	
68.	Dr. Prem Joshua, Professor
ICAR Research Complex for NEH Region, Umroi Road, Ri-Bhoi-79 3 103, Barapani, Meghalaya (Umiam)	
69.	Dr. M. Bilashini Devi, Scientist
ICAR Res. Complex for NEH Region, Regional Station, Mizoram Centre, Kolasib – 796 081, Mizoram	
70.	Dr.Jeetendra Kumar Soni, Scientist (Agronomy)
ICAR Res. Complex for NEH Region, Regional Station, Sikkim Centre, Tadong, Gangtok - 737 102, Sikkim	
71.	Dr. Amit Kumar, Scientist (Agronomy)
Department of Horticulture, SASRD, Nagaland University, Medziphema-797 106, Dimapur, Nagaland	
72.	Dr. C. S. Maiti, Professor (Hort.)
73.	Dr. Graceli I Yepthomi, Asst. Prof
Horticultural Research Station, Assam Agricultural University, Jorhat- 785013, Assam	
74.	Dr. Kusum Kr. Deka, Sr. Scientist (Hort.)
College of Horticulture & Forestry, Central Agricultural University, Pasighat-791 102, Arunachal Pradesh	
75.	Dr. Chandra Deo, Professor
VOLUNTARY CENTRES	
Govind Ballabh Pant University of Agriculture and Technology, College of Agriculture, Pantnagar-263 145, Distt. Udham Singh Nagar, Uttarakhand	
76.	Dr. Dhirendra Singh, Professor
BIRSA Agricultural University, Kanke, Ranchi-834006, Jharkhand	
77.	Dr. Arun Kumar Tiwari, Scientist (Hort.)
Bidhan Chandra Krishi Vishwa Vidhyalay, Directorate of Research, Faculty of Horticulture, Kalyani-741 235, Dist. Nadia, WB	
78.	Dr. Anupam Pariari, Professor & PI of AICRPS
Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur-482004, Madhya Pradesh	
79.	Dr. Reena Nair, Asst. Professor
Seed Spices Research Station, Anand Agricultural University, Sanand	
80.	Dr. T.T. Patel, Asst. Research Scientist
Agricultural University, Jodhpur, Mandor-342304	
81.	Dr. Ramesh, Asst. Professor (Agron.)
Agricultural Research Station, AUK, Kota-324001	
82.	Dr. Preethi Verma, Asst. Professor
NM College of Agriculture, Navsari Agricultural University, NAVASARI-396450	

83.	Dr. Ritesh K. Patel, Associate Professor
84.	Dr. Madhu Bala. Assistant Professor
PROJECT MODE CENTRES	
Kerala Agricultural University, Vellanikkara-680 656, Kerala	
85.	Dr. Vikram H. C, Asst. Prof & PI.
SRS, Sher-e-Kashmir Univ. of Agricultural Sciences & Technology, Kashmir	
86.	Dr. Mudasir H. Khan, Asst. Prof.

Annexure-I

Research programme at a glance (crop-wise)

Crop	Crop Improvement			Crop Management			Crop Protection			Total
	Ongoing projects	Closed projects	New projects	Ongoing projects	Closed projects	New projects	Ongoing projects	Closed projects	New projects	Ongoing 2022-23
Black pepper	4	-	-	-	1	-	3	-	-	7
Small cardamom	6	1	-	2	-	-	3	-	-	11
Large cardamom	1	-	-	1	-	-	-	-	-	2
Ginger	3	-	2	3	-	-	3	-	-	9
Turmeric	7	-	1	2	-	-	3	-	-	12
Tree spices	4	1	-	-	-	-	1	-	-	5
Coriander	4	-	-	-	-	2	-	-	-	4
Cumin	3	-	-	1	-	-	-	-	1	4
Fennel	2	-	-	1	-	-	-	-	-	3
Fenugreek	4	-	-	1	-	2	-	-	1	5
Ajwain	1	-	–	-	-	-	-	-	-	1
Nigella	1	-	-	-	-	-	-	-	1	1
Saffron	1	-	–	-	-	-	-	-	-	1
Kalazeera	1	-	-	-	-	-	-	-	-	1
Seed spices	-	-	-	1	-	-	1	-	-	2
Total	42	2	3	12	1	4	14	-	3	68

Annexure-II

Research programme at a glance (Centre-wise)

Sl. N.	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. Reshmi Paul Dr. Sudha B.	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, TUR/CI/2.11 (10)
5	Yercaud (TNAU)	Dr. V. A. Sathyamurthy	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. Murathasalam	TUR/CI/1.1, TUR/CI/2.8, TUR/CI/2.9, TUR/CI/2.10, TUR/CI/2.11, TUR/CI/2.12, COR/CI/1.1, COR/CI/2.8, COR/CM/5.1, COR/CM/6.1, 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, FGK/CP/7.1 (18)
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/2.12, 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 YSRHU)	Dr. K. Giridhar Dr. Tanuja Priya	TUR/CI/1.1, TUR/CI/2.8, TUR/CI/2.9, TUR/CI/3.9, TUR/CI/2.12, COR/CI/1.1, COR/CI/2.8, FGK/CI/1.1, FGK/CI/3.7, AJN/CI/2.2, COR/CM/5.1, COR/CM/6.1, FGK/CM/5.1, TUR/CP/7.9, TUR/CP/7.10, SS/CP/7.1 (16)
10	Solan (YSPUHF)	Dr. Meenu Gupta	GIN/CI/1.1, TUR/CI/1.1, GIN/CM/4.1, TUR/CM/5.1, TUR/CM/5.2, GIN/CP/6.15, TUR/CP/7.8 (7)
11	Pottangi (OUAT)	Dr. Parshuram Sial	GIN/CI/1.1, GIN/CI/2.5, GIN/CI/2.6, GIN/CI/2.7, 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 (21)
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, COR/CI/4.1, 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/2.2, COR/CM/6.1, CUM/CM/ 5.5, FGK/CM/5.9, FGK/CM/6.1, FNL/CM/5.1, SS/CM/4.1, CUM/CP/7.1, FGK/CP/7.1, SS/CP/7.1 (23)
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/2.2, FNL/CM/5.1, CUM/CM/5.5, FGK/CM/5.9, SS/CM/4.1, SS/CP/7.1, CUM/CP/7.1, FGK/CP/7.1 (16)
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/2.2, NGL/CI/2.2, FNL/CM/5.1, COR/CP/7.1, SS/CM/4.1, COR/CM/6.1, FGK/CM/5.9, FGK/CM/5.1, FGK/CM/6.1 (16)
15	Dholi (RAU)	Dr. A.K. Mishra	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, FNL/CM/5.1, SS/CM/4.1, GIN/CP/6.15, TUR/CP/7.8, COR/CP/7.1, SS/CP/7.1, TUR/CI/2.12, COR/CM/5.1, FGK/CM/6.1, NGL/CP/7.1 (21)
16	Kumarganj (NDUAT)	Dr. Pradip Kumar	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/5.2, FNL/CM/5.1, SS/CM/4.1, TUR/CP/7.8, COR/CP/7.1, SS/CP/7.1, TUR/CI/2.11, GIN/CM/5.1, GIN/CM/5.2, FGK/CM/6.1, NGL/CP/7.1 (23)
17	Pundibari (UBKVV)	Dr. Anamika Debnath Dr. Ramakrishna Sarkar	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/CI/2.11, TUR/CM/5.1, 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 Dr. A.V Bhuwad	PEP/CI/1.1, PEP/CI/3.5, PEP/CI/3.6, PEP/CI/3.7, TUR/CI/2.11, TSP/CI/1.1, TSP/CI/1.2, TSP/CI/2.2, TSP/CI/2.4, PEP/CM/4.7, PEP/CP/5.8(11)
19	Raigarh (IGKVV)	Dr. Ajit Kumar Singh Dr. Shrikant Laxmikant Sawargaonkar	GIN/CI/1.1, GIN/CI/2.5, GIN/CI/2.6, GIN/CI/2.7, TUR/CI/1.1, TUR/CI/2.7, TUR/CI/2.8, 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, FGK/CM/5.9, NGL/CP/7.1, GIN/CP/6.15, TUR/CP/7.8, SS/CP/7.1 (23)
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, TUR/CM/5.1, GIN/CP/6.15, GIN/CP/7.1, TUR/CP/7.8, TUR/CP/7.9 (10)
21	Pechiparai (TNAU)	Dr. Jaya Jasmine	TSP/CI/1.1, TSP/CI/1.2, TSP/CI/2.2, TSP/CI/2.4 (4)

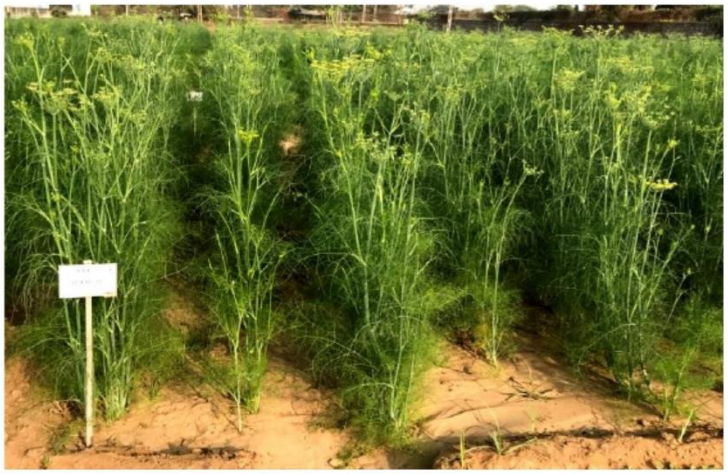
22	Gangtok (ICRI)	Dr. Ashuthosh Goutam	LCA/CI/1.1, LCA/CM/5.1(2)
23	Sakleshpur (ICRI)	Dr. Sreekrishna Bhat	CAR/CI/3.8, CAR/CM/5.5, CAR/CM/5.6 (3)
24	Myladumpara (ICRI)	Dr. K. Pradip Kumar Dr. K.A. Saju	CAR/CI/3.7, CAR/CI/3.8, CAR/CI/3.9, CAR/CI/4.4, CAR/CI/4.5, CAR/CM/5.5, CAR/CM/5.6, CAR/CP/6.11, CAR/CP/6.12, CAR/CP/6.13 (10)
25	ICAR RC 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/CP/6.15, GIN/CP/7.1, GIN/CP/7.2, TUR/CI/2.10, TUR/CI/2.12, TUR/CP/7.9, TUR/CP/7.10, (11)
26	ICAR RC NEHR, Mizoram	Dr.Jeetendra Kumar Soni	GIN/CI/4.3, GIN/CM/4.1, GIN/CP/7.1, TUR/CI/2.11, TUR/CP/7.8, TUR/CP/7.9 (6)
27	ICAR RC 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 (Nagaland AU)	Dr. C. S. Maiti	GIN/CI/2.5, GIN/CI/2.6, GIN/CI/2.7, GIN/CI/4.3, GIN/CM/4.1, GIN/CP/6.15, GIN/CP/7.1 (7)
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/2.11, 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 (13)
VOLUNTARY CENTRES			
31	Pantnagar (GBPUAT)	Dr. Dhirendra Singh	COR/CI/2.8, FNL/CI/2.8, FGK/CI/2.5, NGL/CI/2.2, FGK/CM/5.1, FGK/CM/5.9, TUR/CP/7.9, SS/CM/4.1, NGL/CP/7.1 (9)
32	Kanke (BIRSAAU)	Dr. Arun Kumar Tiwari	TUR/CI/2.8, TUR/CI/2.9, GIN/CM/4.1, TUR/CM/5.2, GIN/CP/6.15, GIN/CP/7.1, TUR/CP/7.8, TUR/CP/7.9 (8)
33	Kalyani (BCKVV)	Dr. Anupam Pariari	COR/CI/2.8, FGK/CI/2.5, TUR/CI/2.10, NGL/CI/2.2, TUR/CM/5.1, TUR/CM/5.2, GIN/CM/5.1, GIN/CM/5.2, GIN/CP/6.15, GIN/CM/4.1, NGL/CP/7.1, SS/CP/7.1 (12)
34	Kota (AUK)	Dr. Preethi Verma	COR/CI/2.8, FGK/CI/2.5, NGL/CI/2.2, COR/CM/5.1, COR/CM/6.1, FGK/CM/5.1, FGK/CM/5.9, FGK/CM/6.12, COR/CP/7.1, FGK/CP/7.1 (10)
35	Navasari (NAU)	Dr. Ritesh K. Patel Dr. Madhu bala	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, FGK/CM/5.9 (8)
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, COR/CM/6.1, FGK/CM/5.9, FGK/CM/5.1, FGKCP/7.1 (9)
37	Mandor (AUJ)	Dr. Ramesh	CUM/CI/1.1, CUM/CI/2.5, SS/CM/4.1, FNL/CM/5.1, FGK/CM/5.1, CUM/CM/5.5, CUM/CP/7.1 (7)
38	Sanand (AAU)	Dr. T.T. Patel	COR/CI/2.8, CUM/CI/1.1, CUM/CI/2.5, SS/CP/7.1 (4)

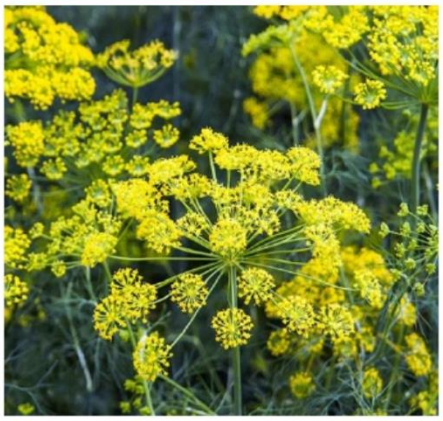
PROJECT MODE CENTRES			
39	Thrissur (KAU)	Dr. Vikram H.C.	TSP/CI/1.2, TSP/CI/2.4, TSP/CI/5.1 (3)
40	Pampore (SRS)	Dr. Mudasir H. Khan	SAF/CI/5.1, KZ/CI/5.1 (2)

- **New projects are marked in red**

VARIETIES RECOMMENDED FOR IDENTIFICATION DURING 33rd AICRPS ANNUAL GROUP MEETING

Appangala-3 (IC 349537)





Gujarat Fennel 13 (JF 2013-19)

ICAR-All India Coordinated Research Project on Spices (AICRPS)

ICAR-Indian Institute of Spices Research

Post bag No. 1701, Marikunnu P.O.,
Kozhikode-673 012, Kerala, India.
Phone:0471-2731794/2731410, Fax: 0495-2731794,
Email: aicrpspices@gmail.com; aicrps@spices.res.in
Website: www.aicrps.res.in