वार्षिक रिपोर्ट
2022-23
ANNUAL REPORT
2022-23

सत्यमेव जयते

DIRECTORATE OF ARECANUT AND SPICES DEVELOPMENT
Ministry of Agriculture and Farmers Welfare
(Department of Agriculture and Farmers Welfare)
Government of India
Calicut, Kerala - 673 005

DASD Annual Report 2022-23

Directorate of Arecanut and Spices Development
Ministry of Agriculture and Farmers Welfare
(Department of Agriculture and Farmers Welfare)
Government of India
Calicut - 673 005
Kerala.

Phone : +91-0495-2369877, 2765501
Fax : +91-0495-2765777
email : spicedte@nic.in
Website: : http://dasd.gov.in

Published by : Dr. Homey Cheriyan
Director
Directorate of Arecanut and Spices Development

Compiled & Edited by : Dr. Femina
Shri Babulal Meena
Smt. C. V. Divya
Shri C. S. Sundaram
Dr. P. N. Jyothi
Smt. K. Thejas Das
Smt. M. K. Suma
Shri T. Srikumar
Shri K. Manojkumar
Smt. Sruthi Sreekumar
Shri M. P. Unnikrishnan
Shri P. R. Anil Kumar

Cover Design : Shri C. F. Gedam

PREFACE

The Directorate of Arecanut and Spices Development (DASD) is a subordinate office of the Ministry of Agriculture and Farmers Welfare which looks after the production of Arecanut, Spices, Betel vine and aromatic plants at national level. These crops play a very important role in Indian economy contributing to around 5 to 8% of agriculture GDP, besides providing livelihood to around 15 to 20 million people. Spices in particular adds to the economy by way of bringing in a foreign exchange earning to the tune of US $ 4 billion annually.

The Directorate has the distinction of successfully implementing Central Sector Schemes on Spices, Arecanut and Medicinal & Aromatic Plants over the Plan periods with the cooperation of State Departments, State Agricultural Universities, ICAR Institutes etc. During 2005-06, the Government of India launched National Horticulture Mission (NHM) to give further impetus to the growth in production of horticultural crops including spices. Since the inception of NHM, the Directorate is coordinating and monitoring the overall activities on the development of spices and arecanut in the country. The Directorate supplements the developmental efforts of the State Governments by making available nucleus planting materials of various high yielding varieties of spices and aromatic crops across the country. Dissemination of technologies through frontline demonstration plots, farmers training programmes, seminars and workshops and accreditation of spices nurseries have been given the highest priority.

During the period of NHM, spices production in the country increased at a compound annual growth rate (CAGR) of 6.8% annually. As a result, our area under spices has jumped from 2.3 million ha. to 4.5 million ha. and production from 3.9 million tonnes to 11.83 million tonnes during the period from 2005-06 to 2022-23. The growth rate of 6.8% annually for production of spices is commendable compared to other agricultural commodities. This surge in production has made available enough exportable surplus of quality spices, due to which export earnings of spices has increased tremendously during the same period from Rs. 2628 crores to Rs. 31761 crores.

This Annual Report carries all the activities undertaken by the Directorate for the development of the mandate crops. I take this opportunity to thank Dr Prabhat Kumar, Horticulture Commissioner for giving adequate support. I also thank my colleagues for their cooperation in achieving the goals set by the Directorate.

(Homey Cheriyan)
Director

CONTENTS

1. INTRODUCTION

The Directorate of Arecanut and Spices Development was established on 1st April, 1966 at Calicut in Kerala, as a subordinate office under the Ministry of Agriculture, Government of India, to look after the development of spices and arecanut at National level. This responsibility was earlier shouldered by Central Spices and Cashewnut Committee and Indian Central Arecanut Committee, which were abolished in 1965 consequent to the recommendations of Agricultural Research Review Team.

1. Mandate

The Directorate of Arecanut and Spices Development, Calicut is a national level institution responsible for development of spices, aromatic plants, betel vine and arecanut grown in the country.

The mandate of the Directorate is as follows.

- Assessment of the developmental needs of the crops entrusted to it.
- Formulation of Central Sector/Centrally Sponsored Schemes and implementation of the same either directly or through the State Governments, Agricultural Universities etc.
- Monitoring the implementation of Central Sector/Centrally Sponsored Schemes and coordinating the developmental activities.
- Rendering technical assistance to State Governments and other agencies on commodity development programmes.
- Collection and compilation of statistics of area, production, export, import, prices etc. and dissemination of the same to the Central and State Governments and other agencies.
- Keeping liaison with the research institutes and extension agencies and acting as a two-way channel in the transfer of technology.
- Undertaking the publicity and propaganda works relating to the commodities.
- Assisting the Central and State Governments on all matters relating to the development of the commodities.
- Accreditation of spices nurseries.

Fig. 1. Office of the Directorate of Arecanut and Spices Development

2. Organizational Structure

The Directorate is headed by a Director supported with two Deputy Directors, one Assistant Director, one Research Officer and other supporting staff viz. Superintendent, Senior Technical Assistants, Statistical Investigator, Technical / Marketing/ Statistical Assistants along with other administrative staff.

In accordance with the mandate, the Directorate has four Sections *viz.* Development, Marketing, Economic Research & Statistics, Publicity and Administration.

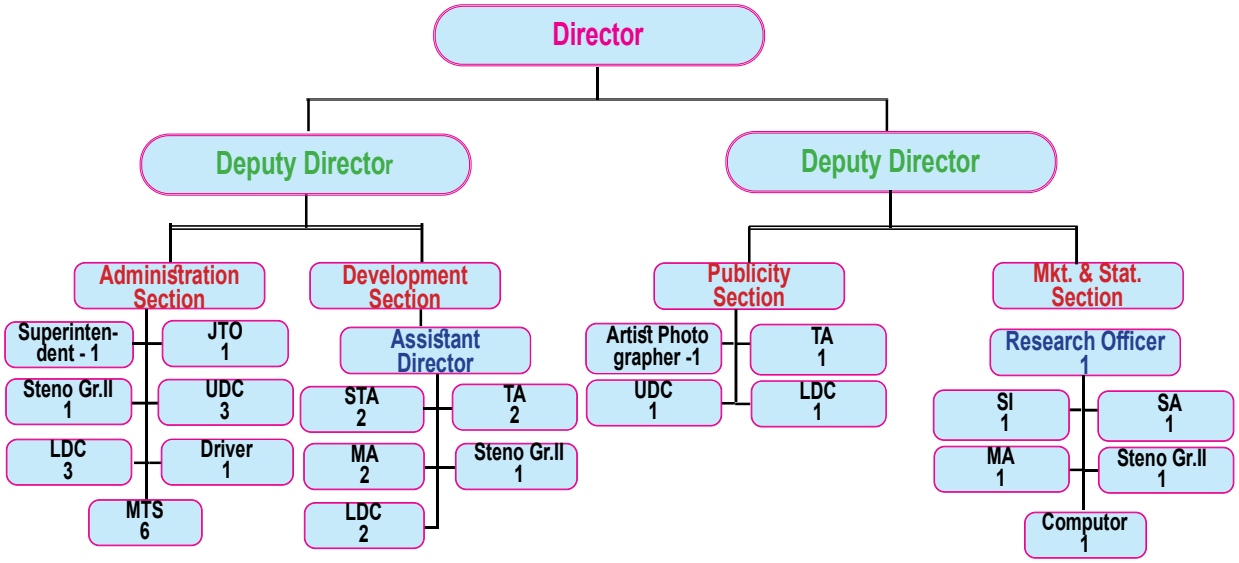


Fig. 2. Organizational Structure

3. Staff

a. Staff strength as on 31-03-2023

Sl. No.	Name of the post	Group A/B/C	Sanctioned Strength	In position
1.	Director	A	01	01
2.	Deputy Director	A	02	02
3.	Assistant Director	A	01	01
4.	Research Officer	A	01	-
5.	Superintendent	B	01	01
6.	Statistical Investigator	B	01	01
7.	Senior Technical Assistant	B	02	01
8.	Junior Translation Officer	B	01	01
9.	Technical Assistant	C	03	02
10.	Marketing Assistant	C	03	02
11.	Statistical Assistant	C	01	01
12.	Artist Photographer	C	01	01
13.	Computor	C	01	-
14.	Stenographer Grade II	C	03	02
15.	Upper Division Clerk	C	04	03
16.	Lower Division Clerk	C	06	02
17.	Staff Car Driver (OG)	C	01	01
18.	Multi Tasking Staff	C	06	05
	TOTAL		**39**	**27**

b. Staff in position as on 31-03-2023

Sl. No.	Name	Designation
1.	Dr. Homey Cheriyan	Director
2.	Dr. Femina	Deputy Director
3.	Shri. Babulal Meena	Deputy Director
4.	Smt. C.V. Divya	Assistant Director
5.	Shri C. Shunmuga Sundaram	Superintendent
6.	Smt. K. Thejas Das	Senior Technical Assistant
7.	Shri. K. Manojkumar	Statistical Investigator
8.	Dr. P.N. Jyothi	Junior Translation Officer
9.	Shri. C.F. Gedam	Artist Photographer
10.	Smt. M.K. Suma	Technical Assistant
11.	Shri. P. Vinod Kumar	Technical Assistant
12.	Smt. K. Ushakumari	Marketing Assistant
13.	Smt. K.S. Kanchana	Marketing Assistant
14.	Smt. Sruthi Sreekumar	Statistical Assistant
15.	Shri. P.R. Anil Kumar	Stenographer Grade II
16.	Shri. M.P. Unnikrishnan	Stenographer Grade II
17.	Shri. P. Baiju	Upper Division Clerk
18.	Shri. K.V. Rajesh	Upper Division Clerk
19.	Shri. Palash Kanti Mollick	Upper Division Clerk
20.	Shri. T. Srikumar	Lower Division Clerk
21.	Shri. Satish Kumar	Lower Division Clerk
22.	Shri. Ranjith M	Staff Car Driver
23.	Shri. E.Ajithkumar	Multi Tasking Staff
24.	Shri. K.S. Santhos	Multi Tasking Staff
25.	Shri. K.V. Chandran	Multi Tasking Staff
26.	Shri. T. Pramoth Kumar	Multi Tasking Staff
27.	Shri. L. Sujeesh	Multi Tasking Staff

4. Plan and non-plan budget

a. Non-plan budget for 2022-23

Particulars of sub-head and name of the scheme etc. 1/2401	Sanctioned budget (Rs in lakhs)	Expenditure (Rs. in lakhs)
570101- Salaries	320.00	293.58
570102- Wages	1.30	.53
570106 - Medical treatment	6.00	1.34
570111- Domestic Travel Expenses	16.50	16.46
570133- Office Expenses	29.00	14.61
570116- Publications	8.50	1.74
570126- Advertising & Publicity	1.25	1.00
570127- Minor Works	41.00	40.99
5596-Swchhata Action Plan	2.00	0.25
Total	**425.55**	**370.50**

(b) Plan budget under Mission for Integrated Development of Horticulture (MIDH) 2022-23

Particulars of Sub-Head and name of the Scheme etc.	Sanctioned budget (Rs. in lakhs)	Expenditure (Rs. In lakhs)
MIDH	1400	1380.88

5. Right to Information (RTI) in DASD

During the year 2022-23, the Directorate received requests under various provisions of RTI Act 2005 seeking various kinds of information. During the year, Shri Babulal Meena, Deputy Director was designated as Central Public Information Officer (CPIO) and Director was the Appellate Authority. The details of RTI requests received and disposed off are as under:-

Total number of RTI requests received	Total no. of requests disposed off	Total no. of requests in which information was denied	Total no. of appeals received
11	11	Nil	Nil

6. Vigilance Awareness Week

In accordance with the instructions received from the Ministry, Vigilance Awareness Week 2022 was observed in the Directorate during the period from 31st October to 6th November, 2022. Posters and Banners were prepared and displayed in prominent places of the Directorate. On 31st October, 2022 all the Officers and staff assembled in the Office. Dr Femina, Deputy Director,

DASD addressed the staff explaining the importance of eradicating corruption and to raise public awareness regarding the threat caused by corruption. Afterwards, the Deputy Director administered the integrity pledge to all the staff at 11.00 am.

A workshop on Vigilance Awareness was organized in this Directorate on 3rd November, 2022, Shri Jnanadevan R, Vigilance Officer (Retired) , DCCD, Kochi, gave detailed lecture on vigilance awareness with the support of Power Point Presentation and all officers and staff of this Directorate and officers and staff from the Central Marine Fisheries Research Institute, Kozhikode and Regional Science Centre & Planetarium, Calicut, were attended the workshop.

Fig. 3. Banner displaying Vigilance Awareness Week

Fig.4. Shri Jnanadevan R, Vigilance Officer (Retired), DCCD, Kochi, taking class

Fig. 5. Integrity pledge by the staff

7. Sadbhavana Diwas

"Sadbhavana Diwas" was observed on 20th August, 2022 to commemorate the birth anniversary of former Prime Minister Late Rajiv Gandhi to promote national integration and peace among the diverse population of India. All staff were gathered and took Sadbhavana Diwas pledge on that day.

8. Rashtriya Ekta Diwas (National Unity Day)

Rashtriya Ekta Diwas (National Unity Day) was observed on 31st October, 2022 on the birth anniversary of Sardar Vallabhbhai Patel. All staff were gathered and took Rashtriya Ekta Diwas pledge.

9. Special Campaign 2 for disposal of pending matters during 2nd to 31st October, 2022

Special Campaign for disposal of pending matters were organised in this Directorate during 2nd to 31st October, 2022. Shri Babulal Meena, Deputy Director is the nodal offier of this Directorate for the special campaign. Cleaning activitiy of office area and office campus and weeding out of old files were conducted and 525 files were weededout in the special campaign 2.

2. DEVELOPMENT PROGRAMMES

The Directorate has the national mandate for the development of Arecanut, Spices (other than Cardamom), Betel vine and Aromatic plants. The above mentioned crops occupy an important position among the horticulture crops because of their huge domestic consumption, sizeable export earnings and substantial employment generation, particularly in the rural sector.

1. Mission for Integrated Development of Horticulture (MIDH)

During 2005-06, Government of India has launched National Horticulture Mission (NHM) in the country to promote holistic growth of the horticulture sector through an area based regionally differentiated strategies with an aim to double the production in horticulture crops, primarily through the improvement in productivity of the crops. The National Horticulture Mission envisaged to cover all aspects of production including scientific cultivation, adoption of high production technology, integrated pest and disease management, integrated nutrient management, organic cultivation, post-harvest management including value addition, storage etc. The mission programmes are fully funded by the Government and different components proposed for implementation financially supported on the scales laid down. The schemes are implemented in all the states and Union Territories in the country except North Eastern and Himalayan States, for which a separate scheme has been sponsored by the Government of India. During 2014-15, the Ministry of Agriculture and Farmers Welfare, Government of India has subsumed all the development schemes of horticulture in the country under an umbrella scheme namely Mission for Integrated Development of Horticulture (MIDH) for the holistic growth of the entire horticulture sector including spices in the country. The Mission programmes has completed a period of almost 17 years and the programme has made significant progress in achieving its objectives.

1.1 Role of the Directorate of Arecanut and Spices Development (DASD) in the implementation of MIDH programmes

- Responsible for coordinating and monitoring the activities on development of arecanut, spices and aromatic plants.
- Responsible for organizing national level training programmes, seminars and workshops on spices, medicinal & aromatic plants on regular intervals.
- Directorate supplements the developmental efforts of the State Government by making available the nucleus planting materials of various high yielding varieties of spices and aromatic plants across the country, through Central Institutes and State Agriculture Universities.
- Directorate is responsible for undertaking accreditation of spice nurseries across the country.
- Directorate disseminates periodically the seasonal crop prospects, area coverage, price trend etc. for the use in the planning process.

1.2 Strategies identified for development of Spices and Aromatic Plants under MIDH

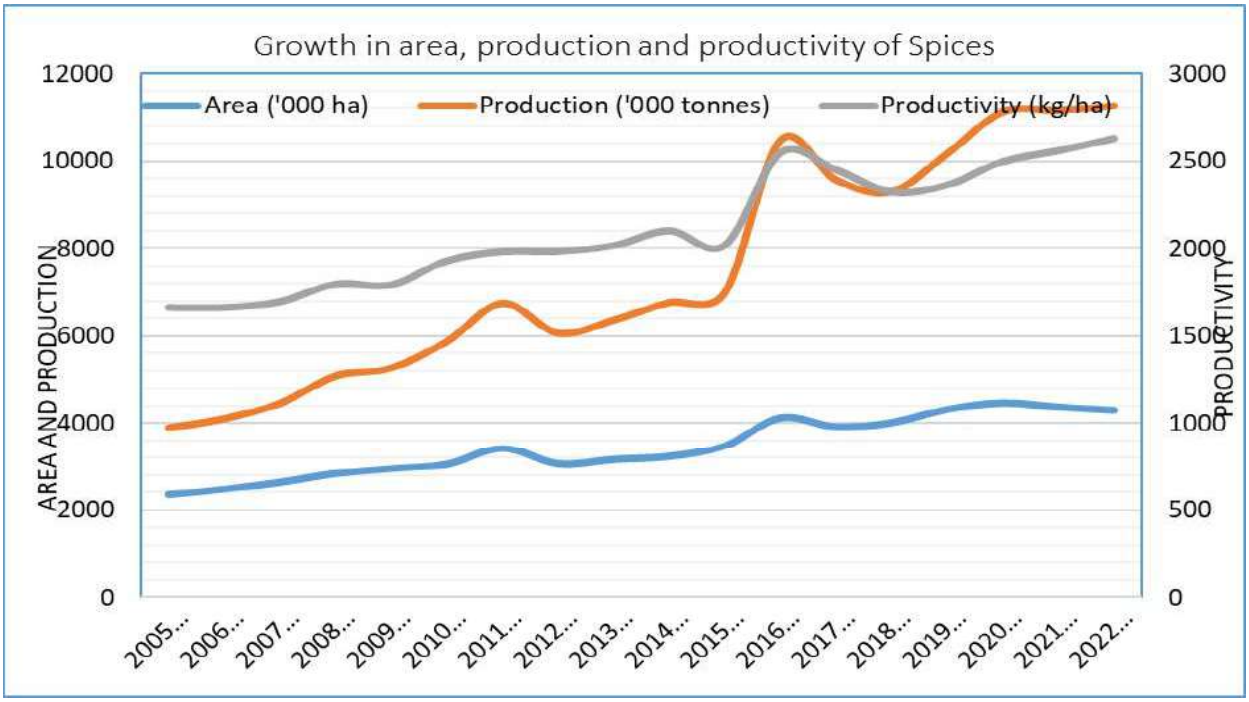
The growing demand for various spices and aromatic plants in food, pharmaceutical and cosmetic industries, both within the country and globally, necessitates streamlining production of these commodities so as to make available enough material for the domestic market as well as for exports. As a result of the national policies on liberalization and globalization and integrated approach in the crop development adopted in the previous plan periods, our export of spices and aromatic plant products, have increased substantially in recent years. Further, the above plant

products are generally exported mainly in the whole form collected from various production centres without looking into the varieties. Variety has specific characteristics suited for production of value-added products. Such varieties having specific characteristics, which, *inter-alia*, relate to its intrinsic quality, will have to be rapidly multiplied and their cultivation organized for regular production. In order to take full advantage of the above situation and to keep up the momentum of exports, a Mission approach seems inevitable.

1.2.1 Growth in spices sector during NHM / MIDH period

The National Horticulture Mission is specially focused on increasing production and productivity through adoption of improved technologies, ensuring quality through genetic upgradation of all horticulture crops. Special emphasis is also given on adoption of area-based cluster approach for developing regionally important crops based on their local adaptation. Availability of quality planting materials being the primary requirement, received focused attention through an integrated approach in nucleus planting material production by providing the required infrastructure to various organizations predominantly the ones responsible for the release of these varieties and having sufficient technical support for production and maintenance of purity.

Various development programmes implemented in the spices sector under MIDH (Mission for Integrated Development of Horticulture) have helped tremendously in achieving spectacular growth in production of spices. During the period of NHM/MIDH, from 2005-06 to 2022-23, the area of spices has increased from 23.45 lakh ha to 42.86 lakh ha and production from 38.97 lakh tonnes to 112.62 lakh tonnes with a CAGR of 3.6% and 6.4% respectively. Productivity has also increased to the tune of 2.7%.



1.3 Thrust areas identified for development of Arecanut, Spices and Aromatic Plants under MIDH

- Achieving higher level of productivity and reducing the cost of production so as to keep the prices at affordable level in the local market and competitive in the international market.
- Assuring availability of quality, disease free planting material of HYV of spice crops through planting material production programme implemented in SAUs and ICAR Institutes.
- Through nursery accreditation programme , ensuring regulation of quality and genuinity of planting material produced through private and public sector nurseries.
- Developing the cultivation of export-oriented varieties such as bold and pungent pepper varieties, ginger with low fibre content, turmeric with high curcumin, chillies with bright red colour and low pungency, varieties of spices with high oleoresin and volatile oil content.
- Encouraging women in cultivation as well as community processing.
- Reducing the foreign exchange outflow taking place on account of import of certain spices and aromatic plants by increasing their production.

1.4 Strategies adopted for development of spices

In order to achieve the production targets, to meet the domestic and export demands, accomplishing the quality parameters and product diversification, the following strategies are being adopted:

- Promotion of varieties available in the country which have high production potential and better export demand.
- Promoting the production of quality planting materials in large scale, adopting the latest technology including tissue culture techniques, microrhizome production, protray raising of seedlings etc. through State Agriculture/Horticulture Departments, Research Institutes, voluntary and private organizations and individuals.
- Promoting nursery accreditation programme for regulating the public/private nurseries across the country.
- Motivating farmers to follow improved cultivation methods including plant protection measures through transfer of technology programmes.
- Collecting statistics on area and production, market arrivals, prices etc. within and outside the country, their compilation and dissemination, conduct studies on cost of production, price spread, domestic demand etc.

1.5 Crop wise strategies adopted by the Directorate for development of Mandate crops

Mandate crops

- **Black pepper** - To improve the productivity of black pepper, the Directorate has been prioritizing cluster based demonstration programmes on organic/ sustainable production practices and multiplication and distribution of improved varieties which assures improved productivity and biotic/ abiotic stress resistance.
- **Ginger** – To address the disease spread through seed material, promotion of disease free planting material production through microrhizomes and protray technique is implemented in main production centres. High oil / oleoresin containing varieties having suited for industrial purpose are also promoted under planting material production programme.

- **Turmeric** – Promotion of high curcumin varieties through planting material production programme is implemented in main producer states and cluster based demonstrations for promoting organic/ sustainable production practices and export oriented high curcumin turmeric cultivation is implemented in selected potential production clusters.
- **Chilli** – Quality seed material production programme and demonstrations on promotion of sustainable cultivation practices are implemented in main producer states. Leaf curl resistant/ tolerant high yielding Hybrid varieties developed in public sector are also promoted through demonstration programme. In drought prone areas, drip irrigation is also demonstrated for improved productivity.
- **Seed Spices** – Identifying export oriented pesticide free production of seed spices. Promotion of Good Agricultural Practices, Drip irrigation practices and multiplication and demonstration of potential HYV.
- **Tree spices** – Promotion of quality planting material production through planting material production programme, establishment of nurseries /mother blocks linking with accreditation programme in clove, nutmeg, tamarind, garcinia etc. Promotion of high density cultivation and post harvest handling practices to commercialise cinnamon cultivation and other tree spices.
- **Arecanut** – Promotion of multi species cropping system, INM/ IPM practices and use of bioagents and newer molecules in pest and disease management.
- **Betelvine** – Establishing hi-tech baroj structures in major production centres to ensure availability of quality planting material.
- **Aromatic crops** – Establishment of cluster based demonstrations and distillation units to create awareness among rural farmers on the potential of commercial cultivation and value addition of aromatic plants.

2. Development Programmes taken up by DASD under MIDH during 2022-23

The activities of the Directorate during the year 2022-23 were

1. Coordinating and monitoring the activities on the development of arecanut, spices and aromatic plants in the country.
2. Monitoring of NHM programmes in the mandated crops in various states in the country.
3. Implementation of development programmes in the mandated crops through various State Agricultural Universities and Central Institutes to supplement the States' efforts in achieving the desired results in the production fronts as conceived in the NHM / MIDH.

The development programmes implemented by the Directorate consisted primarily of the production of nucleus planting material of different spices through SAUs and ICAR Institutes and technology dissemination programmes including establishment of frontline demonstration plots, conduct of National Seminar/Workshops/Farmer's Training programmes. During 2022-23, the Directorate implemented the NHM programmes with an outlay of Rs.14.00 crores for the development of Spices and Aromatic Plants.

Table 1. Major programmes implemented and achievements made during 2022-23 are as follows.

				Target		Achievement	
S. No.	Programmes	Unit	Cost per unit (Rs. in lakhs)	Physical	Financial (Rs. in lakhs)	Physical	Financial (Rs. in lakhs)
I	**Production and Distribution of Quality Planting Materials**						
i	**Production and Distribution of nucleous Planting Materials of spices**						
1	Black Pepper / Betelvine	Nos in lakhs	8.00	22.1800	177.4400	22.0000	177.0246
2	Ginger rhizomes	Qty in tones	0.30	151.0000	45.3000	151.0000	45.3000
3	Ginger Protray seedlings	Nos in lakhs	1.20	10.4150	12.4980	10.4150	12.4980
4	Turmeric rhizomes	Qty in tones	0.30	573.0050	171.9015	573.0050	171.9015
5	Turmeric protray seedlings	Nos in lakhs	1.20	10.2350	12.2820	10.2350	12.2820
6	Chilli seeds	Qty	0.75	41.9900	31.4925	41.9900	31.4925
7	Seed spices	Qty in tones	0.40	169.0000	67.6000	169.0000	67.6000
8	Garlic	Qty in tones	0.50	76.5000	38.2500	76.5000	38.2500
9	Bush Pepper	Nos in lakhs	40.00	0.4140	16.5600	0.4140	16.5600
10	Tree spices grafts /seedlings						
i.	Nutmeg grafts (Orthotropic)	Nos in lakhs	140.00	0.0920	12.8800	0.0920	12.8800
ii.	Nutmeg grafts (Plagiotropic)	Nos in lakhs	80.00	0.4000	32.0000	0.4000	32.0000
iii	Tamarind / Kokum grafts	Nos in lakhs	20.00	2.1250	42.5000	2.1250	42.5000
iv	Clove /Allspice seedlings	Nos in lakhs	20.00	0.2600	5.2000	0.2600	5.2000
v	Cinnamon /Cassia / Curry leaf seedlings	Nos in lakhs	5.00	4.5900	22.9500	4.5900	22.9500
11	Aromatic Plants	Ha.	0.75	63.0000	47.2500	63.0000	47.2500
12	Nursery Centre for spices and Aromatic Plants	Nos	15.00	4.0000	60.0000	4.0000	60.0000
13	Upgradation of spice nurseries	up to 10 lakhs/4ha	up to 10 lakhs/4ha		25.000		24.92290
14	Seed processing and storage infrastructure	10 lakh/unit	10.00	5.000	50.000	5.00	50.00
15	Estt of Large Cardamom nursery	Nos		2.000	10.000	2.00	10.00
	Sub Total				**881.1040**		**880.612**
II	**Accreditation of spice nurseries**	LS		25.000	3.000	20.000	0.36536
III	**Technology Dissemination through Frontline Demonstration**						

i	Organic Farming Spices	Nos in ha	0.60/1.00	31.000	31.000	31.000	31.000
ii	Maint. of Pepper demo plots	Nos in ha	0.25	25.000	6.250	25.000	6.250
iii	Estt of Demo plots for Chilli	Nos in ha	0.50	15.000	7.500	15.000	7.500
iv	Demonstration plots of seed spices	Nos in ha	0.40	75.000	30.000	75.000	30.000
v	Demonstration plots of aromatic plants	Nos in ha	0.80	72.000	57.600	72.000	57.600
vi	On farm water management by micro irrigation	Nos in ha	LS	72.000	32.650	72.000	32.650
vii	Demonstration of Fruit rot disease management in areanut using mandipropamid fungicide	Nos in ha	LS	3.000	3.990	3.000	3.990
viii	Participatory Demonstration Plots of Cinnamon intercropping in coconut	Nos in ha	LS	30.000	36.000	30.000	36.000
ix	Demonstration of Entomopathogenic nematode in Arecanut	Nos in acre	LS	4.000	4.740	4.000	4.740
x	Demonstration of integrated mgt of inflorescence dieback disease in Arecanut	Nos in acre	LS	3.000	4.250	3.000	4.250
xi	Demonstration of disease free ginger seed production using microrhizomes and IDM at multiple locations	Nos in acre	LS	25.000	8.540	25.000	8.540
	Sub total				**222.5200**		**222.5200**
IV	**Project based programmes**						
i	Hi tech prod system for quality disease free seed rhizomes of Turmeric and Ginger		LS		2.000		2.000
ii	Establishment of essential Oil Distillation Unit	Nos	LS	2.000	5.000	2.000	5.000
iii	Rejuvenation of Cochin Ginger and Alleppey Finger Turmeric for export promotion				15.000		12.42620
iv	Demonstration of protected cultivation of spice crops in naturally ventilated polyhouse with automated irrigation systems				5.000		5.0000

v	scaling up of microrhizome technology based ginger seed production	LS			4.500		4.5000
	Sub Total				**31.500**		**28.926**
V	**Transfer of Technology programmes**						
a.	National Seminar	Nos	5.00	1.00	5.00	1.000	5.000
b.	State Level Seminar	Nos	3.00	5.00	15.00	5.000	15.000
c.	District Level Seminar Workshops	Nos	2.00	19.00	38.000	19.000	37.99788
d.	Farmers Training programme	Nos	0.75	141.00	105.750	141.000	105.74984
	Sub Total				**163.750**		**163.74772**
VI	**Skill Development Schemes**	Nos in lakhs	LS	6	**24.630**	6.000	**24.6300**
VII	**T S G (Monitoring, Evaluation, Mass Media, Publicity etc)**			LS	6.200		0.038190
VIII	**Mission Management**				LS	67.2960	60.04800
	GRAND TOTAL					**1400.000**	**1380.88699**

2.1 Production and Distribution of Quality Planting Materials

The NHM/MIDH programmes on spices implemented in different States such as area expansion, replanting/rejuvenation etc. requires a sizeable quantity of quality planting materials of the respective spices crop. Non-availability of quality planting materials of high yielding varieties is identified as a major constraint in achieving the desired productivity of these crops as conceived in the Mission. Quite a good number of varieties of various spices and aromatic crops have been evolved in various research centres. However, for want of basic infrastructure and adequate funds, the required quantum of nucleus planting material is not being generated so that it can be made available for large scale multiplication and distribution to the farmers. In order to improve the situation, as done in the past, the Directorate had taken up the production of nucleus planting material during 2022-23 also with a financial outlay of 881.1040 lakhs. This programme was implemented in association with the SAUs and ICAR Institutes in different states of the country. The materials so produced were made available for further multiplication and distribution to the farmers.

2.1.1 Black pepper and Betelvine

Non - availability of good quality planting material is one of the major constraints in improving the production of black pepper in pepper growing areas. To overcome this situation, Directorate has taken up production of quality planting materials of black pepper by both conventional and advanced propagation technologies in the State Agricultural University (SAU) farms and Indian Council of Agricultural Research (ICAR) farms located in the major production centers of pepper. A total of 22.18 lakhs of planting materials were produced and distributed with a financial utilization of Rs.177.44 lakhs. Rate of assistance given for production of quality nucleus planting materials of pepper was Rs. 8.00/ cutting. Kerala, Karnataka and Tamil Nadu are the major states producing black pepper in the country. Different Universities/Institutes in Kerala, Karnataka,

Tamil Nadu, Andhra Pradesh, West Bengal and Maharashtra implemented this programme for production and distribution of planting materials in the states. The details of Universities/Institutes which undertook this component during the year is placed in the table below.

Implementing centres at Dr. PDKV Akola, UBKV West Bengal, OUAT Bhubaneswar, UAS Dharwad, UAS Bangalore also produced rooted cuttings of betelvine from the allotted targets.

Table 2. Planting material production of black pepper 2022-23 (University-wise).

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. In lakhs)
1	Assam Agri University, Assam	0.500	4.000
2	Bidhan Chandra Krishi Vishwa Vidyalaya, West Bengal	0.800	6.400
3	Central Island Agriculture Research Institute, Port Blair, A & N Islands	0.100	0.800
4	Central Agriculture University, Arunachal Pradesh,	0.050	0.400
5	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	3.000	24.000
6	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	0.400	3.200
7	Dr. YSR Horticulture University, Andhra Pradesh	0.200	1.600
8	ICAR - Central Coastal Agriculture Research Institute, Goa	0.250	2.000
9	ICAR - Indian Institute of Spices Research, Calicut, Kerala	1.000	8.000
10	Kerala Agriculture University, Thrissur, Kerala	7.000	56.000
11	Navsari Agri University, Gujarat	0.030	0.240
12	Orissa University for Agriculture and Technology, Orissa	0.200	1.600
13	Sri Konda Laxman Telengana State Horticulture University, Telengana	0.100	0.800
14	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	2.900	23.200
15	University of Agriculture and Horticulture Sciences, Shimoga, Karnataka	2.550	20.400
16	University of Agriculture Sciences, Bangalore, Karnataka	0.500	4.000
17	University of Agriculture Sciences, Dharwad, Karnataka	0.300	2.400
18	University of Horticulture Sciences, Bagalkot, Karnataka	0.900	7.200
19	Uttar Banga Agricultural University, Pundibari, West Bengal	0.900	7.200
20	Directorate of Arecanut and Spices Development, Kozhikode, Kerala	0.500	4.000
	Total	**22.180**	**177.440**

2.1.2 Ginger

The Directorate produced and distributed 151.00 tonnes of nucleus seed rhizomes of high yielding varieties of ginger through various SAUs and ICAR Institutes located all over the country. Assistance was provided at the rate of Rs. 0.30 lakh/tonne of ginger rhizomes. An amount of Rs.45.30 lakhs was incurred for the programme. The Institute-wise production details of ginger seed rhizomes are detailed below:-

Table 3. Planting material production of ginger 2022-23 (University-wise)

S No	Institute	Quantity produced and distributed (Nos. in tonnes)	Financial utilisation (Rs. In lakhs)
1	Assam Agri. University, Assam	5.000	1.500
2	Bidhan Chandra Krishi Vishwa Vidyalaya, West Bengal	7.000	2.100
3	Birsa Agricultural University, Ranchi, Jharkhand	5.000	1.500
4	Central Island Agriculture Research Institute, Port Blair, A & N Islands	1.000	0.300
5	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	6.000	1.800
6	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	16.000	4.800
7	Dr. Y.S Parmer univ of Horti & Forestry, HP	3.000	0.900
8	Dr. YSR Horticulture University, Andhra Pradesh	1.000	0.300
9	ICAR - Central Coastal Agriculture Research Institute, Goa	2.000	0.600
10	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	12.000	3.600
11	ICAR - Indian Institute of Spices Research, Calicut, Kerala	5.000	1.500
12	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, MP	1.000	0.300
13	Kerala Agriculture University, Thrissur, Kerala	6.000	1.800
14	Vasantrao Naik Marathwada Agriculture University, Parbhani, Maharashtra	5.000	1.500
15	Orissa University for Agriculture and Technology, Orissa	8.000	2.400
16	Dr. Rajendra Prasad Central Agricultural University, Dholi, Bihar	1.000	0.300
17	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, MP	6.000	1.800
18	Sri Konda Laxman Telengana State Horticulture University, Telengana	15.000	4.500
19	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	1.000	0.300
20	University of Agriculture and Horticulture Sciences, Shimoga, Karnataka	20.000	6.000
21	University of Agriculture Sciences, Bangalore, Karnataka	3.000	0.900

22	University of Agriculture Sciences, Dharwad, Karnataka	4.000	1.200
23	University of Horticulture Sciences, Bagalkot, Karnataka	9.000	2.700
24	Uttar Banga Agricultural University, Pundibari, West Bengal	9.000	2.700
	Total	**151.000**	**45.300**

2.1.3 Ginger protray seedlings

State Agri. Universities/ICAR Institutes working on ginger and turmeric have standardized protocol for raising low-cost ginger seedlings using single bud rhizomes in protrays, which can be transplanted to main field within 30-40 days. DASD has been promoting this technique and started providing assistance to implementing agencies since 2019-20, to produce protray seedlings @ Rs. 1.20/seedling. During this year, 10.415 lakhs ginger protray seedlings were produced and distributed under this programme, utilizing a financial assistance of Rs.12.498 lakhs.

Table 4. Ginger protray seedlings produced in 2021-22 (University-wise)

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. In lakhs)
1	Assam Agri University, Assam	0.300	0.360
2	Central Agriculture University, Arunachal Pradesh	1.000	1.200
3	ICAR - Central Coastal Agriculture Research Institute, Goa	0.300	0.360
4	Kerala Agriculture University, Thrissur, Kerala	7.615	9.138
5	Narendra Dev University for Agri & Tech, Ayodhya, UP	0.500	0.600
6	Orissa University for Agriculture and Technology, Orissa	0.700	0.840
	Total	**10.415**	**12.498**

2.1.4 Turmeric

Turmeric seed production programme was mainly implemented through the SAUs located in the major turmeric producing states. Financial assistance was given @ Rs.30,000/- per ton for Turmeric rhizomes. By the implementation of the programme, 573.005 tonnes of turmeric seed rhizomes were produced and distributed and Rs.171.9015 lakhs has been utilized for the same. The Institute-wise production details of turmeric seed rhizomes are given below.

Table 5. Planting material production of turmeric 2021-22 (University-wise).

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. In lakhs)
1	Anand Agricultural University, Anand, Gujarat	17.000	5.100
2	Assam Agri University, Assam	10.000	3.000

3	Banda Agricultural University, Uttar Pradesh	1.000	0.300
4	Bidhan Chandra Krishi Vishwa Vidyalaya, West Bengal	37.000	11.100
5	Birsa Agricultural University, Ranchi, Jharkhand	15.000	4.500
6	C C S Haryana Agriculture University, Hissar, Haryana	1.000	0.300
7	Central Island Agriculture Research Institute, Port Blair, A & N Islands	0.005	0.0015
8	Central Agriculture University, Arunachal Pradesh	6.000	1.800
9	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	10.000	3.000
10	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	50.000	15.000
11	Dr. Y.S Parmer Univ. of Horti & Forestry, HP	3.000	0.900
12	Dr. YSR Horticulture University, Andhra Pradesh	40.000	12.000
13	ICAR - Central Coastal Agriculture Research Institute, Goa	5.000	1.500
14	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	40.000	12.000
15	ICAR - Indian Institute of Spices Research, Calicut, Kerala	12.000	3.600
16	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, MP	6.000	1.800
17	Kerala Agriculture University, Thrissur, Kerala	13.000	3.900
18	Vasantrao Naik Marathwada Agriculture University, Parbhani, Maharashtra	15.000	4.500
19	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	5.000	1.500
20	Narendra Dev University for Agri & Tech, Ayodhya, UP	7.000	2.100
21	Navsari Agriculture University, Gujarat	18.000	5.400
22	Orissa University for Agriculture and Technology, Orissa	12.000	3.600
23	Punjab Agricultural University, Ludhiana, Punjab	42.000	12.600
24	Dr. Rajendra Prasad Central Agricultural University, Dholi, Bihar	40.000	12.000
25	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, MP	14.000	4.200
26	Sri Konda Laxman Telengana State Horticulture University, Telengana	16.000	4.800
27	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	38.000	11.400
28	University of Agriculture and Horticulture Sciences, Shimoga, Karnataka	10.000	3.000
29	University of Agriculture Sciences, Bangalore, Karnataka	12.000	3.600
30	University of Agriculture Sciences, Dharwad, Karnataka	30.000	9.000

31	University of Horticulture Sciences, Bagalkot, Karnataka	26.000	7.800
32	Uttar Banga Agricultural University, Pundibari, West Bengal	22.000	6.600
	Total	**573.005**	**171.9015**

2.1.5 Turmeric protray seedlings

State Agricultural Universities/ICAR Institutes working on ginger and turmeric have standardized protocol for raising low cost seedlings using single bud rhizomes in protrays, which can be transplanted to main field within 30-40 days. DASD has been promoting this technique and started providing assistance to implementing agencies since 2019-20, to produce protray seedlings @ Rs. 1.20/seedlings. Under this programme, 10.235 lakhs turmeric protray seedlings were produced and distributed, utilizing a financial assistance of 12.282 lakhs during this year. Following implementing agencies implemented this programme in 2022-23.

Table 6. Turmeric protray seedlings produced in 2022-23 (University-wise)

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. In lakhs)
1	Assam Agri University, Assam	0.200	0.240
2	Central Agriculture University, Arunachal Pradesh	1.000	1.200
3	ICAR - Central Coastal Agriculture Research Institute, Goa	0.200	0.240
4	Kerala Agriculture University, Thrissur, Kerala	0.085	0.102
5	Vasantrao Naik Marathwada Agriculture University, Parbhani, Maharashtra	2.000	2.400
6	Narendra Dev University for Agri & Tech, Ayodhya, UP	0.500	0.600
7	Orissa University for Agriculture and Technology, Orissa	1.000	1.200
8	Sri Konda Laxman Telengana State Horticulture University, Telengana	1.900	2.280
9	University of Horticulture Sciences, Bagalkot, Karnataka	3.100	3.720
10	Uttar Banga Agricultural University, Pundibari, West Bengal	0.250	0.300
	Total	**10.235**	**12.2820**

2.1.6 Chilli

Chilli is the largest produced spice in the country and it is estimated that about 30 tonnes of chilli seeds are required annually to meet the demand. The Directorate had taken up a programme on production of nucleus seeds of chillies through the SAUs located in the major chilli producing centres. During the year 2022-23, a quantity of 41.99 quintals of nucleus seeds of chillies were produced and distributed to State Department farms for further multiplication and distribution

among farmers. Assistance to the tune of Rs. 75,000/quintal was provided to the implementing agencies for this programme. A total of Rs.31.4925 lakhs was incurred for this purpose during the year.

Table 7. The planting material production of chilli seeds during 2022-23

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. In lakhs)
1	Anand Agricultural University, Anand, Gujarat	1.000	0.750
2	Chandra Shekhar Azad Agricultural University, Kanpur, UP	0.040	0.0300
3	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	2.000	1.500
4	Dr. YSR Horticulture University, Andhra Pradesh	2.000	1.500
5	Vasantrao Naik Marathwada Agriculture University, Parbhani, Maharashtra	2.000	1.500
6	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	2.000	1.500
7	Narendra Dev University for Agri & Tech, Ayodhya, UP	2.000	1.500
8	Sardar Khrushinagar Dantiwada Agriculture University, Jagudan, Gujarat	1.000	0.750
9	Sri Konda Laxman Telengana State Horticulture University, Telengana	1.000	0.750
10	Sher-e-Kashmir University for Agriculture and Technology, Kashmir	4.450	3.3375
11	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	5.500	4.125
12	University of Agriculture Sciences, Bangalore, Karnataka	1.000	0.750
13	University of Agriculture Sciences, Dharwad, Karnataka	8.000	6.000
14	University of Horticulture Sciences, Bagalkot, Karnataka	10.000	7.500
	Total	**41.990**	**31.4925**

2.1.7 Seed Spices

Seed spices have a prominent place in our agricultural economy because of its large domestic consumption and growing demand for export. Seed spices occupy about 40% of area under spices and contributes 17% of total spices production in the country. Low productivity is one of the serious problems in the production of seed spices. Production of nucleus seeds of high yielding released varieties of seed spices was carried out in major seed spice producing states through the SAUs and ICAR Institutes. It is estimated that around 25,000 tonnes seeds of seed spices are required annually. The Directorate in association with the SAUs situated in the major seed spices production centres, produced 169 tonnes of seeds and distributed to State Department farms and private nurseries for further multiplication and distribution among farmers. Assistance provided for this purpose was Rs. 40,000/tonne and Rs.67.60 lakhs were incurred for this programme.

Table 8. University-wise details of seed spices seed production programme 2022-23

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. In lakhs)
1	Agriculture University, Jodhpur, Rajasthan	15.000	6.000
2	Agriculture University, Kota, Rajasthan	25.500	10.200
3	Anand Agricultural University, Anand, Gujarat	2.000	0.800
4	Banda Agricultural University, Uttar Pradesh	2.900	1.160
5	C C S Haryana Agriculture University, Hissar, Haryana	10.000	4.000
6	Chandra Shekhar Azad Agricultural University, Kanpur, UP	1.100	0.440
7	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	3.000	1.200
8	Dr. Y.S Parmer Univ. of Horti & Forestry, HP	0.500	0.200
9	Dr. YSR Horticulture University, Andhra Pradesh	2.000	0.800
10	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	6.000	2.400
11	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, MP	2.000	0.800
12	Junagadh Agri University, Gujarat	2.000	0.800
13	Maharana Pratap University for Agri & Tech, Udaipur, Rajasthan	5.000	2.000
14	Vasantrao Naik Marathwada Agriculture University, Parbhani, Maharashtra	2.000	0.800
15	Narendra Dev University for Agri & Tech, Ayodhya, UP	3.000	1.200
16	ICAR - National Research Centre for Seed Spices, Ajmer, Rajasthan	27.000	10.800
17	Punjab Agricultural University, Ludhiana, Punjab	6.000	2.400
18	Dr. Rajendra Prasad Central Agricultural University, Dholi, Bihar	1.000	0.400
19	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, MP	10.000	4.000
20	Sardar Khrushinagar Dantiwada Agriculture University, Jagudan, Gujarat	10.000	4.000
21	Sri Konda Laxman Telengana State Horticulture University, Telengana	8.000	3.200
22	Sardar Vallabh Bhai Patel University, Meerut, UP	1.500	0.600
23	Sher-e-Kashmir University for Agriculture and Technology, Kashmir	0.500	0.200
24	Sri Karan Narendra Agriculture University, Jobner, Rajasthan	7.000	2.800
25	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	4.000	1.600
26	University of Agriculture Sciences, Bangalore, Karnataka	1.000	0.400

27	University of Agriculture Sciences, Dharwad, Karnataka	5.000	2.000
28	University of Horticulture Sciences, Bagalkot, Karnataka	1.000	0.400
29	ICAR - Central Arid Zone Research Institute, Bhuj, Gujarat	5.000	2.000
	Total	**169.000**	**67.600**

2.1.8 Garlic

Garlic is an important spice crop grown in an area of 2.97 lakh ha with an estimated production of around 16.01 lakh tonnes. The low productivity when compared to other producing countries is primarily because of the varieties being cultivated in major parts of the country. New varieties released from various research stations have not reached the farmers in the required extent. Directorate of Arecanut and Spices Development had been funding Universities to produce nucleus planting materials during 2022-23 so as to make available enough materials for further multiplication and distribution among the farmers. A total of Rs.38.25 lakhs was incurred for this purpose during the year.

Table 9. Nucleus seed production programme of Garlic 2022-23.

S No	Institute	Quantity produced and distributed (Nos in lakhs)	Financial utilisation (Rs. In lakhs)
1	Agriculture University, Kota, Rajasthan	5.000	2.500
2	C C S Haryana Agriculture University, Hissar, Haryana	10.000	5.000
3	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	5.000	2.500
4	Dr. Y.S Parmer Univ. of Horti & Forestry, HP	3.000	1.500
5	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, MP	7.000	3.500
6	Junagadh Agri University, Gujarat	4.000	2.000
7	Vasantrao Naik Marathwada Agriculture University, Parbhani, Maharashtra	2.000	1.000
8	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	4.000	2.000
9	Narendra Dev University for Agri & Tech, Ayodhya, UP	2.000	1.000
10	Punjab Agricultural University, Ludhiana, Punjab	17.00	8.500
11	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, MP	8.000	4.000
12	Sri Konda Laxman Telengana State Horticulture University, Telengana	1.000	0.500
13	Sardar Vallabh Bhai Patel University, Meerut, UP	1.500	0.750
14	Sher-e-Kashmir University for Agriculture and Technology, Kashmir	1.000	0.500

15	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	3.000	1.500
16	University of Agriculture Sciences, Dharwad, Karnataka	3.000	1.500
	Total	**76.500**	**38.250**

2.1.9 Bush Pepper

Since scope for area expansion is limited, especially in urban horticulture, cultivation of bush pepper in the terrace garden, coconut garden, orchards is one of the alternatives to increase the black pepper production to meet the growing demand. From 2020-21, Considering the increasing demand for bush pepper as a part of emerging urban horticulture, the Directorate initiated to provide assistance for bush pepper production @ Rs. 40/- per plant. During this year, 14 implementing agencies produced a total No of 41,400 bush pepper plants/ grafts with a financial assistance of Rs.16.56 Lakhs.

Table 10. Bush pepper planting material production programme during 2022-23

S No	Institute	Quantity produced and distributed (Nos in lakhs)	Financial utilisation (Rs. in lakhs)
1	Assam Agri University, Assam	0.010	0.400
2	Bidhan Chandra Krishi Vishwa Vidyalaya, West Bengal	0.005	0.200
3	Central Island Agriculture Research Institute, Port Blair, A & N Islands	0.005	0.200
4	Central Agriculture University, Arunachal Pradesh,	0.010	0.400
5	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	0.100	4.000
6	ICAR - Central Coastal Agriculture Research Institute, Goa	0.050	2.000
7	Kerala Agriculture University, Thrissur, Kerala	0.034	1.360
8	Orissa University for Agriculture and Technology, Orissa	0.005	0.200
9	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	0.010	0.400
10	University of Agriculture and Horticulture Sciences, Shimoga, Karnataka	0.100	4.000
11	University of Agriculture Sciences, Bangalore, Karnataka	0.010	0.400
12	University of Agriculture Sciences, Dharwad, Karnataka	0.040	1.600
13	University of Horticulture Sciences, Bagalkot, Karnataka	0.025	1.000
14	Uttar Banga Agricultural University, Pundibari, West Bengal	0.010	0.400
	Total	**0.414**	**16.560**

2.1.10 Tree Spices

Tree spices being of perennial nature, quality planting material has a major role to play in the success of its cultivation. Lack of good quality planting materials in tree spices like clove, cinnamon/tejpat, tamarind, nutmeg, allspice, cassia, curry leaf etc. is a major hindrance to its development. The Directorate extended assistance for the production of tree spices grafts/seedlings sourced from selected high yielding trees to SAUs and ICAR Institutes located in southern states and Konkan region where it is popularly grown. Grafts of nutmeg and tamarind and seedlings of clove, cinnamon, curry leaf, allspice, cassia were included in the programme. Approximately Rs.3.367 lakh grafts/ seedlings of various tree spices were produced and distributed with a financial utilization of Rs.95.03 lakhs.

Table 11. Details of tree spices planting material production programme

S No	Tree Spices grafts/seedlings	Unit	Unit Cost	Quantity produced and distributed (in lakhs)	Financial utilisation (Rs. in lakhs)
1	Nutmeg grafts (Orthotropic)	Nos in lakhs	140.00	0.092	12.880
2	Nutmeg grafts (Plagiotropic)	Nos in lakhs	80.00	0.400	32.000
3	Tamarind/Kokum grafts	Nos in lakhs	20.00	2.125	42.500
4	Clove/All spice seedlings	Nos in lakhs	20.00	0.260	5.200
5	Cinnamon/Cassia/Curry leaf seedlings	Nos in lakhs	5.00	0.490	2.450
	Total			**3.367**	**95.030**

Table 12. Institute-wise details of planting material production of tree spices

(a) Nutmeg (Orthotropic)

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. in lakhs)
1	Kerala Agriculture University, Thrissur, Kerala	0.072	10.080
2	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	0.020	2.800
	Total	**0.092**	**12.880**

Nutmeg (Plagiotropic)

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. in lakhs)
1	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	0.300	24.000
2	ICAR - Central Coastal Agriculture Research Institute, Goa	0.005	0.400

3	ICAR - Indian Institute of Spices Research, Calicut, Kerala	0.025	2.000
4	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	0.010	0.800
5	University of Agriculture Sciences, Bangalore, Karnataka	0.030	2.400
6	University of Agriculture Sciences, Dharwad, Karnataka	0.030	2.400
	Total	**0.400**	**32.000**

(b) Tamarind/Kokum grafts

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. in lakhs)
1	Banda Agricultural University, Uttar Pradesh	0.020	0.400
2	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	0.850	17.00
3	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	0.150	3.000
4	Dr. YSR Horticulture University, Andhra Pradesh	0.500	10.000
5	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, MP	0.020	0.400
6	Kerala Agriculture University, Thrissur, Kerala	0.0950	1.900
7	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	0.100	2.000
8	University of Agriculture Sciences, Bangalore, Karnataka	0.060	1.200
9	University of Agriculture Sciences, Dharwad, Karnataka	0.100	2.000
10	University of Horticulture Sciences, Bagalkot, Karnataka	0.230	4.600
	Total	**2.125**	**42.500**

(c) Clove/Allspice Seedlings

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. in lakhs)
1	Central Island Agriculture Research Institute, Port Blair, A & N Islands	0.030	0.600
2	Kerala Agriculture University, Thrissur, Kerala	0.050	1.000
3	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	0.050	1.000
4	University of Agriculture Sciences, Bangalore, Karnataka	0.100	2.000
5	University of Agriculture Sciences, Dharwad, Karnataka	0.020	0.400
6	University of Horticulture Sciences, Bagalkot, Karnataka	0.010	0.200
	Total	**0.260**	**5.200**

(d) Cinnamon/Cassia/Curry leaf

S No	Institute	Quantity produced and distributed (Nos in lakhs)	Financial utilisation (Rs. In lakhs)
1	Banda Agricultural University, Uttar Pradesh	0.020	0.100
2	Bidhan Chandra Krishi Vishwa Vidyalaya, West Bengal	0.600	3.000
3	Central Island Agriculture Research Institute, Port Blair, A & N Islands	0.100	0.500
4	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	0.500	2.500
5	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	0.200	1.000
6	Dr. YSR Horticulture University, Andhra Pradesh	0.200	1.000
7	ICAR - Central Coastal Agriculture Research Institute, Goa	0.050	0.250
8	ICAR - Indian Institute of Spices Research, Calicut, Kerala	0.050	0.250
9	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, MP	0.020	0.100
10	Kerala Agriculture University, Thrissur, Kerala	0.490	2.450
11	Vasantrao Naik Marathwada Agriculture University, Parbhani, Maharashtra	0.050	0.250
12	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	0.100	0.500
13	Orissa University for Agriculture and Technology, Orissa	0.020	0.100
14	Sri Konda Laxman Telengana State Horticulture University, Telengana	0.060	0.300
15	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	0.160	0.800
16	University of Agriculture Sciences, Bangalore, Karnataka	1.200	6.000
17	University of Agriculture Sciences, Dharwad, Karnataka	0.260	1.300
18	University of Horticulture Sciences, Bagalkot, Karnataka	0.510	2.550
	Total	**4.590**	**22.950**

2.1.11 Aromatic Plants

In order to multiply quality planting materials of selected aromatic plants which are in good demand for the domestic industries and also for the export markets, the Directorate extended financial assistance to Universities/ICAR Institutes spread across the country. A total of 63 hectares were covered under the programme with a financial outlay of Rs.47.25 lakhs during 2022-23, with an assistance @ Rs.75,000/ha.

Table 13. Institute-wise details of planting material production programme in Aromatic Plants

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. In lakhs)
1	Anand Agricultural University, Anand, Gujarat	1.000	0.750
2	Bidhan Chandra Krishi Vishwa Vidyalaya, West Bengal	1.000	0.750
3	C C S Haryana Agriculture University, Hissar, Haryana	3.000	2.250
4	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	5.000	3.750
5	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	7.000	5.250
6	Dr. Y.S Parmer Univ. of Horti & Forestry, HP	1.000	0.750
7	ICAR - Directorate of M & A Plants, Anand, Gujarat	4.000	3.000
8	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	6.000	4.500
9	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, MP	1.000	0.750
10	Kerala Agriculture University, Thrissur, Kerala	4.000	3.000
11	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	2.000	1.500
12	Narendra Dev University for Agri & Tech, Ayodhya, UP	4.000	3.000
13	Orissa University for Agriculture and Technology, Orissa	4.000	3.000
14	Punjab Agricultural University, Ludhiana, Punjab	1.000	0.750
15	Sri Konda Laxman Telengana State Horticulture University, Telengana	5.000	3.750
16	Sher-e-Kashmir University for Agriculture and Technology, Kashmir	1.000	0.750
17	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	5.000	3.750
18	University of Agriculture Sciences, Bangalore, Karnataka	5.000	3.750
19	University of Agriculture Sciences, Dharwad, Karnataka	2.000	1.500
20	University of Horticulture Sciences, Bagalkot, Karnataka	1.000	0.750
	Total	**63.000**	**47.250**

Quality Planting Material Production Programme 2022-23

1. Quality planting material of Black Pepper cuttings raised at AHRS,Ullal,UAHS, Shimogga

2.Black Pepper cuttings production at BCKV,West Bengal

3. Black Pepper cuttings raised at ICAR-IISR, Calicut

4.QPM mother block of Black Pepper at RARS, Ambalavayal, KAU

5. Quality planting material of Black Pepper produced at Gandevi, Navasari AU, Gujarat

6. Black Pepper grafts raised at KAU, Thrissur

7. QPM of Black Pepper grafts produced at UAS, Dharwad

8. Mother block of Bush pepper established at Dr.BSKKVP, Dapoli

9. Betel vine quality planting material production at UBKV, Pundibari

10. Quality planting material of Betelvine raised at GKVK, Bangalore

11. Betelvine quality planting material raising at OUAT, Bhuvaneshwar

12. Quality planting material of Betelvine raised at PDKV, Akola

13. Field view of QPM Ginger at GKVK, Bangalore

14. QPM Ginger field at KVK, Mainpat, IGKV, Chattisgarh

15. Field view of QPM Ginger at MPKV, Rahuri

16. Quality planting material production of Ginger at ICAR-IISR, Calicut

17. Qyality seed rhizomes of ginger produced at Dr. BSKKVP, Dapoli

18. Field view of QPM Ginger at UBKV, Pundibari

19. HC visited Ginger seed production plot at UHS, Shimogga

20. Quality planting material of ginger field raised at Banda AU, UP

21. Field view of Turmeric plot at Anand AU, Gujarat

22. QPM production at TNAU, Coimbatore

23. Field view of quality seed production of Turmeric at Dr. YSRHU, AP

24. Quality seed rhizomes of Turmeric produced at GKVK, Bangalore

25. Field view of quality planting material of Turmeric at MPKV, Rahuri

26. Quality seed rhizomes of Turmeric multiplied at Dr.YSRHU, AP

27. Field view of QPM production of Turmeric at RVSKVV, Gwalior (2)

28. QPM Turmeric produced at UHS, Bagalkot

29. Roma variety of Turmeric multiplied at JNKV, MP

30. Field view of QPM Turmeric plot at PDKV, Akola

31. Quality planting material of Turmeric produced at PAU, Ludhiyana

32. Turmeric plot established for QPM at OUAT, Orissa

33. Waigon variety of Turmeric multiplied at ICAR-CCARI, Goa

34. Quality planting material of turmeric raised at IGKV, Chattisgarh

35. Quality planting material production of Turmeric at CHF, Pasighat

36. Field view of Turmeric at Navasari AU, Gujarat

37. Planting at Protray seedlings of turmeric PDKV, Akola

38. Protray seedlings of Ginger transplanting at ICAR-CCARI, Goa

39. Turmeric protray seedlings produced at VNMPKV, Parbhani

40. Protray turmeric seedlings produced at CHF, Pasighat

41. Turmeric protray seedlings Produced at UHS, Bagalkot

42. Protray seedlings of Prathibha variety produced at UAS, Dharwad

43. Chilli Hybrid seed production plot at SKLTSHU, Telangana

44. Quality planting material of Chilli seeds produced at TNAU, Coimbatore

45. Field view of Chilli seed production plot at MPKV, Rahuri

46. Quality Chilli seed production unit at SDAU, Jagudan

47. Processing of quality chilli seeds production at GKVK, Bangalore

48. Drying of harvested chilli at SKUAT, Kashmir

49. Chilli seed extraction process at UHS, Bagalkot

50. Chilli seed production at MVRS, AAU, Gujarat

51. Quality seed production of Cumin, ICAR-CAZRI, Bhuj

52. Field view of quality seed production of Cumin at Anand AU, Gujarat

53. Seed multiplication plot AU, Jodhpur

54. Coriander seed multiplication field at JAU, Junagadh

55. Sudha variety of coriander multiplied at JNKV, MP

56. Field view of quality seed production of Coriander at SKUAT, Kashmir

57. QPM Coriander field view at RAU, Bihar

58. Quality seed production of Coriander at Dr.YSRHU, AP

59. Quality Coriander seed production at TNAU, Coimbatore

60. ACr-1 variety of Coriander multiplioed at UAS, Dharwad

61. Quality seed multiplication of Coriander at CS Azad, UP

62. Fenugreek seed multiplication plot at CCSHAU, Haryana

63. Gujarat Fenugreek 2 variety multiplied at JAU, Junagadh

64. Quality seed production of Fenugreek at RVSKVV, Gwalior

65. Quality seed production of Fenugreek at NDUAT, UP

66. Fenugreek Var.PRM 45 multiplied at MPUAT, Udaipur

67. Seed spices multiplied at AAU, Gujarat

68. Gujarat Fennel 11 seeds multiplied at SDAU, Jagudan

69. Quality seed production of Fennel at SVPUT, Meerut

70. Nigella seed production plot at RAU, Bihar

71. Seed spices multiplied at PAU, Ludhiyana

72. Field visit by farmers in seed multiplication field at IGKV, Raipur

73. Deputy Director, DASD visited the QPM plot at AU, Kota

74. QPM in Seed spices at Banada AU, UP

75. Field view of Garlic at CSS HAU, Haryana

76. Garlic variety multipled at JNKV, MP

77. Quality seed production plot of Garlic at PAU, Ludhyana

78. G-41 Bhima Purple Var of Garlic multiplied at PDKV, Akola

79. Quality seeds of Garlic produced at Dr.YSPUHF, Solan

80. Garlic field raised at MPKV, Rahuri

81. Quality planting material production of Garlic at Banda AU, UP

82. QPM of garilic distributed to farmers MPKV, Rahuri

83. Nutmeg grafts raised at KAU, Thrissur

84. Kokum seedlings produced at Dr.BSKKVP, Dapoli

85. Nutmeg grafts raised at TNAU

86. Cinnamon layers at Dr.BSKKVP, Dapoli

87. Cinnamon layers produced at CARI, Port Blair

88. Konkan Tej cinnamon seedlings raised at CCARI, Goa

89. Clove seedlings produced at KVK, UAS, Dharwad

90. Clove seedlings raised at UHS, Bagalkot

91. Clove seedlings raised at CARI, Port Blair

92. Multiplation of clove seedlings at TNAU

93. QPM of curry leaf produced at SKLTSHU, Telangana

94 .Curry leaf seedlings raised at at BCKV, West Bengal

95. QPM of curry leaf produced at UHS, Bagalkot

96. Distribution of QPM of curry leaf at Dr. YSRHU, AP

97.Tamarind DTS 1 variety raised at UAS, Dharwad

98. Tamarind seedlings multiplied at VNMKV, Parbhani

99. Allspice seedlings raised at UHS, Bagalkot

100. Tamarind grafts var. PKM 1 at GKVK, Bangalore

101. QPM production of Thulsi at Dr.YSPHUF, Solan

102. Satawar aromatic crop raised at HISAR, Haryana

103. QPM production of Geranium MPKV, Rahuri

104. Field view of Lemon grass at BCKV, WB

105. QPM production of Tulsi at DMAPR, Gujarat

106. Citronella field view at PDKV, Akola

107. Quality seed production of Aromatic plants at GKVK, Bangalore

108. QPM production of Aromatic plants at UAS, Dharwad

109. Field view of Aromatic plants at AAU, Gujarat

110. Aromatic plants raised at Thovalai, TNAU

2.2 Nursery centre for spices & aromatic plants

In order to supply quality planting materials of selected aromatic plants which are in good demand for the domestic industries and also for the export markets and major spices, the Directorate established 4 small nurseries in different SAUs. An amount of Rs. 15.00 lakhs were provided per each centre for establishing the nursery centre. Total Rs.60.00 lakhs were incurred for this purpose. Following SAUs implemented this programme during 2022-23;

1. Central Agriculture University, Arunachal Pradesh
2. Dr. Balasaheb Sawant Konkan Krishi Vidya Peeth, Dapoli, Maharashtra
3. Kerala Agri University, Thrissur, Kerala
4. Vasantrao Naik Marathwada Agriculture University, Parbhani, Maharashtra

2.3 Upgradation of Spice Nurseries

Non-availability of quality planting material had been a major bottleneck in improving the production and productivity of spices crop. Nursery infrastructure is an important factor in ensuring the quality of planting material produced.

There are many nurseries in the country which lack modern facilities for producting quality planting material, mainly due to less financial resources. DASD is upgrading / modernizing such existing nurseries with all the modern facilities to meet accreditation norms for producing quality planting material. Both public and private nurseries are strengthened under this programme. The most important component is mother block establishment to ensure the genuinety of the varieties multiplied. The other components include soil solarization unit, work shed for mixing potting mixture, the mist chambers for root and shoot development, poly houses for giving right environment for growth, hardening sheds, irrigation facility etc.

Based on the applications received from nurseries across the country, following nurseries which are already accredited under DASD nursery accreditation programme were selected for providing assistance for upgradation during 2022-23.

1. H C & R I, Periyakulam, Tamil Nadu Agriculture University
2. H C & R I, Coimbatore, Tamil Nadu Agriculture University
3. HRS, Yercaud, Tamil Nadu Agriculture University
4. Spice Nursery at University of Agriculture Sciences, Dharwad
5. Spice Nursery at PPNMU, Vellanikara, Kerala Agriculture University
6. Spice Nursery at College of Horticulture, Mulde, Dr. BSKKVP, Dapoli
7. Spice Nursery at ARS Awashi, Dr. BSKKVP, Dapoli
8. Spice Nursery at College of Horticulture, Dr. BSKKVP, Dapoli

DASD officials visited the selected nurseries and evaluated the requirements submitted in the proposals. A total financial assistance of Rs.24.92290 Lakhs were provided to these nurseries as assistance for upgradation.

2.4 Establishment of seed processing and storage infrastructure

This programme is being implemented since 2005-06 under NHM and has contributed significantly in the development of seed processing infrastructure and storage facilities in various SAUs and Central Institutes.

Development of infrastructure facilities for processing and storage of seeds is important for any seed production programme. The Directorate has given financial assistance to various Universities/Institutes for developing facilities for handling, processing and package of seeds. Assistance was also given for creating infrastructure like drying platforms, cleaning and grading machineries, storage bins, packaging units and other related equipments. 100% assistance was provided for this programme. A total of 5 Universities were covered under the programme with a total financial utilization of Rs.50.00 lakhs. Each University were provided with an assistance of Rs.10 lakhs for establishing a seed processing and storage infrastructure. Following are the Universities/Institutes involved in this programme.

1. Agriculture University, Jodhpur, Rajasthan
2. Agriculture University, Kota, Rajasthan
3. Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra
4. Sri Konda Laxman Telengana State Horticulture University, Telengana
5. University of Horticulture Sciences, Bagalkot, Karnataka

111. Established Nursery Centre at CRS, Pambadumpara, KAU

112. Horticulture Commissioner visiting the Bio control lab established under MIDH at UAHS, Shimogga

113. Seed storage structure constructed under MIDH at KVK, Phlodi AU, Jodhpur

114. Constructed Mist Chamber at UAS, Dharwad

115. Seed storage and infrastructure constructed at CHF, Pasighat

116. Green House constructed at RARS, Pattambi, KAU

117. Seed grading and Processing Unit established at ARSS, Khanpur AU, Kota

118. Seed processing and Storage structure established at UHS, Bagalkot

119. Shadenet House constructed at UAS, Dharwad

120. Seed storage structure established at SKNAU, Jobner

2.5 Estabilshment of Large Cardamom nursery

Large cardamom (*Ammomum subulatum* Roxb.) which belongs to the family Zingiberaceae is the main cash crop of the NE states. Sale of planting material of large cardamom is an important income generating activity in these states. However, there is no systematic nursery activity undertaken in the area for the production of true to type, healthy quality planting material. As it was essential that the concept of "Nursery" be introduced in these states, to ensure that only quality planting material of genuine variety is traded within and outside the region, the Directorate has been promoting establishment of large cardamom nurseries in NE region. Since 2019-20, five large cardamom nurseries have been established and accredited by DASD in Sikkim, in association with State Dept of Horticulture. During 2021-22, the Directorate established similar programme for establishment of Large Cardamom nurseries in Arunachal Pradesh in association with Department of Horticulture.

During the year 2022-23, the Directorate initiated action for establishment of Large Cardamom nurseries in Nagaland state at ICAR – KVK, Phek and at Kohima, State Horticulture Department. Awareness trainings were conducted for Dept officials and nurserymen of Nagaland, on importance of nursery concept for producing healthy and disease-free planting material. An amount of Rs.10.00 lakhs was incurred for this programme.

3. Accreditation of spices nurseries

Quality of planting material plays an important role in the successful cultivation and development of spices. The planting material requirement by the spices growers is mainly met by nurseries established under State Department of Horticulture/Agriculture, the SAUs and ICAR Institutes at present. However, these nurseries in public domain provide only 30-40% of the demand for planting material. The major part of the demand is met by the unregulated private nurseries, which lacks modern infrastructure such as green house, mist chamber, efficient nursery tools and gadgets, implements and machinery. Establishment of a network of Spice Nursery to ensure the availability of good quality, disease free, certified planting material of desired high yielding variety will have a tremendous impact on production, productivity and quality of the spices produced. Towards this direction, DASD has been authorized by the Ministry of Agriculture and Farmers Welfare, Govt. of India for accrediting spices nurseries.

Accreditation of Nurseries is an important step to ensure availability of quality planting material to the farmers. As per the MIDH norms, planting materials need to be procured only from accredited nurseries for all government programmes. Under the accreditation programme, DASD grants graded recognition to nurseries based on their infrastructure, production system and quality parameters of planting material and management practices adopted. The assessment is carried out through a special committee formed for this purpose. The programme was initiated in the year 2015-16 and more than 60 nurseries have been accredited by DASD till March, 2023.

Table 14. List of spice nurseries accredited by DASD during 2022-23

S. No.	Nursery Details	State	Crop certified	Variety/ Cultivar	Star rating	Production capacity (Nos.) / annum
1	The Associate Director of Research, RARS, Kerala Agriculture University, Ambalavayal Pin - 673 593, Wayanad, Kerala	KERALA	BLACK PEPPER CLOVE CINNAMON	PANNIYUR - 1 Local Variety Local Variety	Two star	2,00,000 2,000 2,000
2	The Prof & Head, Aromatic, Medicinal Plants Research Station, Odakalli, Asamanoor PO, Ernakulam, Kerala	KERALA	BLACK PEPPER NUTMEG	Panniyur 1 – 8, Karimunda, Vijay, IISR Thevam, IISR Malabar Excel, Sreekara, Subhakara, Panchami, Pournami, IISR Shakti & IISR Girimunda Viswasree, KAU - Pullan, KAU - Kochukudy, KAU - Mundathanam, KAU - Poothara, KAU - Punnathanam	One Star	22,000 2,000
3	The Director (Res & Dev) ICRI, Spices Board, Kailasanadu PO, Myladumpara, Idukki, Kerala	KERALA	BLACK PEPPER	Panniyur - 4, Pournami Panchami, IISR Thevam, IISR Malabar Excel, IISR Girimunda, Subhakara and IISR Shakti,	Two star	12,000
4	M/s Kumbuckal Pepper Nursery, Kumbuckal House, Kaleketty PO, Kanjirapally, Kottayam Distt. Kerala	KERALA	BLACK PEPPER	Kumbuckal Pepper	Two star	50,000
5	The Prof & Head, Panniyur Research Station, Kerala Agriculture University, Panniyur, Pin 670 142, Kannur, Kerala	KERALA	BLACK PEPPER	Panniyur 1-8 and Karimunda	One Star	14,770

6	The Associate Dean, Hi Tech Pepper Nursery, College of Agriculture, Padanakkad PO, Kasaragod, Kerala	KERALA	BLACK PEPPER	Panniyur 1-8 and Karimunda	One Star	30,000
7	The Professor & Head Horticulture Research Station, TNAU Yercaud, Salem District Tamil Nadu	TAMIL NADU	BLACK PEPPER	PANNIYUR - 1, Karimunda, IISR - Shakti and IISR Thevam	One Star	63,000
8	The Professor & Head Horticulture Research Station, TNAU Thadiyankudisai, Dindigul District, Tamil Nadu	TAMIL NADU	BLACK PEPPER CINNAMON CLOVE	Panniyur 1 and Karimunda PPI - 1	Two star	1,50,000 25,000 5,000
9	The State Horticulture Farm, Ladys Seat Road, Yercaud, Salem District, Tamil Nadu	TAMIL NADU	BLACK PEPPER	PANNIYUR - 1	One Star	2,00,000
10	The Associate Prof and Head Agri and Horti Research Station, Ullal, Mangalore Dakshina Kannada Karnataka	KARNATAKA	BLACK PEPPER	Panniyur 1, 5 and IISR Thevam	One Star	2,15,000
11	Sh K Shyam Prasad M/s Annapoorna Nursery Pethri, Cherkady, Brahmavar, Udupi Dist Karnataka	KARNATAKA	BLACK PEPPER	Panniyur - 1, Thevam and Karimunda	One Star	41,000
12	The Sr. Scientist and Head KVK Sirsi, UAS Dharwad Shimoga, Karnataka	KARNATAKA	BLACK PEPPER	Panniyur -1 and Karimunda	One Star	20,000
13	Shri B R Krishna Varashree Farm and Nursery, Sakrebail, Gajanuru Post. Shimoga, Karnataka	KARNATAKA	BLACK PEPPER NUTMEG CINNAMON CLOVE	Panniyur -1 and Panniyur -4 Local varieties Local varieties Local Varieties	Two star	8,00,000 35,000 35,000 40,000

14	The Senior Farm Superintendent Zonal Agri and Horti Research Station, Mudigere, Karnataka	KARNATAKA	BLACK PEPPER	Panniyur - 1	Two star	2,00,000
15	The Asst. Director of Horticulture, Beejuvalli Horticulture Farm, Mudigere, Chikmanglore, Karnataka	KARNATAKA	BLACK PEPPER	Panniyur - 1	One Star	50,000
16	M/s Cannoncadoo Estate TATA Coffee Ltd PB No 22, Siddapur, North Kodagu, Karnataka	KARNATAKA	BLACK PEPPER	Panniyur - 1, IISR Thevam, Panchami, Sreekara, and Pournami	Two star	67,500
17	M/s Karadibetta Estate TATA Coffee Ltd Rayarkoppal Post, Hassan Karnataka	KARNATAKA	BLACK PEPPER	Panniyur - 1, IISR Thevam, Panniyur - 3, Sigandini, Sreekara and Kottanadan	One Star	70,000
18	M/s Yemmigoondi Estate TATA Coffee Ltd PB No 29, Pollibetta, Kodagu, Karnataka	KARNATAKA	BLACK PEPPER	Panniyur - 1, IISR Thevam, Malabar Excel and Arka Coorg Excel	One Star	65,000
19	The Agronomist RCRS Bhatye, Ratnagiri Dr. BS KKVP Dapoli Maharashtra	MAHA-RASHTRA	BLACK PEPPER NUTMEG CINNAMON KOKUM	Panniyur - 1 Konkan Swad, Konkan Sugandha Konkan Sreemanti Konkan Tej Konkan Tejpatta Konkan Amrita Konkan Hatis	Two Star	10,000 21,000 22,500 7,500
20	The Head, Department of Horticulture, College of Horticulture, Dr. BSKKVP Dapoli, Maharashtra	MAHA-RASHTRA	BLACK PEPPER NUTMEG CINNAMON KOKUM	Panniyur - 1 Konkan Swad, Konkan Sugandha Konkan Tej Konkan Amrita Konkan Hatis	Two star	50,000 6,000 15,000 36,000

(The procedure for recognition and assessment criteria and details of accreditation are available in the website www.dasd.gov.in)

DASD Nursery Accreditation Activities 2022-23

121. Accreditation team evaluated the Annapurna Nursery at Karnataka

122. DASD accreditation team visited at Varashree Nursery, Karnataka

123. DASD Accreditation team at HRS Thadiyankudisai, TNAU

124. DASD Accreditation team at SHF, Yercaud

125. Record verification by Accreditation team at SHF, Bijuhalli, Karnataka

126. DASD Accreditation team at ZAHRS, Mudegere

127. Evaluating the TATA Coffeee Nursery at Karnataka

128. Accreditation team visited at KVK, Sirsi UAS, Dharwad

129. Evaluated spice nursery at COH, Padanakkad, KAU

130. DASD Accreditation team at PRS, Panniyur, KAU

131. Field visit of Cinnamon plot at ARS, Ambalavayal, KAU

132. Acrediatation team evaluated spice nursery at AMPRS, Odakkali, KAU

133. Accreditation team at ICRI, Spices Board

134. DASD Accreditation team at Kumbuckal Nursery

135. Nursery Accreditation team visited RARS, Bhatya Dr.BSKKVP, Dapoli

136. DASD Accreditation team at Dr.BSKKVP, Dapoli

137. Accreditation team evaluated the nursery at ARS Ullal, UAHS, Shimogga

138. Mother block established at HRS Yecaud, TNAU

4. Technology Dissemination through Frontline Demonstration

4.1 Establishment of FLDs on organic farming in major Spices

Organic farming in the spices sector is becoming increasingly important. Its environmental and economic benefits have captured attention in most of the importing countries. Consumers' demand for organically produced food products and society's demand for more sustainable development provide new opportunities for farming and business around the world. In view of the growing demand for the organically produced food items worldwide i.e., around 25% per annum, the national advantage our country has, need to be fully exploited. Latest technologies in organic farming need to be demonstrated through farmer participatory demonstration in a compact area.

Even though there is lot of demand for organic products in the markets, the farming community is yet to be fully convinced of the feasibility of organic farming in various crops. The frontline demonstration plots will serve to demonstrate and convince farmers of the applicability of various technologies developed for organic cultivation in different crops. It will encourage farmers to take up the organic farming thereby increasing the country's share in the organic products. Cluster based approach will help to develop these areas into production hub of spices for export.

The Directorate identified 2 potential clusters in the country to implement the farmer participatory demonstrations on cluster based organic production. The activities taken up in these clusters during 2022-23 are detailed below;

4.1. 1 Demonstration for Organic Turmeric production at Kandhamal district, Odisha

This programme has initiated in association with Odisha University of Agri. & Technology, Bhuvaneswar in selected locations of Kandhamal district in the state, where most of the population belongs to the SC/ST community. The bounties of nature have blessed this district with very congenial agro climatic conditions for cultivation of ginger and turmeric. Turmeric is the main cash crop of these tribals which is being cultivated from ages in rainfed uplands. The tribals are financially and educationally poor, so they never apply any fertilizer or pesticide to the crop. Thus, the agriculture of the district is organic in nature. All the turmeric and ginger produced in the district are organic products. However, farmers of Kandhamal district of Odisha are getting very low productivity and income from turmeric cultivation due to non adoption of scientific package of practices and use of traditional local variety. Thus, there is need for increasing the productivity of organic turmeric through high yielding improved varieties with scientific cultivation and thereby improving the living status of the tribal farmers.

The beneficiaries were selected by the university and initial trainings were given to the selected farmers in organic farming, post harvest technology and marketing. The inputs for demonstration like seed rhizome of turmeric variety Roma, Surama and Rasmi were distributed to the selected farmers. The planting of turmeric is under progress and the detailed report of the programme will be presented next year.

4.1. 2 Demonstration for organic ginger production at TNAU

Frontline demonstration on organic ginger cultivation in scientific way was conducted by TNAU at farmers' field, Thandikudi village of Dindigul district, Tamil Nadu.

Demonstration on preparation of different organic inputs *viz.,* Vermicompost, Panchakavya, Jeevamirtham, Fish Amino Acid, Egg Amino Acid and scientific application of these inputs were demonstrated in the field. The inputs were applied to the ginger crop as soil application and foliar spray (60,90 &120 days after planting). Humic acid was also purchased from NLC, Neyveli and applied. During different stages of crop growth, field days were conducted in the plots for the benefits of farmers. A yield of 26.2 t/ha organic ginger was recorded which is on par with the normal yield and farmers got higher price for organic ginger.

The samples collected under organic cultivation and farmers practice (application of chemical fertilizers) were sent to Indian Institute of Spices Research, Calicut for analyzing quality parameters *viz.,* ginger oil, oleoresin, camphene and gingiberene and the results showed that ginger samples grown under organic cultivation recorded higher values for all the quality parameters as compared to inorganically grown ginger. The programme has helped to popularize the organic cultivation of ginger among farmers in Theni and Dindigul districts.

4.2 Establishment of demo plots for Hybrid Chilli Varieties

Chilli (*Capsicum annuum* L.) is an economically important and widely cultivated crop of India. In India, chilli is grown in an area of 10.10 lakh hectares both dry chilli (6.23 lakh ha) and green (3.87 lakh ha) with annual production of 41.19 lakh MT of green chilli and 18.45 lakh MT of dry chilli. Of late, the whitefly (Bemisia tabaci) transmitted begomovirus is becoming a serious threat to chilli cultivation in India, causing severe retardation of plant growth and development, inducing symptoms such as foliar chlorosis and curling, reduced leaf size, inhibited fruit set and eventually abnormal fruit development causing even up to 100% loss if the crop got affected at early stage. Leaf curl disease of chilli has emerged as a serious problem in the major chilli growing areas of both North and South Indian states, such as Haryana, Punjab, Rajasthan, West Bengal, Uttar Pradesh, Delhi, Madhya Pradesh, Maharashtra, Andhra Pradesh, Telangana, Karnataka and Tamil Nadu. Several factors such as climate change, long dry spells, large population of whiteflies, wide host range and faulty agricultural practices have contributed to the emergence and wide spread of begomoviruses in the country causing significant economic losses. Due to their broad host range and large number of insect vectors, complete control of virus is very difficult. Genetic resistance in host plants is an ideal line of defense against this virus, since it does not require use of insecticides to control vectors and thus is beneficial for the environment and human health.

To overcome ChLCV, ICAR-IIHR, Bangalore, has developed five new high yielding chilli F1 hybrids viz. Arka Tejasvi, Arka Yashasvi, Arka Saanvi, Arka Tanvi and Arka Gagan. These varieties show tolerance/ resistance to chilli leaf curl begomovirus (ChLCV) and various other pests and diseases. Apart from high yield, these varieties are found to exhibit varying levels of pungency and colour thereby catering to varying market demands. At present, the farmers highly depend on private companies for hybrid chilli seeds at very higher cost. The IIHR varieties, being developed in public sector will be made available to chilli farmers at much lower rates. The IPM/ IDM is a globally accepted strategy for promoting sustainable agriculture. ICAR-IIHR, Bangalore, has also standardized the IPM/IDM package of practices for chilli cultivation. Taking into consideration the importance of these varieties, and the need to promote the cultivation practices through farmer participatory mode for popularizing among the farming community, the Directorate took up FLDs

of these five varieties @ half acres per variety in association with three state agricultural universities located at core chilli growing areas during the year 2021-22 which showed promising results. The demonstration were repeated in 3 different locations in 2022-23.

UHS Bagalkot has completed the programme and detailed report furnished below:

The programme was established in the UHS Bagalkot (Karnataka) each in a plot size of 0.5 acre. Seeds of the five varieties and recommended package of practices for hybrid chilli were supplied from ICAR-IIHR.

The cultural practices followed as per the recommendations of ICAR-IIHR are listed below:

- Nursery raising under nylon net cover 40 to 60 mesh.
- Raising of the seedlings in protrays filled with properly fermented & microbial enriched cocopeat. At the time of germination drench the trays with fungicide (Captaf/Blitox/alliette @ 2g/litre) to avoid damping off. Apply foliar spray of acephate (@1.5g/litre) + neem oil (@ 2ml/litre) or Fipronil (@1ml/litre) + neem oil (@2ml/Litre) after 15 days of germination.
- Growing border crop two to four rows of Maize and sowing done 20-30 days before transplanting chilli seedlings.
- Land preparation was done and raised beds were prepared. Bio pesticides and bio fertilizers enriched FYM along with neem cake @1 kg/sq mtr were applied on the raised beds. Basal dose mixture of NPK 3:5:1 @1kg/7-8 sq meters was also applied along with this.
- Drip laterals were installed in the centre of the raised bed and the beds were covered with mulch sheet.(30microns) (with holes on both the rows of 60cm apart at 45 cm apart in zig zag fashion) and 40-45 days old seedlings were planted.
- Irrigation was done on the bed a day before planting. After one month of transplanting water soluble KNO_3 and $CaNO_3$ @5g/litre were given through drip @ 100 litre/acre.
- insect sticky trap 40 numbers were installed.
- Fertigation with Water soluble fertilizers (19all) @5g/litre at weekly interval was ensured.
- Kept the land free from weeds.
- Routine plant protection measures were taken up. Upto flowering regular spray of (@ 15 day interval) confidor to control thrips and mites .
- Preventive phytophthora blight control measures using acrobat 1g/litre ± polyram 2g /lit
- At flowering stage , confidor 0.3 ml/l was sprayed.
- To control borer coragen 0.3 ml/l spray was recommended.
- At the time of fruit initiation foliar application of sea weed extract (2ml/l) and micronutrient (3-5g/l) sprays alternatively at 10 days interval is recommended.
- Use of tonic growth regulators to be avoided.

The following observations were recorded and submitted by UHS, Bagalkot

Sl. No.	Name of the Hybrid Chilli	Plant ht(cm)	Fruit length (cm)	Fruit width (cm)	Twenty fruit wt(g)	Green fruit yield/ Plant (kg)	Green fruit yield/ac. (t)	Red fruit yield/ac. (t)
1	Arka Tejasvi	74.57	8.22	0.78	76.00	0.35	2.10	1.90
2	Arka Yashasvi	80.57	7.67	0.69	78.40	0.42	2.50	2.90
3	ArkaSaanvi	80.00	8.87	0.80	83.10	0.41	2.50	3.90
4	Arka Tanvi	86.14	8.14	0.62	58.10	**0.47**	2.80	4.90
5	Arka Gagan	72.00	8.04	0.72	55.20	0.32	1.90	5.90

From the above table, the results shows that among the hybrid varieties, Arka Tanvi showed maximum plant height (86.14cm). Highest Fruit length (8.87cm), fruit width (0.80cm) and twenty fruit weight (83.10 g) was recorded in hybrid Arka Sanvi where as green fruit yield per plant (0.47 kg) and Red ripe yield per plant (0.47 kg) was recorded in Arka Tanvi.

Reaction to ChLCV and other pest and diseases

Sl. No.	Name of the Hybrid Chilli	ChLCV	Powdery mildew	Anthrac-nose	Fruit Borer	Market acceptability
1	Arka Tejasvi	Low	Low	Low	Low	Green, good and attractive
2	Arka Yashasvi	Low	Low	Low	Low	Green, good and attractive
3	ArkaSaanvi	Medium	Low	Low	Low	Green, good and attractive
4	Arka Tanvi	Low	Low	Low	Low	Green, good and attractive
5	Arka Gagan	Medium	Medium	Low	Low	Green, good and attractive

The results shows that Arka Tejasvi, Arka Yashasvi and Arka Tanvi varieties are less susceptible to Chilli leaf curl virus. All hybrid varieties except Arka Gagan are less susceptible to powdery mildew, anthracnose and fruit borer. Arka Saanvi and Arka Gagan showed medium susceptibility to ChLCV. All hybrid varieties are very much acceptable to market.

139. Input distribution for FLD on Organic Turmeric by HRS Chintapalli, YSRHU

140. FLD on turmeric at Bilaspur, IGKV, Chattisgarh

141. Kandhamal variety of turmeric distributed at OUAT, Orissa

142. FLD on Organic production of Ginger at TNAU, Coimbatore

143. FLD on organic ginger at TNAU

144. FLD on Hybrid varieties of Chilli at UHS, Bagalkot

145. FLD on Chilly at SKLTSHU,Telangana

4.3 Demonstration plots for seed spices

Seed spices comprise the single largest group of spices with over 17 items coming under it. The important amongst this group are coriander, cumin, fennel, fenugreek, celery, ajowan seed, dill seed, aniseed etc. India is the largest producer of seed spices with a production of 20.20 lakh tonnes of seed spices annually from an estimated area of about 20.97 lakh ha. This group has a prominent place in our agricultural economy because of its large domestic consumption and growing demand for export. Being annual crops, these are grown extensively in rotation with food crops and also as inter/mixed crops under rainfed/irrigated conditions. Seed spices are mainly cultivated in the states of Rajasthan and Gujarat with a sizeable area in the states of Madhya Pradesh, Haryana, Punjab, Uttar Pradesh, Andhra Pradesh and Bihar. However, the productivity of these crops is much less compared to the potential yield of varieties released by various research stations. This is primarily because of the non-adoption of technologies evolved in these crops. The Directorate established 75 demonstration plots in the major production centres of the seed spices for dissemination of technological information among the farming community. The financial assistance for one unit of the demonstration plot was Rs. 0.40 lakh/hectare. An amount of Rs.30.00 lakhs was utilized for this programme.

Table 15. Institute-wise details of FLDs established for seed spices

S No	Institute	No. of Plots in Ha.	Financial utilisation (Rs. in lakhs)
1	Agriculture University, Jodhpur, Rajasthan	5.00	2.000
2	Agriculture University, Kota, Rajasthan	7.00	2.800
3	Anand Agricultural University, Anand, Gujarat	5.00	2.000
4	Banda Agricultural University, Uttar Pradesh	5.00	2.000
5	Bidhan Chandra Krishi Vishwa Vidyalaya, West Bengal	2.00	0.800
6	Chandra Shekhar Azad Agricultural University, Kanpur, UP	2.00	0.800
7	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	2.00	0.800
8	Dr. Y.S Parmer Univ of Horti & Forestry, HP	1.00	0.400
9	Junagadh Agri. University, Gujarat	2.00	0.800
10	Maharana Pratap University for Agri & Tech, Udaipur, Rajasthan	3.00	1.200
11	Narendra Dev University for Agri. & Tech, Ayodhya, UP	2.00	0.800
12	ICAR - National Research Centre for Seed Spices, Ajmer, Rajasthan	17.00	6.800
13	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, MP	5.00	2.000
14	Sri Konda Laxman Telengana State Horticulture University, Telengana	2.00	0.800
15	Sher-e-Kashmir University for Agriculture and Technology, Kashmir	3.00	1.200
16	Sri Karan Narendra Agriculture University, Jobner, Rajasthan	5.00	2.000
17	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	2.00	0.800
18	University of Agriculture Sciences, Dharwad, Karnataka	2.00	0.800
19	ICAR - Central Arid Zone Research Institute, Gujarat	3.00	1.200
	Total	**75.00**	**30.0000**

146. Field view of FLD plot of Coriander at SKLTSHU, Telangana

147. FLD on Coriander at ARSS, Aklera AU, Kota

148. FLD on pesticide free cumin production ar NRCSS, Ajmer

149. Material distributed to farmers as part of FLD on seed spices at NRCSS, Ajmer

150. FLD on seed spices conducted by SKNAU, Jobner

151. FLD on seed spices conducted by Banda AU, UP

152. FLD on seed spices selected farmers at NRCSS, Ajmer

153. FLD plot of Fennel at SKNAU, Jobner

154. FLD plot of Cumin at ICAR-CAZRI, Bhuj

155. FLD on Seed spices JAU, Gujarat

156. Input materials for FLD were distributed at AU, Jodhpur

157. Field view of FLD plot of Dill at KVK Arnej AAU, Gujarat

158. Seed materials of Coriander distributed for FLD at NDUAT, Ayodhya

4.4 Demonstration plots for Aromatic Plants

India is endowed with a rich wealth of medicinal and aromatic plants and presently it has a well developed strong market at global level. In recent years, there has been a tremendous demand in plant based drugs, pharmaceuticals, essential oils, perfumery products, cosmetics and aroma compounds. The aromatic plants are extensively used as raw materials for the extraction of oils, used in food, flavors, fragrances and natural color industries. Now a days, the aromatic industry has emerged as a promising sector and a source of economic growth with increased utilization in food supplements, cosmetics, botanical pesticides, medicines etc. Due to its wider applicability and high demand, it is very important to introduce these crops into the cropping system of the county and also educate the farming community about the latest technologies in cultivation and processing. With this view, this Directorate initiated establishment of 72 demonstration plots in the various locations spread over the country in the crops of priority in the respective areas. Assistance of Rs.0.80 lakhs was given for establishing a demonstration plot of one hectare. An amount of Rs.57.60 lakhs was utilized for this purpose.

Table 16. Institute-wise details of demonstration plots for aromatic crops

S No	Institute	No. of Plots (in ha)	Financial utilisation (Rs. in lakhs)
1	Banda Agricultural University, Uttar Pradesh	15.00	12.000
2	Bidhan Chandra Krishi Vishwa Vidyalaya, West Bengal	1.00	0.800
3	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	4.00	3.200
4	Dr. Y.S Parmer Univ. of Horti. & Forestry, HP	1.00	0.800
5	ICAR - Directorate of M & A Plants, Anand, Gujarat	5.00	4.000
6	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	25.00	20.000
7	Kerala Agriculture University, Thrissur, Kerala	1.00	0.800
8	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	6.00	4.800
9	Narendra Dev University for Agri & Tech, Ayodhya, UP	2.00	1.600
10	Orissa University for Agriculture and Technology, Orissa	4.00	3.200
11	Sri Konda Laxman Telengana State Horticulture University, Telengana	2.00	1.600
12	Sher-e-Kashmir University for Agriculture and Technology, Kashmir	2.00	1.600
13	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	4.00	3.200
	Total	**72.00**	**57.6000**

4.4.1 Cluster based demonstration on aromatic crops established by Indira Gandhi Krishi Vishwavidyalaya, Raipur

The IGKV, Raipur, identified Kabirdham district which situated in the moderately to gently sloping of Chhattisgarh Mahanadi Basin area for establishing a cluster based demonstration on aromatic plants production, value addition and marketing under DASD MIDH assistance. The main objective of the programme was to improve livelihood and enable to enhance the rural income and socio-economic status of farmers of urbarn cluster, Scheduled caste dominated villages of Kabirdham District of Chhattisgarh. The aromatic crops like Lemongrass, Rosa grass, Citronella were found suitable for demonstration in the location.

Considering the need of crop diversification, cluster demonstration of aromatic crops have been conducted in 25 hectares of land during 2022-23 through Krishi Vigyan Kendra, Kawardha with the technical guidance of Centre of Excellence, Indira Gandhi Krishi Vishwavidyalaya, Raipur (Chhattisgarh).

Methodology

Under the project supported by DASD in CSS MIDH Scheme, Lemongrass, Citronella, Rosa cultivation was done in 25 hectares of land in different villages of Kabirdham district. All the critical inputs like slips, fertilizer, organic manures and irrigation facilities were provided to the farmers with the financial support of DASD through centre of excellence on MAPs and NTFP, IGKV, Raipur. In order to make farmers more aware, capacity building programme on production and processing of aromatic crops were conducted in many villages.

Table 17: The details of crop in different villages of FLDs are as under : -

S No	Village	Block	Crop	Area in ha	No. of farmers
1	Bamhani	Kawardha	Lemongrass/Citronella	5	20
2	Rajanawagaon	Bodla	Lemongrass	5	20
3	Dholbajja	Bodla	Lemongrass/Rosa	9	25
4	Patharra	Kawardha	Lemongrass	3	5
5	Dharmgarh	Kawardha	Lemongrass/Citronella	1	10
6	Newari	Kawardha	Lemongrass	2	5
			Total	**25**	**85**

The district administration also provided financial support for installation of distillation units at village Chirha which could be helpful for extraction of essential oil of the farmers produces. In addition, in order to make the participant farmers, particularly women group self sustained to improve their livelihood, some value added product development related activities such as preparation of small packing of essential oil, soaps, incense sticks, room freshener, mosquito repellant were also initiated. Market Linkages for effective marketing have been developed.

159. Distillation process of Aromatic crops at IGKV, Chattisgarh

160. FLD of Aromatic plants conducted at Kabirdham dist, IGKV, Chattisgarh

161. FLD on Aromatic plant established at Banda AUT, UP

162. FLD on Aromatic crop at MPKV, Rahuri

163. FLD on aromatic plants established at DMAPR, Gujarat

164. FLD plot of Thulsi field established by DMAPR, Gujarat

165. Input materials distributed for FLD of Lemon grass at NDUAT, Ayodhya

4.5 Demonstration of on-farm water management

Productivity and quality of any crop is affected by availability of optimum level of irrigation during critical stages of growth. The water holding capacity of soil has gone down due to decreased organic matter content as a result of intensive cultivation. Developing water resources, adoption of water conservation methods, use of appropriate irrigation method etc. can ensure water availability throughout the crop period and thus help in uniform growth and development of plants.

Growth and yield parameters of spices like Black Pepper, Chilli etc. showed significant increase in response to irrigation. Experiments show that pre-monsoon irrigation helps in early spiking and better crop yield in black pepper. Yield of Ginger and Turmeric has shown significant increase with micro irrigation. As major seed spices are grown in arid and semi arid zones, adoption of suitable irrigation methods will be beneficial in increasing the productivity of the crop. The major objective of this programme is to enhance water use efficiency by promoting efficient on-farm water management technologies and equipments in spice crops. A total numbr of 72 demonstration plots of spice crops on drip irrigation system were established in different spices in SAUs/ ICAR institutes and selected farmers fields.

Table 18. Crop-wise details of demonstration plots

Demonstration Plot – Crop	No. of Demonstration plots established	Rate of Assistance (Rs in lakhs)	Financial Requirement (Rs in lakhs)
Black Pepper	5	0.50	2.50
Ginger	15	0.45	6.75
Turmeric	16	0.45	7.20
Chilli	15	0.45	6.75
Seed spices	21	0.45	9.45
Total	**72**		**32.65**

Table 19. Demonstration of drip irrigation in Black pepper

S No	Institute	No. of plots in ha	Financial Utilization (Rs. in lakhs)
1	Assam Agri University, Assam	1.00	0.5000
2	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	2.00	1.0000
3	University of Agriculture and Horticulture Sciences, Shimoga, Karnataka	2.00	1.0000
	Total	**5.00**	**2.5000**

Table 20. Demonstration of drip irrigation in Ginger

S No	Institute	No. of plots in ha	Financial Utilization (Rs. in lakhs)
1	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	2.00	0.900
2	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	3.00	1.3500
3	ICAR - Indian Institute of Spices Research, Calicut, Kerala	1.00	0.450
4	Vasantrao Naik Marathwada Agriculture University, Parbhani, Maharashtra	1.00	0.450
5	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	1.00	0.450
6	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, MP	1.00	0.450
7	Sri Konda Laxman Telengana State Horticulture University, Telengana	4.00	1.800
8	University of Agriculture and Horticulture Sciences, Shimoga, Karnataka	2.00	0.900
	Total	**15.00**	**6.7500**

Table 21. Demonstration of drip irrigation in Turmeric

S No	Institute	No. of plots in ha	Financial Utilization (Rs. in lakhs)
1	Central Agriculture University, Arunachal Pradesh	1.00	0.450
2	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	2.00	0.900
3	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	2.00	0.900
4	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	3.00	1.350
5	Vasantrao Naik Marathwada Agriculture University, Parbhani, Maharashtra	1.00	0.450

6	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	1.00	0.450
7	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, MP	2.00	0.900
8	Sri Konda Laxman Telengana State Horticulture University, Telengana	2.00	0.900
9	University of Horticulture Sciences, Bagalkot, Karnataka	2.00	0.900
	Total	**16.00**	**7.2000**

Table 22. Demonstration of drip irrigation in Chilli

S No	Institute	No. of plots in ha.	Financial Utilization (Rs. in lakhs)
1	Central Agriculture University, Arunachal Pradesh,	1.000	0.450
2	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	2.000	0.900
3	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	2.000	0.900
4	Vasantrao Naik Marathwada Agriculture University, Parbhani, Maharashtra	2.000	0.900
5	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	1.000	0.450
6	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, MP	1.000	0.450
7	Sri Konda Laxman Telengana State Horticulture University, Telengana	2.000	0.900
8	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	1.000	0.450
9	University of Horticulture Sciences, Bagalkot, Karnataka	3.000	1.350
	Total	**15.000**	**6.750**

Table 23. Demonstration of drip irrigation in Seed Spices

S No	Institute	No. of plots in ha	Financial (Rs. In lakhs)
1	Agriculture University, Kota, Rajasthan	2.00	0.900
2	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	3.00	1.350
3	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, MP	1.00	0.450
4	Vasantrao Naik Marathwada Agriculture University, Parbhani, Maharashtra	2.00	0.900
5	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, MP	2.00	0.900
6	Sri Konda Laxman Telengana State Horticulture University, Telengana	2.00	0.900

7	Sri Karan Narendra Agriculture University, Jobner, Rajasthan	5.00	2.250
8	University of Horticulture Sciences, Bagalkot, Karnataka	1.00	0.450
9	ICAR - Central Arid Zone Research Institute, Bhuj, Rajasthan	3.00	1.350
	Total	**21.00**	**9.4500**

On farm water management demonstrations taken up in 2022-23

166. Front Line Deminstration of Chilli at RVSKVV, Gwalior

167. On farm water management field view of Chilli at CAU, Pasighat

168. On farm water management at RVSKVV, Gwalior

169. On farm irrigation management demonstrated in seed spices at AU, Kota

170. Field view of Demonstration of micro irrigation in Ginger by ICAR- IISR, Calicut

4.6 Demonstration of arecanut fruit rot disease management using Mandipropamid 23.3% SC fungicide.

Fruit rot ('Koleroga' or Mahali) is counted as one of the most dreaded disease of arecanut which has resulted in 40-65 % yield loss in different districts of Kerala and Karnataka during 2018-19. Based on trials conducted by ICAR-CPCRI, it was concluded that the use of Mandipropamid 23.3%SC @ 0.5% spray is the most effective method to control the disease in comparison with conventional methods. The Directorate had established demonstrations on integrated disease management practices for management of arecanut fruit rot using oomycetes specific fungicide Mandipropamid 23.3% SC in the selected farmers field of Kasaragod (Kerala) and Dakshina Kannada (Karnataka) districts in association with CPCRI, Kasargod, during 2020-21.

The recorded previous year incidence of fruit rot disease was 50 to 55% in arecanut garden in Kotekar village, Mangalore Taluk and 30 to 40% at Belvai village, Moodbidri Taluk, Dakshina Kannada district, Karnataka. Fruit rot incidence of 40-45 % in Kodimoole, Enmakaje, Kasaragod district of Kerala. During the year required quantity of fertilizers such as Urea, rock phosphate and Muriate of Potash, neem cake and Mandipropamid 23.3% SC fungicide were procured for three demoplots. Implemented phytosanitory measures such as removal of old infected dried bunches, dead palms and also provided proper drainage channels in all the three demonstration trials from April to May of 2021. Laid out experimental trial in three demo plots and recommended dose of integrated 46 nutrients were applied to experimental gardens. Prophylactic treatment of 0.5% Mandipropamid 23.3% SC fungicide and standard check 1% Bordeaux mixture with pH7 were imposed in all the demo plots from last week of May to first week of June 2021. Second round of treatments with 0.5% Mandipropamid 23.3% SC and 1% Bordeaux mixture were induced during second week of July (45 days interval).

The observations on incidence and severity of fruit rot disease from June to December 2021 at an alternate day's interval in all the demo gardens were recorded. Noticed 20% incidence of fruit rot disease and severity of 45% in 1% Bordeaux mixture sprayed areca plams at Belvai village, Moodbidri taluk of Dakshina Kannada district of Karnataka during October 2021. Two percent incidence and 10% severity of fruit rot disease at Kodimoole, Enmakaje Kasaragod district. Fruit rot disease was not recorded in 0.5% Mandipropamid 23.3% SC fungicide sprayed in all the three demonstration plots. Very good challi yield (1400 to 1450 kg/acre) was recorded in Mandipropamid 23.3% SC sprayed palms in all the three demo plots.

During the year 2022-23 three demonstration plots each consisted of one acre area in Belvai village of Moodbidri taluk and one in Kotekar, Mangalore taluk of Dakshina Kannada, Karnataka and one in Kodimoole, Enmakaje of Kasaragod district, Kerala were continued as per the proposed programme. Successfully demonstrated management of fruit rot disease of arecanut using Mandipropamid 23.3%SC fungicide in three demo plots. Procured required quantity of fertilizers such as Urea, Rock phosphate and Muriate of Potash and Mandipropamid 23.3% SC fungicide for three demoplots. Inorganic nutrients (Urea, Rock phosphate and Muriate of Potash) and Neem cake were applied to three demonstration plots in two split doses before and after monsoon season.

Implemented phytosanitory measures such as removal of old infected dried bunches, dead and disease advanced palms and also provided proper drainage channels in all the three demonstration trials was done from April to May of 2022. Prophylactic treatment of 0.5% Mandipropamid 23.3% SC fungicide and standard check 1% Bordeaux mixture with pH7 were imposed in all the demo plots from last week of May to first week of June 2022. Second round of treatments with 0.5% Mandipropamid 23.3% SC and 1% Bordeaux mixture were induced during second week of July (45 days interval). Observations on fruit rot incidence and severity were recorded from June to December, 2022 at an alternate day's interval in all the demo gardens. Recorded 5 to 10% incidence of fruit rot disease and severity of 20-25% in 1% Bordeaux mixture sprayed areca palms at Belvai village of Moodbidri taluk and Kodimoole, Enmakaje, Kasaragod district respectively. While, fruit rot disease was not recorded in 0.5% Mandipropamid 23.3% SC fungicide sprayed areca gardens in all the three demonstration plots.

Very good challi yield (1450 to 1550 kg/acre) was recorded in Mandipropamid 23.3% SC sprayed palms in all the three demo plots.

4.7 Participatory Demonstration Plots of Cinnamon intercropping in Coconut

Growing spices under coconut in a farming system leads to economic buffering of the farmer against the risk of mono cropping. Many spices, when grown under coconut complement each other and form compatible combinations, and such combinations, if appropriately exploited, can substantially increase the income from a unit area of land through synergism than the coconut or spices grown as a mono-crop. The filtered light received underneath the palm favors the growth of crops like black pepper, vanilla, clove, nutmeg, cinnamon and all spice. Herbal spices like long pepper also requires filtered light similar to that of other annual spices like ginger and turmeric.

Among the above spice crops, potential of commercial cultivation of cinnamon is least explored by the farmers. In modern times, cinnamon is used to flavour a variety of foods, from confections to curries; in Europe and the USA it is especially popular in bakery goods. Cinnamon has a number of health benefits. It is known to lower cholesterol and is good for diabetics. Cinnamon is a stimulant, astringent and carminative, used as an antidote for diarrhoea and stomach upsets. Rampant substitution of cassia for cinnamon has left little demand for the original spice. Consumption of cassia in high amounts is injurious to health since it contains a toxic component by name coumarin. Coumarin is banned as a food additive in many countries since mid-20th century because it is moderately toxic to liver and kidney.

The average production of cinnamon in India is 80 to 100 tonnes per annum. This is miniscule compared to the annual demand of 12,000 tonnes. To meet this growing demand as well as for re-exporting cinnamon after value addition, India imports about 30,000 tonnes of cassia and 1200 to 1400 tonnes of cinnamon a year. In 2019-20, about 1262 tonnes of cinnamon was

imported to India according to Department of Commerce, Government of India. If the possibility of commercial cultivation of Cinnamon is demonstrated, farmers will be encouraged to take up the crop in future. Cinnamon tree could be grown successfully as intercrop in the ideal conditions prevailing in the coconut plantations. High density cultivation of cinnamon in the interspaces of coconut and decentralized processing could be a good model for promotion of cinnamon in the present circumstances of our country. DASD in association with CPCRI, Kasargod had successfully established 4 demonstration plots of size one acre each under high density intercropping of cinnamon in coconut plantations of Kerala, Karnataka and Tamilnadu through participatory approach during 2018-19, with an aim to promote cinnamon cultivation in the country. The demonstration plots in 3 different states have been implemented successfully and the SOPs for production, pruning and bark harvesting and processing has been developed by the institute. This technology needs to be further expanded so that more area in cinnamon cultivation in the interspaces of coconut plantations can be promoted which adds to additional income from a unit area of land. To extend this technology to more coconut growing areas and to demonstrate the potential of the cinnamon crop during 2021-22 DASD established 20 demonstration plots of one acre each in the states of Andhra Pradesh, Maharashtra, Karnataka and Andamans (5 demonstration plots in each state) through their respective State Agricultural Universities. During 2022-23, the demonstrations were extended to more area in the states of Kerala, Goa, Odisha, Maharashtra with the following objectives;

1. To establish demonstration plots of cinnamon as intercrop in coconut plantations in farmer's fields.
2. To reduce cost of production through localized processing.

The Programme was implemented in the following SAUs during 2022-23:

a. Dr. Balasaheb Sawant Konkan Krishi Vidya Peeth, Maharashtra.
b. ICAR - Central Coastal Agriculture Research Institute, Goa.
c. Kerala Agriculture University, Thrissur, Kerala.
d. Orissa University for Agriculture and Technology, Orissa.
e. University of Horticulture Sciences, Bagalkot, Karnataka.

Progress of the Programme: The FLD programme has been taken up by different selected Universities.They were identified the suitable farmers and given training in cinnamon cultivation techniques in coconut gardens by coordinating with ICAR-CPCRI. Identified farmers were supplied with quality planting materials of cinnamon and other input materials for planting. Planting has completed by the Universities.

4.8 Demonstration of use of Entomo Pathogenic Nematode (EPN) in root grub management of Arecanut

White grub is a key pest of Arecanut and its intercrops in sandy loam soils of Karnataka and Kerala. It damages the seedlings and adult palms by feeding on roots, boring the bole and collar region. Presently the grubs are managed with application of high dose of pesticide frequently which is deleterious to ecosystem. EPNs are identified to be effective and environment friendly alternative to manage white grubs by CPCRI, Kasaragod. To popularize ecofriendly integrated pest management (IPM) of white grub using EPNs, DASD had established 4 acres of demonstration plots in farmers' fields in arecanut growing areas of Karnataka during 2015-16, which was widely accepted

and many farmers of the area adopted this technology for managing root grubs in the plantation. The imposed IPM includes two time application of native EPN isolate of CPCRI Steinernema carpocapsae to root zone @ 1.5 billion infective juveniles (IJs) per hectare in combination with imidacloprid 17.8 SL @ 0.25 ml/litre of water, neem cake 2 kg/palm and providing proper drainage system in gardens resulted in 91% root grub populations in three year of treatments, significantly higher than that untreated gardens (without IPM practices). The EPN demonstration has exhibited significant increase in arecanut yield than untreated gardens in root grub alone infested gardens and yellow leaf disease (YLD) + root grub infested gardens in Dakshina Kannada and Chikmagalur districts of Karnataka.

In 2018-19 DASD established demo plots on use of EPN in the Arecanut farmers field in Udupi and Dakshina Kannada district of Karnataka where root grub infestations were reported and successfully demonstrated the effectiveness of technology in 3 years. Similarly, during the year 2021-22, similar demonstration plots were selected in three locations in Puttur Taluk of Dakshina Kannada district and Karkala Taluk of Udupi district of Karnataka. The selection of gardens were made by visiting villages of white grub infested farmers gardens along with district horticulture officers and extension workers. Details of selected beneficiary farmers are as follows : -

Table 24. Details of selected beneficiary farmers

S No	Name and address	Area (Acre)	Category
1	Mr. Vilas Rai P., Palthad house,Post Manikara Via Bellre, Puttur Taluk - 574212, Dakshina Kannada district, Karnataka	1	Gen
2	Mr. Kavan Shetty, Pernoli Maney, Andaru village574101, Karkala Taluk, Udupi district, Karnataka	1	Gen
3	Mr. Sheena Gowda, S/o Somaidh Gowda, Andra Darkasth Mane, Ajekar -574101, Karkala Taluk Udupi district, Karnataka	1	ST

Progress of the programme during the year 2022-23

Mass Production of EPN and its host insect Greater wax moth under laboratory.The EPN were mass produced on Greater wax moth, Galleria mellonella larvae and about 10950 units of Kalpa EPN were produced and supplied to the farmers of white grub infested arecanut gardens in Karnataka and Kerala for bio-suppression of sporadic pest outbreak in the region.

Superimposition of 'Kalpa EPN treatment in selected demonstration plots

Three demonstration plots on EPN of one acre, each established in farmers garden at Puttur Taluk in Dakshina Kannada district and Karkala Taluk of Udupi district in Karnataka. Selected beneficiaries were supplied neem cake of 1000 kg each and 2 litre Propiconozole fungicide during the 2022-23 crop season.Trainings were also conducted to popularize this technology. Application of liquid formulation of Kalpa EPN, Steinernema carpocapsae (CPCRI-SC1 @ 20 lakh IJs/palm) during June - July and September - October followed by application of neem cake 2kg/palm during December - January resulted suppression of white grub (Leucopholis sp.) to the tune of 66 - 70%. Due to reduction of grub population, observed emergence of new healthy roots in treated palms which helps to proper utilization of water and nutrients leads overall health improvement of the palms.

An MOA signed with the South Canara Coconut Farmers Producer Company Limited Mangala Mantama, CPCRI, Vittal, Dakshina Kannada - 574243, Karnataka and Senior Scientist and Head, ICAR - KVK Mitraniketan, Vellanad, Trivandrum, Kerala -69553 for transfer of 'Kalpa EPN' (CPCRI - SC1) technology for production and use in their own farm and distribution of EPNs at local level to the needy farmers.

4.9 Demonstration of integrated management of inflorescence dieback disease in Arecanut

Arecanut or betel nut (*Areca catechu* L. family: Arecaceae) is one of the major profitable crop in India. Arecanut industry forms the economic backbone of nearly 16 million people in India and it is the sole means of livelihood for many of them. Crop loss due to diseases has been identified as a major constraint to arecanut production. Among the diseases, inflorescence dieback (IDB) and button shedding disease is responsible for the low fruit set in most of the arecanut gardens (Anonymous, 1971). IDB disease is incited by an anamorphic fungus, *Colletotrichum gloeosporioides* Penz. and Sacc. Survey conducted during mid seventies recorded that IDB alone accountable for upto 60 percent yield loss (Saraswathy *et al.* 1977). Since then the disease has been reported from all the arecanut growing areas of the country with varying intensities and crop loss. Hence, timely action is one of the key factors in effective disease management. As of now, Mancozeb 75% WP (0.3%) is recommended for the management of IDB disease. But it is found less effective/ineffective against IDB in recent years. Moreover, the Government of India banned Mancozeb due to its adverse effect on environment. In order to find the effective fungicide for IDB management, seven fungicides have been evaluated under field conditions by ICAR-CPCRI RS, Vittal. The results showed that Propiconazole 25% EC (0.3%) sprayed arecanut plots recorded significantly less disease incidence and severity compared to other treatments and standard check 0.3% Mancozeb 75% WP. This fungicide belongs to sterol dimethylation inhibitors (DMI) group and widely recommended for the management of *Colletotrichum gloeosporioides* in chilli, turmeric and rubber.

In order to demonstrate the efficacy of Propiconazole 25% EC against IDB disease for effective management, the Directorate in association with CPCRI, Kasargod established demonstration plots in 3 selected farmers field of one acre each (2 in Dakshina Kannada district of Karnataka and One in Kasaragod district, Kerala as listed below) during the year 2021-22. During the year 2022-23 the following actions were taken:

- Monitored three demonstration plots on integrated management of inflorescence dieback disease in arecanut with 1 acre each *viz.*, 2 plots in Dakshina Kannada district of Karnataka and 1 plot in Kasaragod district of Kerala.
- Removal and burning of dried and diseased inflorescence, two rounds of spraying Propiconazole (3 ml per L of water) in mist form at 25 days interval, and collection of data on inflorescence dieback incidence at pre- and post-spraying were carried out in all the selected plots.
- Farmers were supplied with two doses of inorganic fertilizers (Urea, Rock phosphate, Muriate of Potash, Zinc sulphate and Borax) and Neem cake for demonstration plots to maintain the nutrient status of the palms.
- Organized 3 field day/training /farmers interface programmes at Swarga, Kasaragod (09.09.22; 100 beneficiaries), Kidu, Karnataka (20.12.22; 500 beneficiaries) and Balnadu,

Puttur Tq., Karnataka (07.03.23; 167 beneficiaries) to create awareness on the IDB disease and its management.

- 'Exhibition cum help desk' was the hall mark of each programmes in which live specimens of arecanut and cocoa pest and disease symptoms with causal agents were displayed and suitable management practices were suggested to the beneficiaries.
- Published four extension folders on integrated management of IDB and Pentatomid bug each in Kannada & English, and a short video on IDB management in English & Kannada to create awareness among the farmers.

List of beneficiaries

1. Shri. Deviprasad, Sharma farms, Kallaje, Punacha Village, Bantwal Taluk, Dakshina Kannada District
2. Shri. Shivaprasad K., Kochi house, Madnooru, Kavu, Puttur Taluk, Dakshina Kannada District
3. Shri. Abdul Sattar A. M., Bolamogar House, Ariyapady Post, Manjeshwar Taluk, Kasaragod District

Activities undertaken by CPCRI in the IDB management demo programme during the year 2022-23 is as under :

- Monitored three demonstration plots on integrated management of inflorescence dieback disease in arecanut with 1 acre each viz., 2 plots in Dakshina Kannada district of Karnataka and 1 plot in Kasaragod district of Kerala.
- Field activities carried out was followed as removal and burning of dried and diseased inflorescence, two rounds of mist spraying of Propiconazole (3 ml per L of water) at 25 days interval, and collection of data on inflorescence dieback incidence at pre- and postspraying.
- Farmers were supplied with one dose of inorganic fertilizers (Urea, Rock phosphate, Muriate of Potash, Zinc sulphate and Borax) and Neem cake for demonstration plots.
- A Field day was organized on 'Plant health management in arecanut' at Gundyadka village, Kowdichar, Puttur taluk, Dakshina Kannada district on 04.02.2022.

171. Dwarf variety of Arecanut at flowering stage at CPCRI, Vittal

172. Entemo Pathogenic Nematode demo plot at CPCRI,Vittal

173. EPN Field visit by officials at CPCRI,Vittal

174. Demonstration on management of Die Back in Arecanut at CPCR,VittaI

175.Multi species garden established at CPCRI, Vittal

176. FLD programme on Cinnamon at ICAR-CIARI, Port Blair

177. FLD on Cinnamon initiated at ICAR-CIARI,Port Blair

178. Cinnamon seedlings planted at CCARI, Goa

179. Demonstration of Cinnamon intercropping established at UHS, Dharwad

4.10 Demonstration of disease-free ginger seed production using microrhizomes and IDM at multiple locations

Soft rot and bacterial wilt diseases of ginger are a big threat to the cultivation of this crop. In fact, the area under this crop is decreasing due to the failure in controlling of these diseases in the field. Though these diseases are both soil and seed borne, in majority of the incidences the infected seed rhizome is the root cause of the disease outbreak. Production of disease-free ginger seed rhizome therefore, is of utmost importance in the successful cultivation of this crop.

Ginger is exclusively vegetatively propagated through seed rhizome. Since it is bulky crop, with a seed rate of 2 tonnes per hectare, the seed is mostly acquired through farmer-to-farmer exchanges. Hence, it is important that the technology for disease free seed rhizome production of ginger is demonstrated to the farmers, wherein microrhizomes derived seed are raised following Integrated Disease Management practices.

In vitro microrhizome technology in ginger using tissue culture techniques is optimized at Centre for Plant Biotechnology and Molecular Biology, College of Agriculture, Kerala Agricultural University under DASD-MIDH assistance. Under the programme, microrhizomes were induced in three KAU released varieties of ginger viz. Athira, Karthika and Aswathy. The scaling up programme for microrhizomes production, being implemented at various centres of KAU has proved that the microrhizome technology is a potential tool to provide the famers with disease free planting material in ginger.

To address the soil-borne diseases in ginger, especially bacterial wilt; ICAR-Indian Institute of Spices Research (IISR), Kozhikode has developed a package which includes soil solarization using polythene sheets of 100 µm for 65 days (where the temperature remain 50-58°C during noon from 11 am to 3 pm) and amelioration with calcium chloride (3% $CaCl_2$) or Bacillus licheniformis. This was established to be an effective integrated strategy for the management of bacterial wilt of ginger incited by *Ralstonia pseudo solanacearum*. During the year 2021-22, the Directorate initiated a two year demonstration programme on Disease-free ginger seed production through microrhizome and soil management technologies at farmers' fields in association with CPBMB, Kerala Agri University with the undermentioned objective:

- To demonstrate the potential of microrhizome derived single bud transplants in disease

free seed production of ginger, by coupling with the IISR technology of soil solarization and soil treatment, on a network mode at farmers' field in selected districts of Kerala state and thus to develop a protocol for disease free ginger seed production in the state.

Progress of the programme in 2022-23:

The microrhizome technology in ginger, optimized at the centre for Plant Biotechnology and Molecular Biology (CPBMB), KAU has proved to be a potential tool to provide farmers with disease free planting material in Ginger. In combination with IDM recommendations of IISR Kozhikode, microrhizome technology promises to reduce crop loss from soil borne diseases in Ginger, especially bacterial wilt.

The Project for demonstration of the technology has five collaborating KVKs with five progressive farmers under each KVK. The demonstration is carried out at the farmers fields (5 cents of area each for the control and IDM) under the supervision of the respective KVK. Each KVK was given 19600 single -bud ginger transplants raised from microrhizome raised ginger crops in the poly house at CPBMB. The $CaCl_2$ and solarization sheets required for the crop season were also supplied from CPBMB to the centres. No wilt symptoms were observed in the single bud seedlings derived crop in all the districts, whereas the conventional crop had shown the bacterial wilt incidence.The crop were harvested during the month of March, 2023.

180. Field visit by KAU officials in farmers plot of IDM ginger

181. Field visit at FLD plot of IDM

182. Field view of IDM ginger plot established at farmers field by KAU, Thrissur

183. Soil solarization conducted at farmers Field

5. Project Based Programmes

The Directorate introduced some innovative programmes on Hi-tech production system for quality disease free seed rhizomes of Ginger and Turmeric and establishment of distillation units for aromatic plants. A brief of these programmes are given below.

5.1 Hi tech production system for quality disease free seed rhizomes of Turmeric and Ginger

In vitro induction and development of microrhizomes

In order to produce disease free rhizomes of ginger, rapid multiplication of planting materials was done using plant tissue culture. Two hundred new cultures of different ginger and turmeric varieties were initiated using rhizome bud as explants. Rapid multiplication of planting materials was done in the media composition of MS+ BAP (3 mg L-1) and NAA (0.5 mg L-1). The multiple shoots produced were subcultured at regular intervals. The multiple shoots so developed served as a source of explant for microrhizome production *in vitro*. Regenerated shoots of all four ginger varieties of 3-4 cm in length were excised, its top shoots and roots were trimmed off and then transferred into microrhizome induction media of basal MS with sucrose (9 %), agar (7g L-1), and BAP (0.5 mg L-1). All the cultures were incubated at a temperature of 25±2°C and 12 hours period for 150-180 days.The developed microrhizomes after 180 days were then harvested from the culture bottles and planted on pro trays containing coirpithcompost and vermicompost (1:1) for hardening.

In vitro production of turmeric varieties

Different turmeric varieties were also multiplied *in vitro*. Fifty cultures of different turmeric varieties like IISR Prathibha, IISR Pragati, IISR Alleppey Supreme, Duggirala Red and Megha turmeric 1 were also distributed to Hon'ble Balasaheb Thackeray Haridra Research and Training Centre, Hingoli, Maharashtra.

Frontline demonstration

A frontline demonstration was carried out at Meenangadi in which 3 kg of the microrhizome derived seed materials of ginger variety IISR Varada was distributed. The farmer, Mr. Eldo planted the seed rhizomes in about 60 bags from which he harvested about 21 kg of ginger rhizomes free of diseases. The maximum yield he obtained from single bag is 380 g.

Table 25. Details of cultures under lab condition

	Variety	No. of cultures
In vitro microrhizome induction	IISR Varada Karthika IISR Rejatha	230 215 40
In vitro multiplication	IISR Varada Karthika IISR Rejatha IISR Mahima	70 75 20 100

Table 26. Details of microrhizome derived pro tray plants in ginger

Variety	No. of pro tray plants
IISR Varada	250
Karthika	150
IISR Rejatha	30
IISR Mahima	30

Table 27. Achievements

S.No.	Particulars	Quantity
1.	*In vitro* production of micro rhizomes of ginger	500 No.
2.	*In vitro* multiplication of cultures	500 No.
3.	Production of micro rhizome based seed material of ginger	21 kg
4.	Production of pro tray plantlets of ginger micro rhizomes	500 No.

5.2. Establishment of Essential Oil Distillation Unit

a. ICAR – Directorate of Medicinal and Aromatic Plants, Anand, Gujarat

A 200 litre capacity distillation unit was installed at ICAR – DMAPR during the year. Live demonstrations were arranged to demonstrate the processing of the facility. Over 200 farmers, including SC and ST communities, visitors (students about 250 numbers) and trainees (50 numbers) attended the training programmes.

Table 28. Details of distillation of different available aromatic crops

S No	Crops	Weight of bio-mass (Kg)	Average oil yield/150 Kg of biomass (ml)	Oil (%)
1	Palmarosa herbage	150	800	0.53
2	Lemongrass herbage	150	900	0.60
3	Tulsi/Damro	150	500	0.30

b. Punjab Agriculture University, Ludhiana

A distillation unit for the extraction of essential oil from aromatic plants has been installed at the School of Organic Farming, PAU, Ludhiana.

The distillation unit is direct fired type, made up of stainless steel with a capacity of 200 kg/batch. The distillation unit is running successfully and initially, essential oil from menthol

mint, peppermint and lemongrass has been extracted effectively. After filling the produce in the distillation tank, it takes about 4 hours to completely extract the essential oil from the produce. Only one skilled labourer is required to do all the necessary operations like filling the distillation tank with produce, filling of water in the water tank (attached beneath the distillation tank) through an inlet which is attached to the water source, burning and maintaining the fire in the furnace and separation of essential oil from the separator etc.

The functioning of distillation unit was demonstrated to the farmers, as cultivation of aromatic crops alone cannot serve the purpose, and marketing is to be done after processing i.e. extraction of essential oil. Presently, cultivation of aromatic crops, mainly mint sp. is confined to Ludhiana, Moga, Jallandhar and SBS Nagar districts and essential oil extraction facility is available in only private distillation units in these districts, which is a major constraints for the farmers of the other areas of the state to take up aromatic crops. Since the agro-climatic conditions of the entire state are favourable for the cultivation of aromatic crops, the installation of small distillation units by the farmers at their own farms will also help them to diversify to some extent from the existing rice-wheat cropping system. The installation of distillation units at their own farms will benefit the farmers not only by saving a huge cost on transportation of the produce and for extraction of essential oil (the prevailing cost Rs 300/litre in the state) but also make them self reliant to earn more profits. This demonstration is expected to serve this purpose.

5.3. Rejuvenation of Cochin Ginger and Alleppey Finger Turmeric for export promotion

Among the spice crops which showed a sizeable increase in export during the covid-19 pandemic are ginger and turmeric. The spice which showed the most promise in 2019-20 was ginger which registered an increase of 178% in volume of exports and 129% in value at 50,410 tonnes and 449 crores in value. Both ginger and turmeric are traded all around the world. There are almost 138 countries and territories which actively import ginger from India. Major importers of Indian turmeric are Japan, Srilanka, Iran, US, UK, Middle east countries, North Africa and Ethiopia.

India contributes 80 % of the global production of turmeric and in the case of ginger, China is the main competitor, Chinese ginger being price competitive. Price of different trade types of ginger and turmeric in overseas market is given in the table below. The recent visit of the parliamentary sub committee of Commerce Ministry to Kerala has identified the unavailability of both Cochin Ginger and AFT in sufficient quantities against their potential demand in their respective niche markets. The traders/ exporters also often express their concern in getting these superior turmeric and ginger types without admixture. Research findings about the biological activities of both ginger and turmeric have further intensified the requirement of these superior types of ginger and turmeric in domestic as well as global markets. The pharmaceutical as well as nutraceutical industries are also demanding these varieties to meet their requirements.

Table 29. Price of different trade types of ginger and turmeric in Overseas Market

Ginger		Turmeric	
Trade Name	Price (USD/Kg)	Trade Name	Price (USD/Kg)
Cochin Ginger	4.2	Alleppey Finger Turmeric	1.8
Karnataka Ginger	2.9	Gundalpet	1.1
Nigerian Ginger	2.3	Vietnam Ginger	1.2

AFT (Alleppey Finger Turmeric) : Alleppey Finger Turmeric (AFT) is one of the dominant types of turmeric popular in the world market. It is a generic variety of turmeric grown only in Kerala state. It comes from central Kerala, especially from Ernakulam and Kottayam districts. This variety has a curcumin content of minimum 5 % and some times as high as 6.5 %. It has got thin fingers, dark orange colour and with its superior fresh turmeric flavour, it has been used as most effective coloring agent. AFT more closely resembles the flavour of fresh turmeric and has a some what earthy aroma with superior delicate top notes of lemon and mint. It is the most demanded turmeric in US, Europe, Germany, France, China, Russia, Middle East and other countries. AFT is easier to grind, than its other counter parts. AFT contains 3.5 % to 5.5 % volatile oils.

Cochin Ginger : The two popular varieties of Indian ginger in the international market are Cochin Ginger and Calicut Ginger. It is available in four forms as oil, oleoresin, ground ginger and fresh ginger. The specifications of Ungarbled Non-Bleached Cochin Ginger (NUGC) dried ginger are small cut pieces of less than 20 mm in length with maximum extraneous matter of 10 %, very light pieces of 10% and volatile oil content of minimum 1 %. Cochin ginger is also named after the region of production in India, that is Kerala state.

It was felt that a concerted effort is required to boost the production of AFT & CG to meet the domestic and global demand. Over the years, due to the unorganized cultivation and procurement, both these types are not available in the pure form. In this background this component was implemented through Kerala Agriculture University with the following methodology and objectives :

1. Survey and collection of ginger and turmeric types cultivated and marketed in central Kerala.
2. Characterization and quality analysis of the varieties
3. Multiplication of purified types of AFT and CG in association with KAU / State Dept farms
4. Large scale cultivation of the purified AFT & CG in farmers clusters/SHG in central Kerala through State Horticulture Mission

During the year 2022-23 areas for survey and multiplication were identified in consultation with concerned district officials and other agricultural organizations. Conducted FGD of ginger and turmeric growers at different regions. A total 106 fields were surveyed in Kottayam, Idukki, Pathanamthitta, Ernakulam, Palakkad, Thrissur and Wayanad districts. About 58 samples of CG type Ginger and 50 Samples of AFT type Turmeric were collected. The samples collected were labelled and the required quantity for quality analysis were sliced, dried and sent to labs. The remaining portion of samples were treated and stored in optimum conditions for planting in the upcoming season. Out of 58 samples, more than 8 samples collected were having the required level of Zingiberene and other specifications preferred by industry. More than 12 samples of AFT

types were found to have higher extractability and more than 6 % Curcumin; especially one sample was having highest curcumin level of 11.5%. Large scale multiplication of purified types of AFT and CG in association with KAU / State Dept farms has already started.

5.4. Scaling up of micro rhizome technology-based ginger seed production

Lack of availability of high-quality disease-free seed rhizomes remains a major problem in ginger and turmeric cultivation. Seed production programmes taken up by research institutes and Govt. farms could meet only a small percentage of requirements for the seed material. Even after several years of release, spread of HYV is low due to the lack of supply of seed material in required quantities. Being a crop highly prone to seed and soil borne diseases, the availability of quality disease free seed rhizomes of HYV could contribute significantly to the success of these crops.

The Directorate has standardized, the protocols for production of tissue culture plants of turmeric/ginger transplants using bud sprouts of rhizomes at KAU, TNAU and IISR centres under MIDH programme and following findings were made :

- High tech polyhouse cultivation can be adopted for seed production in ginger
- *In vitro* induced microrhizomes could be included in the seed chain of ginger
- There is no additional yield advantage in ginger with higher amount of seed material
- There is no additional yield advantage in ginger with higher fertigation schedule in polyhouse cultivation
- Potting mixture with sand soil and cowdung (1:1:1) in grow bag is better than soilless medium with coirpith alone
- Performance of three KAU varieties Athira, Karthika and Aswathy in poly house was on par
- Microrhizomes could be produced *in vitro* with simple tissue culture facility
- Year-round production of microrhizome and year-round availability of planting material is thus possible
- Off season production of ginger also can be planned using microrhizomes
- Long distance transport of micro rhizome is possible in thermocol boxes and hardening can be undertaken at the receiving end.
- Localised production of planting materials using microrhizomes and single bud transplants will help to reduce seed rate in ginger and reduce transportation cost also.
- As there was no incidence of diseases and infestation of pests in poly house, production of quality rhizomes (clean ginger) without any pesticide residues is also possible.

Based on these findings, a discussion was done with Vice Chancellor and concerned officials of Kerala Agri. University during 2019-20, to scale up production of microrhizomes derived ginger seed to replace ginger seed production by conventional method in the University and a two-year programme was chalked out to scale up ginger seed production through microrhizome technology. The proposed activities under the programme are as follows:

Time frame	Activities
First year	• Production of microrhizomes of three KAU released ginger varieties viz. Athira, Karthika and Aswathy and distribution to different network centres • Scaling up production of microrhizomes for distribution to progressive farmers/entrepreuners • Establishment/ modification of existing poly house at different centres for growing of microrhizomes • Growing of microrhizomes in poly houses at different centres
Second year	• Production of protray budlings from microrhizomes at different network centres • Refinement of production technology at Centre of Excellence in High tech Horticulture • Experiments on off season production of microrhizomes at Centre of Excellence in High Tech Horticulture

Activities done: The CPBMB provided 23,400 numbers of microrhizome derived protray seedlings to the 10 different network centres in 2022-23. These centres raised the protray seedlings under protected structures. The production technology standardized by KAU for production of seed rhizomes under polyhouse conditions were followed at these centres. Trials on refinement of the production technology and off-season production of microrhizomes was also undertaken as a part of the programme. The microrhizomes were planted in the grow bags and maintained in insect proof hi-tech polyhouses for 10 months. Most of the centeres harvest had been completed during the month of April, 2023. The rhizomes harvested from the microrhizomes planted during 2022-23 are being used in the single bud seedling production for distribution to farmers.The harvested rhizome from the CPBMB,Thrissur were supplied to five KVKs for single bud preparation for supplying to farmers, 5.72 lakh was utilized for this programme.

Glimpses of innovative programmes implemented in 2022-23

184. Microrhizome production at ICAR- IISR, Kozhikode

185. CG varieties identified under CG&AFT Programme

186. Field visit by officials - CG&AFT

187. Field visit conducted for collecting CG & AFT samples - KAU, Thrissur

188. Scaling up of Ginger demonstration at KAU, Thrissur

189. Distillation Unit established at DMAPR, Gujarat

190. Distilation Unit established at PAU, Ludhiana

191. Distillation unit established at GKVK, Banglaore

192. Demonstration of DU to farmers at DMAPR, Gujarat

6. Skill Development Training

Pradhan Mantri Kaushal Vikas Yojana (PMKVY) is the flagship outcome based skill training scheme of the Ministry of Skill Development & Entrepreneurship (MSDE). The scheme offers meaningful, industry relevant, skill based training to enable youth to get wages or self-employment leading to increase earnings and/or improved working conditions such as getting formal certifications for informal skills.

During 2022-23, the Directorate initiated conduct of skill development trainings under MIDH programmes in selected job roles through KVKs, SAUs/ICAR Institutes affiliated to Agriculture Skill Council of India (ASCI). Institutes with sufficient infrastructure and facilities were newly affiliated as per the ASCI norms, and a trainers training (ToT) for the nominated trainers were conducted at different locations. The qualified trainers were given ASCI Trainer Certificate.

The details of Skill development trainings conducted during the year are as under :

a. Sher-e-Kashmir University for Agri and Technology, Kashmir, J & K

i. Skill development training program on Vermicompost Production was conducted on 25th Feburary, 2023 at the Camp office HMAARI, SKUAST-K, Leh Ladakh. Dr.Jigmet Yangchan, Head, KVK, Nyoma, was the course trainer / Course director of Skill training. Dr Jigmet Yangchan inaugurated the training programme with a brief introduction about the mandates and objective of KVK Nyoma SKUAST-K in detail and stressed on organic farming scenario of Ladakh. She stated that Vermicompost technology is an alternative source of livelihood under Ladakh condition and described the job role and its objective to the trainees. Lectures were conducted by Dr. Kunzang Lamo SMS Vegetable Science KVK SKUAST-K Leh on the scope of organic farming, by Mrs Neelofar on Morphology of Earth worms, Mr Skalzang Dorjay on Scope and marketing of Vermicompost in Ladakh region, Dr. Jigmet Yangchan on identification and procurement of correct species of earthworms from authentic sources. Lectures on other topics were also conducted by experts in the relevant field. 25 farmers took part in the 25 day programme.

ii. Skill development training programme for 45 consequent days on "Medicinal & Aromatic Plants Grower" under MIDH was conducted at Faculty of Forestry SKUAST Kashmir from 25th February to 10th April, 2023. The training was inaugurated by Prof. S.A. Gangoo, Dean Faculty of Forestry and was attended by Prof. P.A. Khan, Head, FBT, Dr G.M Bhat, Head, SAF, Dr S.N. Zaffar, Head, SBS, Dr A.A Wani, Head, FRM Scientists and students. Professor Parvez Ahmad Sofi, Head, Division of FPU welcomed the participants and gave a brief account of this training programme and also spoke about its need and importance in the present times where we are facing lot of unemployment. The programme was conducted as per the qualification packs of ASCI with classroom and practical activities. In addition to the theoretical lectures, trainees were exposed to practical experience of different aspects of medicinal plants grower. Exposure visits to different institutes and farmers fields were undertaken.

Agriculture University, Jodhpur

Skill development training on "Gardener" for 340 hrs was conducted from 27th December, 2022 to 07th February, 2023 at Agricultural Research Station, Mandor, Agriculture University, Jodhpur. The main objective of this training was to equip the youth with the necessary skills to secure better wages or become self-employed, leading to increased earnings and improved working conditions. This training also aimed to provide formal certification for informal skills to enhance employability and career prospects. The inauguration of the programme was done by Dr. B R Choudhary, Hon'ble Vice chancellor of Agriculture University, Jodhpur in the presence of Shri Jaswant Singh Kachhwaha, Eminent Social Worker of Jodhpur. Dr. M L Mehriya, Course Director & PI of MIDH programmes and other senior officials of the university were present on the occasion. Dr. Hari Dayal Choudhary was the trainer for the training. Lectures were delivered by various resource persons on the subject, practical classes were conducted. Ratio of theory and practical classes was 60:40. A total of 23 trainees from nine districts of Rajasthan, namely Jodhpur, Pali, Nagaur, Barmer, Jalore, Dholpur, Jaipur, Sri Ganganagar, and Jaisalmer, were participated in this training program. Out of the 23 trainees, three belonged to the General category, eighteen belonged to the OBC category, one belonged to the SC category, and one belonged to the ST category.

Skill development training conducted at various centres during 2022-23

193. Skill Development training at SKUAST, Kashmir

194. Skill Development on Medicinal & Aromatic plants at SKUAST, Kashmir

195. Participants registered for skill development programme at KVK, SKUAST, Kashmir

196. Training class conducted at SKUAST, Kashmir

197. Skill development programme on Organic grower -Participants at UBKV, WB

198. Skill development on Organic Grower conducted at UBKV, WB

199. Skill Development organized at AU, Jodhpur

200.Certification of trainees conducted by ASCI, AU, Jodhpur

7. Transfer of Technology Programmes

The Directorate organizes transfer of technology programmes like Seminar and Workshops at national level, state level and district level to disseminate the latest improved technologies evolved in the various research stations of SAUs and ICAR Institutes among the extension workers of the State Departments and progressive farming community. The Directorate also conducts farmers training programme in the major production centres of spices, arecanut and aromatic plants to update the farmers on latest improved technologies available in the cultivation of these crops. Details of the various seminars/workshops and training programmes organized at various centres are detailed as follows.

7.1 National Seminar

Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh

Two Days National Seminar on **"Spices and Aromatic Crops – Prospects and Potential in Chhattisgarh"** was held at Barrister Thakur Chhedilal College of Agriculture and Research Station, Bilaspur (C.G.) Campus during 14-15 March 2023. The event included five technical sessions, plenary session, discussion on roadmap, business meet, special interactive session with scientist's buyers/suppliers and exhibition for farmers. The inaugural programme was graced by Shri Pradeep Sharma, Agriculture Advisor to Hon'ble Chief Minister, Government of Chhattisgarh along with Hon'ble Vice Chancellor of Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.) Dr. Girish Chandel, while valedictory programme was graced by Prof. Alok Chakrawal, Hon'ble Vice-Chancellor, Guru Ghasidas Central University, Bilaspur (C.G.). Sri B.L. Meena, Dy. Director, DASD, Calicut, Dr. V. K. Tripathi, Director Research, Dr. S.S. Tuteja, Director, Farm & PI and Technical Adviser, CoE MAPs and NTFP were present during the two day programme.

The chief guest of the function Shri Pradeep Sharma, Agriculture Advisor to Hon'ble Chief Minister, Government of Chhattisgarh delivered motivational speech and emphasized to grow Coriander, Nigella, Fennel seed and other spices in the state. He also mentioned in his speech that IGKV, Raipur has developed the varieties of rice with the help of BARC which have potential to fight against cancer. He also told that crops like Toria and Betelvine should be cultivated in Chhattisgarh. Dr. Vivek Tripathi, Director, Research Services, Dr. Ajay Verma, Director, Extension Services, Dr. S. S. Tuteja, Director, Farm & PI MIDH, Dr. P.K. Joshi, Team Leader, CoE, MAPs & NTFP, Dr. R.K.S. Tiwari, Dean & Organizing Secretary, Dr. Sanjay Verma, Principal Scientist & Co-organizing Secretary, Professors, Scientists and other staff members of BTC College of Agriculture & Research Station were present during the programme.

Eminent invitees delivered lead lectures under various themes in different sessions during two days programme. Similarly, research papers were presented in the form of oral presentation and poster presentation by the participants. Looking to the participation of farmers and their interest, the most of the lead speakers shared their presentation in Hindi as well. Altogether, there were 400 participants comprising of dignitaries, scientists, officers, buyers, suppliers, spice growers, faculties & research scholars from all over the country. There were 19 lead papers and 11 oral papers were presented during the seminar. Out of 132 research papers, 62 research papers were presented in the poster presentation under 5 themes during the seminar. There were 50 dignitaries and 14 lead speakers, about 100 paper presenters, buyers /suppliers from companies across the country and

spice growers from different states participated in the event. Twelve exhibitors were put up their stalls for exhibition. Besides these, there were about 100 faculties and research scholars from Indira Gandhi Krishi Vishwavidyalaya and other Universities also participated in the 2 days National seminar. During the programme, an exhibition was organized in which progressive farmers cultivating spices and aromatic crops displayed their products. Dr. S.S. Tuteja, Director, Farm and PI, Tech. Adviser, CoE MAPs & NTFP, IGKV, Raipur (C.G.) proposed the vote of thanks.

RECOMMENDATIONS/ SUGGESTIONS

- All the production technologies should aim at bridging the gap between realized (actual) and realizable (potential) yield of spices and aromatic crops.
- Preference should be given for undertaking farmer participatory farm trials on spices and aromatic crops.
- Irrigation management, shade regulation, phytosanitation measures should be followed properly during summer months to achieve maximum productivity.
- Area under spices and aromatic crops may increase with good agricultural production practices and processing techniques.
- Soil health management and rhizosphere improvement are the priority areas which need to be addressed for increasing production and productivity in spices and aromatic crops.
- Importance has to be given for research and development in Chhattisgarh, being a potential germplasm belt for spices and aromatic crops.
- Efforts should be focused to create awareness and impart training to spice growers so as to establish quality planting production units in consonance with the guidelines outlined by DASD/MIDH programmes.
- Programmes should be initiated to facilitate dialogue between spice producers and industry to create and strengthen the value chain.
- Studies on impact of agro-climatic changes on spices and aromatic crops production should be taken up as priority for Chhattisgarh region.
- For organic farming, IPM module may be developed for major spice crops.
- Organic spices and aromatic crops production technologies should be streamlined with organic certification systems
- FPO's and FPC's made in Chhattisgarh states should harness the advantage of organic and GI brand authorization through APEDA for marketing the produces for maximizing profitability.
- More startups need to be promoted for adopting post-harvest management and value addition potentials in spices and aromatic crops.
- Minimum support price should be decided and warehousing facilities need to be strengthened / created to store dried spice produces in Chhattisgarh region to ensure price advantage & profitability.
- The schemes available under State Department of Horticulture Chhattisgarh and the Central Government schemes under NHM, NABARD and Spices Board may be utilized to expand the area under spice crops.
- Marketing of large spices needs to be strengthened through formation of FPO's value chain development and organic certification.
- A sustainable production system by adopting good agricultural practices (GAP) and good manufacturing practices (GMP) should be folowed.

- Effort should be made to mechanize both production and processing of the spices.
- Input use efficiency should be the priority in all the spices production packages.

7.2 State Level Seminar

Sardar Krushinagar Dantiwada Agriculture University, Jagudan, Gujarat

A State Level Seminar on Seed Spices was conducted at Seed Spices Research Station, Sardar Krushinagar Dantiwada Agriculture University, Jagudan, Gujarat on 29th December, 2022. The seminar was inaugurated by Dr. P. T. Patel, Director of Extension Education, SDAU. In his inaugural address, he emphasized on the importance of value addition in increasing profitability of seed spices crops and the production of high quality seed spices and value added products. The main themes of the seminar were (**a**) Mission for Integrated Development of Horticulture (MIDH) – Development and strategies of Horticulture in Gujarat State (**b**) Production scenario of seed spices, export potential and tips for profitable production (**c**) Production technology of seed spices with special reference to no or low cost technology (**d**) Integrated Pest and Disease Management in seed spices (**e**) Field visit – Seed Production Plot – Varietal and technologies demonstration etc. and Farmers - Scientists interaction. Scientists shared their expert views on importance of seed spices crops with special reference to area, production, productivity, history and export. Production technologies of seed spices, Integrated pest and disease management in seed spices, Improved varieties and seed production techniques in seed spices and Post-harvest technologies and value addition in seed spices were also discussed during the event. The technical sessions were handled by the scientists from the university including Dr. N R Patel, Principal Investigator of MIDH programmes in the university.

An exhibition was organized in which charts and samples of different value added products of fennel, coriander, fenugreek, ajwain and their importance were displayed. Around 580 farmers including 130 women farmers from Mehsana, Patan, Banaskantha and other districts of Gujarat, officers from line departments, NGOs, other organizations and Scientists from SDAU participated in the seminar.

Agriculture University, Jodhpur

A two day State Level Seminar on "Sustainable and quality seed production in Rajasthan" was organized at the Agricultural Research Station, Mandor (Agriculture University, Jodhpur) on 3 – 4 February 2023 with the aim of creating awareness among spice growers and promoting the cultivation of spices in Rajasthan. Smt. Ruma Devi, President, Gramin Vikas Evam Chetna Sansthan, Barmer and Nari Shakti Puraskar 2018 awardee was the chief guest of inaugural session of seminar. The session was chaired by Dr. B. R. Choudhary, Hon'ble Vice Chancellor, AU, Jodhpur. Shri V. K. Pandey, Additional Director Agriculture (Ext.), Jodhpur and Dr. S. D. Ratnoo, Director Research, Agriculture University, Jodhpur were the guests for the event. Dr. M. L. Mehriya, the Organizing Secretary, delivered the welcome address and warmly welcomed the esteemed chief guest, the president and other dignitaries, as well as the participants attending the seminar. He also provided valuable insights on the importance of sustainable and quality seed production in Rajasthan. Chief Guest Smt. Ruma Devi, President, Gramin Vikas Evam Chetna Sansthan, Barmer in her address informed the participants the need for organic farming, which should be followed as regular approach, so farmers can get more income from agriculture. Dr. B. R. Choudhary, Hon'ble Vice Chancellor, AU, Jodhpur, addressed the gathering and highlighted the significance of seed

spices in Rajasthan. He informed that the university is actively engaged in sustainable research to improve the quality of seed production and also emphasized the need to develop new and improved varieties of seed spices to enhance the productivity in Rajasthan. In the technical sessions, Scientists from the university delivered lectures on various aspects of seed spices.

In this two day seminar, a total of 155 (102 officials + 53 farmers) delegates comprising scientist, subject matter specialist, technical staff of university, officials from agriculture department of state governments and farmers participated. Total 11 lead lectures were presented by various resource persons from university and ex-faculties. One field visit was also conducted at ARS, Mandor Research Farm.

University of Horticulture Sciences, Bagalkot

A State level seminar on "Improved cultivation practices and value addition in spices crops (Chilli, Turmeric, Black pepper and Tamarind)" was organized at RHREC Dharwad on 24th and 25th March 2023. The programme was inaugurated by Shri N M Eter, President, Karnataka State Spices Board, Hubballi. Dr. S. I. Athani, Director of Extension UHS Bagalkot has released the Seminar Compendium. Seminar was presided by Dr. Maheshwrappa H. P., Director of Research, UHS Bagalkot. Dr. Madhav Naidu, Principal Scientist, CFTRI, Mysore, Shri. B. R. Girish, Managing Director, Karnataka State Spices Board, Huballi, Dr. S. K. Ankegouda, Head, Cardamom Research Station, Appangala; Sri Kashinath Badrannavar, DDH, Department of Horticulture, Dharwad, Dr. N Basavaraj, Ex Director of Research and Dr. S I Hanumashetti, Ex. Dean, KRCCH Arabhavi, UHS Bagalkot were the chief guests for inaugural function of the seminar. The topics discussed in the seminar were

- Present status and opportunities of spice crops in India and Karnataka
- Processing and value addition in spice crops
- Advance production techniques in black pepper and turmeric
- Singal node cutting propagation technique in turmeric
- Advance production techniques in tamarind
- Recent high yielding varieties and new effective crop management practices in chilli
- Advance seed production techniques in chilli
- Integrated pest management in chilli, turmeric, black pepper and tamarind
- Integrated disease management in chilli, turmeric, black pepper and tamarind
- Secondary agriculture in chilli
- Post harvest technology and processing of Turmeric.
- Role of FPO in marketing and export of spices crops

Scientists with expertise in the relevant field handled the sessions during the Seminar.

7.3 District Level Seminar

a. Central Plantation Crops Research Institute, Kasaragod, Kerala

As part of the Mega Kisan Mela & Agri Expo at ICAR-CPCRI, Kidu, a district level seminar on 'Sustainable Arecanut Farming and Plant Protection Techniques', was conducted on 21st November 2022 at ICAR – CPCRI, Kidu. Dr. Homey Cheriyan, Director, DASD attended the programme and during his presidential address, appealed to the farmers to actively participate

in the programme and improve their livelihood by adopting scientific technologies developed by the research institutes for cultivation of arecanut in sustainable way. Shri. Ravi B. M., President, TUMCOS inaugurated the programme and initiated discussion on the challenges faced by farmers, particularly pest and diseases and expressed the need for popularizing plant protection technologies for their effective management. Dr. KS Ananda, Former Head, ICAR – CPCRI, Vittal, delivered lecture on improved varieties and hybrids of arecanut, Dr. Subramanian P. Principal Scientist, ICAR – CPCRI, Kasaragod delivered lecture on Integrated Nutrient Management in coconut & arecanut. Dr. Rajkumar, Scientist, ICAR – CPCRI, Kasaragod delivered a lecture on integrated pest management and EPN utilization in root grub management. The programme was a huge success.

b. National Research Centre on Seed Spices, Ajmer, Rajasthan

A two day seminar on "Clean and Safe seed spice production technologies" was organized at Dr. R.S. Proda auditorium, ICAR-NRCSS, Ajmer. Dr. Y.K. Sharma delivered the welcome address and gave a brief about the seminar to the participants. In his address, Dr. Vijay Bhardway presented the scenario of seed spice cultivation as a whole. In afternoon session participants were educated on advance production technologies in seed spices viz; improved varieties, agronomic practices, intercropping of seed spices with fruit crops, Integrated pest and disease management, medicinal properties of seed spices, storage technologies, organic and natural farming strategies in seed spice. On the second day, participants were delivered with lectures on good storage practices, farmer participatory seed production scheme, value addition in seed spices and risk management methodologies in agriculture. In the concluding session open house discussion of seed spice growers with expert was organized where solution of the problems raised by farmers were provided by the expert resource persons.

c. SKN College of Agriculture, Jobner, Rajasthan

The University organized a District Level Seminar on 'Enhancing the production potential of seed spice crops through improved technologies' on 14 -15 February 2023 at Department of Plant Breeding and Genetics, AICRP on spices. The Seminar was chaired by the Hon'ble Vice Chancellor, SKNAU, Jobner. Subject matter experts from NRC on Seed Spices, Ajmer and SKNAU, Jobner delivered lectures on diverse aspects of seed spices like current trend in seed spices, opportunity in seed spices and future prospective of seed spices to increase production and productivity of these crops, genetic resources and their conservation in seed spices, recent varieties of seed spices suitable for different climatic conditions, method of preparation of vermi-compost and its application in seed spices for higher production and Post-harvest technology & value addition in seed spices. Participants visited different experimental trials of seed spices, vermi-compost unit, drip irrigation systems, water harvesting, ponds etc. of SKN Agriculture University, Jobner. Around 120 persons participated in this District Level Seminar which included progressive farmers, Assistant Agriculture Officers, Agriculture Supervisor and others from Jaipur, Nagaur, Sikar and adjoining districts.

d. Banda University of Agriculture and technology, Banda, Uttar Pradesh

A two day District level seminar on 'Harnessing the Potential of Spices Production in Jhansi Region of Bundelkhand UP : Issues and Strategies' was held at ICAR-CAFRI, Jhansi, U.P. on 3 - 4 March 2023. The main objective of the seminar was to develop strategies for production & propagation and technologies of spices in Bundelkhand region, Uttar Pradesh and doubling farm

income. Dr. A. Arunachalam, Director, ICAR-Central Agroforestry Research Institute (CAFRI) was the chief guest of the inaugural programme and in his address he opined that Bundelkhand is emerging as a potential place for spice cultivation. Prof. S.V. Dwivedi,PI, MIDH & Dean, College of Horticulture was also present during the semiar. The workshop was attended by the scientists of KVKs, representatives of line departments and farmers of Bundelkhand region. The resource persons were invited from ICAR research institutes, CSIR research institutes, NGOs, SAUS and CAU. The First session was chaired by Dr. S.V. Dwivedi, Dean, CoH, BUAT, Banda and Co-chaired by Dr. Naresh Kumar, Principal Scientist, ICAR-CAFRI, Jhansi. During the first technical session, three presentations were delivered i.e. Augmenting Production and Productivity of Seed Spices in Bundelkhand region, Strategies for production and propagation technologies of aromatic grasses in Bundelkhand region and Scope and Schemes for Production, Promotion, Post- Harvest and Marketing of Spices in Jhansi region. The second technical session was focused on Strategies for Plant Protection measures of Spices. Third session was on Good Agronomy Practices for Ginger and Turmeric Cultivation under Agroforestry Systems of Bundelkhand Region. There were more than 100 participants for the seminar.

e. University of Agriculture Sciences, Bangalore

A District Level Seminar on "Spices and Aromatics Crops" was organized by Medicinal and Aromatic section, Department of Horticulture, GKVK in Association with Krishi Vigyan Kendra, Chamarajanagara and College of Agriculture Chamarajanagara on 15th and 16th February, 2023. Dr K N Srinivasappa, Prof., Department of Horticulture, GKVK, Bangalore welcomed the participants. The programme was inaugurated by Dr. K.C. Narayanaswamy, Director of Education, UAS, Bangalore by lighting the lamp. In inaugural address, he highlighted the scope and importance of Horticulture Sector, especially spices and aromatic crops, value addition and need for training farmers. A book entitled "Improved cultivation practices of important spices and aromatic crops" was released by all dignitaries. Dr. K.Narayana Gowda, Director of Extension, UAS, GKVK, was the chief guest and in his address he emphasised on need & importance of Spice and Aromatic crops and to cope up production to meet the demand in both domestic and at international levels. Dr. Madhusudhan, K., Deputy Director, Agricultural Department and Dr. Shivaprasad, Deputy Director of Horticulture, Chamarajanagara were present in the programme. The technical sessions were covered with various topics of spices and aromatic crops including nursery, production, processing, value addition and marketing etc. by scientists, entrepreneurs, traders and progressive farmers also arranged field visit. Dr. Srinivasappa, K.N. Professor of Horticulture has coordinated all the sessions of the Seminar.

f. Mahatma Phule Krishi Vishwavidyalaya, Rahuri, Maharashtra

The two day district level Seminar on Production of spices and aromatic crops was conducted on 28 and 29 December, 2022 at Medicinal and Aromatic Plants Project, Mahatma Phule Krishi Vidyapeeth, Rahuri. The Hon'ble Vice Chancellor, MPKV, Rahuri, Director of Research and Head, Dept. of Botany were among the dignitaries were present in the seminar. Resource persons including Dr. Vikarm Jambhale delivered lectures on present scenerio, medicinal properties and mass cultivation of aromatic plants. A total number of 178 participants from this area who are engaged in growing aromatic plants especially Geranium and other related people associated with distillation Unit manufactures, buyers and traders from all kinds of community took part in the programme.

g. ICAR - Directorate of Medicinal and Aromatic Plants, Anand, Gujarat

The two day district level seminar was organised on 23-24 March 2023 at DMAPR, Anand to meet the demand of aromatic and medicinal plants stakeholders in the region. Dr. K. B. Kathiria, Hon Vice Chancellor, Anand Agriculture University, Anand inaugurated the programme. He stated the prosperity of Indian agriculture to the farmers, and stressed the urgent need of collaboration of farmers and buyers (Industries). The organic farming, natural farming and use of safe chemicals in the agriculture is the need of the present hour to protect the human health from the various chemical related health problems. The seminar mainly included good agricultural practices (GAPs), good manufacturing practices (GMPs), post-harvest management aspects, value addition, marketing channel and quality standards requirement of herbal industries of the aromatic and medicinal crops. The seminar was aimed to help the farmers to come forward towards commercial cultivation of aromatic and medicinal crops, which would reduce the burden of unscrupulous harvest from forest and save the natural biodiversity of these crops for the future generation.

7.4 State Level Seminar

S No	Institute	Training topic	Date & Venue	Training details
1	Indian Institute of Spices Research, Calicut	Sustainable practices for scientific management of black pepper plantations	15th December, 2022 at Parish Hall, St. Thomas Church, Palakkuzhy, Palakkad	This training programme was on Black Pepper varieties, nursery practices, Crop production & protection technologies, Post Harvest Practices and value addition. Interactive sessions with farmers were held and discussed. Around 100 farmers participated in the programme. Dr. K Kandiannan, Dr. V Srinivasan, Dr. Biju C N and Dr. Lijo Thomas were the resource persons. At the end of event inputs like black pepper rooted cuttings and pepper special micro-nutrient mixture distributed to all the participants and field visits also made.
		Scientific and technological approaches for sustainable black pepper production in Malnad region	7th February, 2023 at TMS Hall, Sirsi	Lectures on cultivar diversity of black pepper, Nursery techniques for quality planting material production in black pepper, Scientific cultivation in black pepper, Pests & Disease management in black pepper, harvest and post-harvest technology in black pepper, present scenario and future

				prospects of black pepper cultivation in Uttara Kannada were delivered. Around 110 farmers participated in the programme. Dr. S. J. Ankegowda, Dr. Mohammed Faisal and Dr. V Srinivasan, were among the resource persons.
		Production Technologies for Black pepper Cultivation in Tropical Plains	8th March, 2023 at Vadagadu Mariamman Kovil Mandapam, Alangudi TK, Pudukkottai Dist., Tamil Nadu	One day training programme on "Production Technologies for Black pepper Cultivation in Tropical Plains" was for the benefit of farmers was conducted at Pudukkottai Dist., Tamil Nadu. More than 100 farmers from Pudukkottai, Thanjavur, Karur, Namakkal were participated in the programme. The topics covered were improved varieties and nursery techniques, Scientific Cultivation Practices, Pests and Diseases Management, Harvest and Post Harvest Technologies and Spices Board Schemes for farmers. Dr. D Prasath, Dr V Srinivasan, Dr Mohammed Faisal, were the resource persons.
2	Junagadh Agril. University, Junagadh, Gujarat	Production, Value addition, Marketing and Export of Seed Spices Crops	31st January, 2023 at K.V.K., J.A.U., Pipaliya	Training programme on Production, Value addition, Marketing and Export of Seed Spices Crops was held at KVK, JAU, Pipalia. Development & Scope of Seed Spices Crops in Gujarat. Economics and marketing of seed spices crops, harvesting, grading, processing and value addition of seed spices crops, Improved varieties of seed spices crops, etc .were the topics covered. Total 77 progressive farmers (32 Scheduled Caste farmers) including men and women of surrounding areas of Junagadh district took part in the programme.

3	Agricultural University, Jodhpur, Mandor	Production technology of seed spices	28th January, 2023 at ARSS, Samdari	Trainings were organised on the topics Importance of local seed spice in Barmer district with Government support for seed spice production (a) Management of insect pest and diseases in seed spices (b) Improved agricultural practices in seed spices (c) Seed production techniques for seed spices (d) Weed management in spice crops. Over 83 farmers took part in the programme.
		Production technology of seed spices	8th February, 2023 at KVK, Sirohi	Training was organized on the topics (a) Good quality seed production in spices (b) Importance of seed spice crops (c) Integrated disease management in spice crops (d) Insect pest management in spice crops (e) Value addition in seed spices (f) Good Agronomic practices in seed spice production. About 80 tribal farmers were attended the programme.
		Nutrient management and plant protection in seed spice crops	17th February, 2023 at Akeli-A, Merta City	The training was was organised on the topics (a) Nutrient management in seed spices (b) Scenario of spice seed production in Nagaur region (c) Improved agronomic practices in spice crops (d) Importance and prospects of seed spices (e) Quality seed production in spice crops (f) Management of important diseases in seed spices (g) Integrated weed management in spice crops.Over 130 farmers took part in the programme.
		Seed spices: Improved Agricultural practices and quality management	2nd March, 2023 at Bilara Farm, Bilara	During this programme, Agriculture department schemes for farmers, Weed management in seed spices crops, New agrotechniques and organic farming in seed spices, Integrated pest management in seed spices, Post harvest management in seed spice crops and Production technology in cumin & fennel were discussed in the porgramme. About 127 farmers took part in the programme.

4	Maharana Pratap University of Agri. & Tech., Udaipur, Rajasthan	Improved Production Technologies for Spice crops	4th March, 2023 at KVK, Rajsamand	Resource persons from the University delivered the lectures on various aspects of spices production, improvement and protection including the importance of spice crops in generating farm income, future in export of spice crops, requirements of soil and nutrients value addition, post harvest management techniques and its medicinal properties. The total number of participants was 50.
		Value Addition in Spices Crops	4th March, 2023 at Bhopal Sagar, Udaipur	The training programme had lectures deliverd by resource persons on various aspects of spices production, improvement and protection. Dr. Abhay Dashora, PI of this project discussed the importance of seed spice crops and highlighted the purpose of the project. In the training. Over 70 farmers took part in the programme
		Improved Technology of Seed Spice Crops	10th March, 2023 at KVK, Bhilwara	Training programme entitled "Improved Technology of Seed Spice Crops" was conducted at Krishi Vigyan Kendra, Bhilwara. The total number of participants was 61. In the training programme resource persons delivered lectures on various aspects of spices production, improvement and protection. Dr. Abhay Dashora, Project Incharge informed the farmers about the improved varieties of spice crops.
		Improved Production Technology of Seed Spice	14th March, 2023 at KVK, Dungarpur	The topics covered during this training programme was on various aspects of spices production, improvement and protection. Dr. Abhay Dashora, PI of this project discussed the importance of seed spice crops and highlighted the purpose of the project. Lectures on the importance and scope of seed spices in southern Rajasthan to inspire the farmers to earn more economic benefits by cultivating seed spices were delievered.

5	Navsari Agriculture University, Navsari, Gujarat	Quality seed production training programme on turmeric and black pepper	21st January, 2023 at KVK, Dediapada	The training programme had lectures on Quality seed production techniques, higher yield potential varieties, crop management, pest and diseases management, post-harvest handling, storage etc. Scientists from the University acted as resource persons. Over 240 farmers particiapated in the programme.
		Quality seed production training programme on turmeric and black pepper	16th March, 2023 at at KVK, Vyara	
6	Anand Agriculture University, Anand, Gujarat	Modern Techniques for Seed Spices Cultivation in Waghd Zone	31st December, 2022 at Regional Cotton Research Station, AAU, Viramgam	The farmers training programme was on Modern Techniques for Seed Spices Cultivation in Waghd Zone. Lectures on adopting contract farming, paired row system of sowing and selection of new crops based on the suitability of an area/zone in order to increase the productivity and maximum utilization of resources, and importance of spices, better productivity scope particularly in this area were delivered. Total 182 progressive farmers from different villages of Viramgam, Patdi, Dhandhuka Mandal and Raper (Kutchh) talukas were participated.
		Scientific Cultivation of Spices and Vegetable Crops	3rd March, 2023 at AAU, Anand	During the farmers training programme lectures were delivered on Importance of Vegetable and Spices Crops, Medicinal Importance of Vegetable and Spices Crops, New Approaches in the Cultivation of Chilli, Advanced Cultivation in Onion and Garlic, Scientific Cultivation of Ginger and Turmeric, Protective Cultivation in Vegetable and Spices Crops and Protective measures of insects in Vegetable and Spices Crops. Total 80 progressive farmers were participated.

		Scientific Cultivation of Seed Spices	9th March, 2023 at Krishi Vigyan Kendra, AAU, Arnej	The farmers training programme was conducted on the topic of 'Scientific Cultivation of Seed Spices'. Total 140 farmers were participated along with 95 women farmers. Importance of Spices Crops and their varieties, Scientific Crop Cultivation of Spices Crops, Value Addition in Spices, Irrigation Management in Spices Crops, Importance of Spices and Medicinal Crops in Animal Science and Nutrient Management in Spices Crops were the topics covered during the programme
7	Agricultural University, Kota, Rajasthan	Scientific Cultivation of Seed Spices	27th February, 2023 at Kanwas Smart Village	Five resource persons delivered the lectures on various aspects of spice production, improvement and protection etc. During the training, detailed discussion/ lectures were held on role and importance of seed spices, formation of FPO, cultivation practices, nutrient management, disease management, processing and value addition in major seed spices crops. University also demonstrated/ exhibited technologies which were developed for the farmers welfare. More than 300 farmers, farm women participated in the event.
		Improved technology of seed spices crops	27th February, 2023 at ARSS, Aklera, Jhalawar	The training programme entitled 'Improved technology of seed spices was organized in which six resource persons delivered the lectures on various aspects of spice production, improvement and protection etc. Crop diversification through seed spices crops, soil-water and nutrient management in seed spices crops and various aspects of organic farming in seed spices were also discussed. About 100 farmers were participated in the programme.

		Improved cultivation technology of seed spices	27th February, 2023 at ARSS, Khanpur	One training programme entitled 'Improved cultuvation technology of seed splices ' was organized at ARSS, Khanpur on 27th February, 2023. Six resource persons delivered the lectures on various aspects of spices production, improvement and protection etc. About 100 farmers participated in the programme.
		Improved production technology of seed spices crops	28th February, 2023 at KVK, Jhalawar	One training programme entitled 'Improved production technology of seed splices crops' was organized at KVK, Jhalawar on 28th February, 2023. Eight resource persons delivered the lectures on various aspects of spices production, Organic farming and quality improved protection etc. About 75 farmers were participated in the programme.
8	ICAR - Central Plantation Crops Research Institute, Kasargod, Kerala	Management of fungal diseases and effective nutrient management techniques in arecanut	9th September 2022 at Warga Village, Kasaragod taluk & district, Kerala	Training programme on "Management of fungal diseases and effective nutrient management techniques in arecanut" was organised by CPCRI. The programme was inaugurated by Shri. Padre, Editor of Adike Patrike, a Kannada farm Magazine. The importance of balance nutrition for improving the health of arecanut palms and efficient nutrient management techniques in arecanut for its sustainable production was emphasised. Use of bio-control agents for the management of arecanut diseases were explicitly explained to the farmer beneficiaries.
		EPN for the management of insect pests	27th October and 9th November, 2022 Puthige village in Kasaragod district and Palthad village in Puttur Taluk	The training programme was on 'Recent advances in arecanut health management and Entomopathogenic nematode (EPN) technologies for integrated management of root grubs in palms. The aim of the training was to impart scientific

				knowledge to the participants on various integrated practices for the management of pest and diseases. Topics such as good agricultural practices, nutrition management, Entomopathogenic nematodes (EPN) and Trichoderm production and demonstrated its field application, IPM practices of various pest and disease were covered. More than 214 farmers participated in the programme.
		Varietal wealth in arecanut and integrated pest and disease management in arecanut	23rd December 2022 at ICAR-CPCRI, Regional Station, Vittal	This training programme was on 'Varietal wealth in arecanut and integrated pest and disease management in arecanut' organized to celebrate Farmers' Day. The event was witnessed more than 129 participants. The chief guest, Shri. N. Shashi Kumar, IPS, Commissioner of Police, Mangaluru, inaugurated the programme and delivered inaugural address. Varietal wealth of arecanut, quality planting material production in arecanut, recent advances in arecanut production technologies, arecanut based multispecies cropping system, integrated pest management in arecanut etc. were the topics discussed.
		Good Cultivation Practices in Arecanut and Arecanut Based Multi-Species Cropping System	9th March 2023 at Nelluru Kemraje Primary Agriculture Co-operative Society, Elimale, Sullia Tk., Dakshina Kannada Dt., Karnataka	A training programme on "Good Cultivation Practices in Arecanut and Arecanut Based Multi-Species Cropping System" was organized at Dakshina Kannada Dt., Karnataka. The event was witnessed 137 participants. The topic covered were improved varieties and hybrids in arecanut, quality planting material production, recent advances in arecanut production technologies and arecanut based multispecies cropping system.

		Good Cultivation Practices in Arecanut and Arecanut Based Multi-Species Cropping System	15th March 2023 at Loretto Hills, Bantwal Tk., Dakshina Kannada Dt., Karnataka	The event was witnessed by 72 farmers.The topics covered are improved varieties and hybrids in arecanut, quality planting material production, recent advances in arecanut production technologies and arecanut based multispecies cropping system. A small exhibition with display charts on varieties/ hybrids, quality planting materials production, production technologies, arecanut based cropping system, integrated pests and diseases management etc. was also arranged for giving first-hand information to the participants.
9	National Research Centre on Seed Spices, Ajmer, Rajasthan	Promoting GAP & IPM based Cumin Production System	6th January,2023 at village Katyasani District, Nagaur (Rajasthan)	A farmer's training cum field day on "Promoting GAP & IPM based Cumin Production System" under MIDH was organized at Nagaur in which 85 farmers including female farmers participated from Katyasani and nearby villages. The participants were educated on improved cumin production technologies with an emphasis on the minimal use of chemicals in cumin. To get better prices in cumin they were educated on better marketing practices with proper cleaning and grading of produce and sale at a right market in right time.
		Promoting GAP & IPM based coriander Production System	20th February 2023 at village Devpura Dist., Baran (Rajasthan)	In the training, 98 farmers from Devpura, Simli, Pachel Kalan and other nearby villages participated. The training programme was inaugurated by Dr Vinay Bhardwaj, Director ICAR-NRCSS, Ajmer. Dr Y.K. Sharma, Dr Shivlal, Dr Murlidhar Meena, Dr Chetan Kumar Jangid and Dr Vashundhara Sharma from ICAR-NRCSS educated farmers on advanced production technologies in coriander with major emphasis on post-harvest management and good marketing practices to get higher income.

10	Sardar Krushi Nagar Dantiwada Agriculture University, Gujarat	Cultivation of Seed spice crops	26th December, 2022 at Kabirpura Tal. Vadgam Dist. Banaskantha	The university organized three farmers trainings under MIDH on seed spices during the year. The trainings at Kabirpura village of Vadgam taluka and Deesa village of Deesa taluka of Banaskantha district was exclusively for SC category paticipants and the training at Kathroti village of Vijaynagar taluka of Sabarkantha district of Gujarat was for ST category participants. The main objective of organizing the farmer's trainings was to transfer the available latest technologies of seed spices to the growers in order to improve production and quality of seed spices. During three different trainings, total 240 farmers /participants from the respective regions, Officers from line departments, NGOs, other organizations and Scientists from SDAU participated. The main topics of the trainings(a) Mission for Integrated Development of Horticulture (MIDH) – Development and strategies of Horticulture in Gujarat State (b) Production scenario of seed spices, export potential and tips for profitable production (c) Production technology of seed spices with special reference to no or low cost technology (d) Crop production and protection technologies of seed spices under organic farming condition etc
			10th February, 2023 Deesa, Tal. Deesa, Dist. Banaskantha	
			4th March, 2023 Kathroti, Tal. Vijaynagar, Dist. Sabarkantha	
11	SKN Agriculture University, Jobner, Rajasthan	Improved production technology of Spice crops	17 th October 2022 at Extension Education, SKNAU, Jobner	Lectures on important seed spices and their production technologies, Integrated insect and disease management in seed spices, importance of spices in Indian kitchen, seed production technique of seed spices, role of organic manures & fertilizers in production of spices & INM and Integrated Farming System- Need of hour,

				Seed production technique of seed spices, Role of organic manures and fertilizers in production of spices & INM and Integrated Farming System- Need of hour were delivered during the programme. About 110 farmers including woman farmers participated in the programme.
		Improved production technology of methi seed spices	27th January 2023 at KVK, Fatehpur Shekhawati, Sikar	The topics on which lectures conducted were Importance and scope of Spices, Scientific cultivation of Methi, Importance and benefits of Methi production. Officials from the university acted as resource persons. About 113 farmers including woman farmers participated in the programme.
		Production technologies of seed spices crops	18th March 2023 at Krishi Vigyan Kendra , Kotputli - Jaipur	The topics covered during the training were, scope of seed spices in Rajasthan & their medicinal values, advances in production technology of seed spices crops, technology dissemination in seed spices crops, organic farming practices in seed spices, Integrated Nutrients management in seed spices crops and Integrated Pest management in seed spices crops. About 120 farmers including woman farmers participated in the programme.
12	ICAR - Directorate of M & A Plants, Anand, Gujarat	Improved Production Technology of MAPs	23rd December, 2022 at Salun village, Nadiad District	The aim of this training was to provide knowledge to farmers on aromatic and medicinal plants, introduction of the MIDH scheme and production technology of the aromatic grasses. Dr. Khadke G.N., Scientist, DMAPR, Anand was among the resource persons. Sustainable cultivation of MAPs, importance of organic cultivation in medicinal and aromatic crops and importance of the primary process and value addition in the medicinal and aromatic crops were also discussed in the progamme.

		Training on scientific cultivation of Medicinal and aromatic crops and their value addition	30th December, 2022 at Bakrol Village, Ghogamba Tahsil, Panchmahal District	The topics on which lectures delivered were introduction of the training and production technology of the aromatic grasses, sustainable cultivation of important medicinal plants, different input management and component of organic cultivation in medicinal and aromatic crops and importance of the primary process. About 75 tribal farmers from Bakrol village participated in the training programme
		Production Technology and Value addition of MAPs	14th March, 2023 at Varsola Village, Nadiad, District	The objective of the training was to provide knowledge to farmers about importance and scope of aromatic and medicinal plants cultivation, value addition in this startup development era, Introduction of the training and production technology of the aromatic grasses, sustainable cultivation of important medicinal plants and different input management and component of organic cultivation in medicinal and aromatic crops. About 75 farmers actively participated in the training
13	Uttar Benga Krishi Vishwa vidyalaya, Pundibari, West Bengal	Production technology of spice crops	6th and 7th February, 2023 at Kharibari, Darjeeling	Lectures on Scientific package of practices and economics of black pepper and seed spices cultivation, scientific package of practices and problems of Arecanut cultivation, Scientific package of practices for ginger and turmeric production, Importance, economics and package of practices of Tejpat were delivered in the programme. About 75 farmers including woman/SC/ST took part in the programme.
		Production technology of spice crops	15th and 16th February, 2023 at Majhian, South Dinajpur	The objective of the programme was to inform the scope and importance spices in South Dinajpur district. The topics discussed were Production technology of black pepper cultivation, Processing and marketing of spice crops, improved production

				technology of turmeric, ginger and garlic and Cultivation of spices in multi-storeyed cropping system. About 79 farmers including woman/SC/ST/OBC took part in the programme.
		Production technology of spice crops	15th and 16th February, 2023 at Patlakhawa, Cooch Behar	The topics covered during the training programme were promotion of spices cultivation towards crop diversification for better livelihood, scope and production technology of black pepper and seed spices cultivation, Cultivation of spices in multi-storeyed cropping system and processing & disease management of spice crops. About 75 farmers including woman/SC/ ST took part in the programme.
		Production technology of spice crops	15th and 16th February, 2023 at Telipara, Alipurduar	The objective of this training was to apprise the farmers on the scope for Spices cultivation in Alipurduar district. Cultivation, Improved propagation technology of different spice crops and disease management in Spice crops were among the topics dealt in the programme. About 121 farmers including woman from SC, ST and OBC communities took part in the programme.
14	Punjab Agriculture University, Ludhiana, Punjab	Improved agro - techniques for spice and Aromatic crops	7th February, 2023 at KVK Nagkalan, Amritsar	Dr. Rajinder Kumar, PI and Principal Agronomist organised three FT programmes, in which Dr. S S Walia, Director, SOOF was the chief guest. Dr Rajender Kumar, Course Director of these training programmes shared information about improved agronomic practices of mentha and turmeric cultivation while highlighting the prospects of these crops in the state. Good quality seed of released variety viz. Punjab Haldi 1 and Punjab Haldi 2 being produced by PAU, Ludhiana is easily available for the farmers. So turmeric can be adopted as potential crop as its
		Improved agro - techniques for spice and Aromatic crops	10th February, 2023 at KVK Bhatinda	
		Improved agro - techniques for spice and Aromatic crops	14th February, 2023 at KVK Ferozpur	

				production technology have already been standardized and recommended for the farmers for higher productivity. He advised the farmers that cultivation of these crops should be initiated at small level and then increases the area under these crops by estimating the demands of the market. Dr. Tarseen Chand shared information of Processing of Turmeric in detail. Field days on Improved production technologies of turmeric was also conducted
15	Indira Gandhi Krishi Vishwa Vidyalaya, Raipur, Chhattisgarh	Production, processing and value addition of spices and aromatic crops	24-25th March, 2023 at KVK Mahasamund	During the training, lectures were organised by Dr. S S Tuteja, and other senior scientists of the university. The topics covered were prospects, possibilities and importance of spices and aromatic crops in Mahasamund district and improved production technologies of Ginger, Turmeric and seed spices. Various publications and literature were provided to the farmers.
		Production, processing and value addition of spices and aromatic crops	24-25th March, 2023 at CARS, Jagdalpur	The main emphasis of training was on the aspect of Post Harvesting technique and processing of turmeric. Dr. R.S Netam, Dean, CARS, Jagdalpur was the chief guest in this programme. The technical lectures were on scope of spices and aromatic crops, weed management and soil requirement and its health management in Bastar region. Field visits were also conducted during the programme.
		Production, processing and value addition of spices and aromatic crops	24-25th March, 2023 at KVK Mainpat	The main aspect of the two day progrmme was on Post harvest technique and processing of turmeric and production technologies in Aromatic crops and Seed spices. The topics covered were production technologies in lemongrass, Citornella, Coriander and Fenugreek. Field visits were also conducted.

16	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	Production technologies of spices and aromatic crops	9th January, 2023 at Kolewadi	The one day training programme was conducted exclusively for the trabal people of the region. A total of 78 farmers took part in the programme. Lectures on Integrated pest and disease management in spices and acomatic crops and new entrepreneurship in tribal areas in nursery produciton of different aromatic crops were delivered by Dr Vikram Jhambale, PI and other senior scientists of the University.
		Production technologies of spices and aromatic crops	13th January, 2023 at Bholewadi	This training programme was conducted for tribal women farmers of the region. The topics covered included growing geranium aromatic crops as a profit making crops to the tribal farmers and different improved agrotechniques for cultivation of Aromatic plants
		Production technologies of spices and aromatic crops	14th January, 2023 at Ambhol	Resource persons from the University delivered lectures on Garlic and Chilli production and its marketing strategy, general trend of farming and enhancement and doubling farmers income through aromatic plant cultivation and entrepreneurship by growing geranium crop. Over 75 tribal farmers took part in the programme
17	Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, Madhya Pradesh	Production technologies of spice crops	15th March, 2023 at COA, Jabalpur	The training programme was conducted to update the knowledge and skills in modern agricultural technologies of spice crops for the farmers. The participants were mainly from the SC/ST and OBC communities of the region. Dr. Rajnee Sharma and other senior officials of the university were the resource persons for the programme. The topics covered included Organic production, INM, and IDM in spice crops. Produciton and processing technologies in Ginger, Turmeric, Coriander and Fenugreek were also discussed.

		Production technologies of spice crops	8th and 9th February at KVK, Panna	The training programme was conducted to update the knowledge and skills in modern agricultural technologies of spice crops for the farmers. Over 75 farmers from the SC/ST communities took part in the programme. Lectures were delivered on Integrated nutrient management, Integrated pest and disease management and production technologies of spice crops
		Production technologies of spice crops	21st February, 2023 at KVK Betul	The topics on which lectures given were on the importance of production techniques in spice crops and its uses and cultivation techniques of turmeric, ginger, coriander and garlic seed production. Over 75 farmers took part in the programme.
18	Choudhary Charan Singh Haryana Agriculture University, Hissar, Haryana	Cultivation of spice crops	28th March, 2023 at Main Campus, HAU, Hissar	The Training programmes were conducted to create awareness among the farmers regarding cultivation of spices crop for diversification in agriculture. Lectures on relevant topics were delivered by different scientists regarding package of practices and usefulness of these crops. Exhibitions and field visits were condcuted as part of the training programmes. More than 75 farmers took part in each of the programme
		Cultivation of spice crops	29th March, 2023 at Main Campus, HAU, Hissar	
19	Orissa University for Agriculture and Technology, Bhubaneshwar, Odisha	Cultivation techniques of aromatic and medicinal plants	3rd December, 2022 at Kalahandi	The training programme was organised on the topics scope and importance of aromatic plant cultivation in Kalahandi region. Lectures were also delivered on its cultivation techiques, processing and entrepreneurship development and management of pests and diseases. Dr. S C Swain, Principal Investigator and other scientists of the university delivered lectures on the said topics.

		Organic Ginger cultivation	17th March, 2023 at HARS, Pottangi	This training progarmme was organised exclusively for the ST community of the region. Over 75 ST farmers took part in the programme. Lectures were delivered on the required soil for ginger cultivation, use of bio fertilisers, planting methos, value addition and marketing of ginger in Koraput. Intercropping in ginger and plant protection measures were also discussed during the programme
		Organic Ginger cultivation	9th September, 2022 at RRTS, Semiliguda	Lectures were delivered on the suitable varieties for ginger cultivation, use of bio fertilisers, planting methos, value addition and marketing of ginger in Koraput. Intercropping in ginger and plant protection measures were also discussed during the programme. Over 75 farmers from the SC and ST communities took part in the programme
20	Dr. Balasaheb Sawant Krishi Vidyapeeth, Dapoli, Maharashtra	Production technologies in spices	27th March, 2023 at RCRS, Bhatye	Over 100 farmers from Bhatye, Ratnagiri took part in the programme which was on produciton technologies of Black Pepper, Bush Pepper and Turmeric. Other topics covered during the training were disease, insect and pest management in spice crops. Dr. K V Malshe and other scientists acted as resource persons.
		Production technoloties of spices in Konkan region	10th August 2022 at COH Dapoli	This programme was conducted on the occasion of Azadi ka Amritmahotsav and a total of 100 women farmers were present. The main topic of the training was production of quality planting material of spices in konkan region. Lectures were delivered on other topics like produciton technology in Black Pepper, Cinnamon, Nutmeg, Ginger and Turmeric. Intercropping of spices in coconut gardens was also discussed.

		Production technologies in spices	15th February 2023 at Ratnagiri	The topics on which lectures are given were on Produciton technology of Nutmeg, production technology of Black Pepepr and cinnamon, production technology of turmeric & spices. Dr. P M Haldankar, PI and Dr B R Salvi delivered lectures on the said topics. Over 150 farmers from Ratnagiri took part in the training programme
		Production technologies in spices	8th March 2023 at Ratnagiri	This programme was conducted on the occasion of International Women's day. 187 female farmers took part in the programme which was a huge success. Dr. P M Haldankar, PI, Dr N V Dalvi and other scientists from the university deliverd lectures on produciton technology of Nutmeg, Black Pepper, Cinnamon and Turmeric. Lectures on processing technologies of spice crops were also given. The research technologies developed by the university was also discussed.
21	University of Agriculture Sciences, Bangalore, Karnataka	Improved cultivation practices of Turmeric and Ginger	14th November 2022 at Chamar-ajanagara	The training programme was conducted on the topics cultivation, harvesting and post-harvest practices of turmeric and ginger crops, Value addition and Marketing and production of Turmeric and Ginger. Dr. K N Srinivasappa, PI of the MIDH scheme was among the resource persons. Over 75 farmers took part in the training programme. Planting material of turmeric and ginger crops were made available to farmers.
		Improved cultivation practices of Aromatic crops	7th December 2022 at KVK Hadonahalli	The topics covered during the training programme were improved cultivation practices of important aromatic crops by Dr. Srinivasppa. K. N., Prof of Hort, Department of Horticulture, UAS, Bangalore, importance and marketing of aromatic crops by

				Dr.B.S.Sreeramu, Rtd. Professor of Horticulture plant propagation and nursery techniques of important aromatic crops by Dr.Ranjeetha. R, Scientist (Horticulture), ICAR-KVK-Hadonahalli. Planting material of aromatic crops were made available to farmers.
		Advanced cultivation practices of spice crops	7th January, 2023 at Chamar-ajanagara	The topics covered during the programme were Introduction to Spices crops and its importance, importance and future prospectus of Spice crops, nursery production, processing, value addition, marketing and advanced Cultivation of Spices. Dr. Srinivasappa, PI was one of the resource persons for the trainings. Over 75 farmers took part in the programme
22	Kerala Agriculture University, Thrissur, Kerala	Field Day on Nutmeg	10th January, 2023 at Training Hall, Model Nursery on Spices, KAU Main Campus, Vellanikkara	The topics covered were scientific production of nutmeg by Mrs. Annesha A.K, Assistant Professor, Dept. of Plantation Crops & Spices-CoA, Scientific plant protection of nutmeg by Dr. Rashmi C.R., Assistant Professor, AICVIP, KAU, Vellanikkara, Diversification of nutmeg for value addition by Mrs. Anu Mary Markose, Assistant Professor, Dept. of Post-Harvest Technology, KAU, Vellanikkara. Around 55 farmers including SC/ST/Women took part in the programme.
		Good Agricultural Practices in Spice Production	Grama Panchayat Hall, Padiyoor, Thrissur	The FT programme was conduct on Good Agricultural Practices in Nutmeg Cultivation, rhizomatous spices, waste management in integrated farming system and application of bio fertilizer in spices. The resources persons were Dr. N. Mini Raj, Professor & Former Dean (Rtd), Mrs.Aneesha, Assistant Professor, Dept. of Plantation Crops & Spices, CoA,Vellanikkara and other

				scientists of the university. Around 51 farmers including SC/ ST/Women took part in the programme.
		Black pepper and inter crops	16th & 17th December, 2022 at Thaliparamba, Kannur	Two day farmers training programme was conducted at Taliparamba by the university. Lectures on pest management in Black pepper and intercrops, Plant protection of Spices, Relevance of micronutrients in crop cultivation at Thaliparamba and Plant protection of Spices, Disease management in black pepper and Cultivation of black pepper were delivered. Around 110 and 104 farmers including SC/ST/Women participated in the centres.

201. National seminar held at IGKV, Chattisgarh

202. State level Seminar conducted at SDAU, Jagudan

203. State level Training programme conducted at RHREC, Dharwad by UHS, Bagalkot

204. State level Seminar organized at Pasighat

205. State Level Seminar concted at AU, Jodhpur

206. District Level Seminar conducted at Banda, AU&T, UP

207. District Level Seminar conducted at ICAR-CAZRI, Bhuj

208. District Level Seminar organized at DMAPR, Gujarat

209. District Level Seminar conducted at Sadanadapuram, KAU, Thrissur

209. District Level Seminar conducted at Sadanadapuram, KAU,Thrissur

211. District Level Seminar conducted at NDUAT, Ayodhya

212. District Level Seminar conducted at NRCSS, Ajmer

213. District Level Seminar conducted at SKNAU, Jobner

214. District Level Seminar on Spices conducted at UBKV, WB

215. District Level Seminar conducted at AU, Kota

216. District Level Seminar conducted at GKVK, Bangalore

217. Materials distributed during DLS at UBKV, WB

218. Farmers training conducted at AAU, Gujarat

219.Cinnamon planting and bark extraction training at CCARI, Goa

220. Farmers training programme conducted at DMAPR, Gujatrat

221. Farmers visit in Herbal garden during farmers training at HISAR, Haryana

222. Field visit arranged during farmers training at JNKV, MP

223. Farmers training conducted at Kabirpura village SDAU, Jagudan

224. Farmers Training conducted at MPKV, Rahuri

225. Field visit arranged during FT at NRCSS, Ajmer

226. Book release during farmers training at TNAU, Coimbatore

227. Cinnamon bark extraction training conducted at ICAR-CIARI, Port Blair

228. Field visit arranged during farmers training at Dr.BSSKKVP, Dapoli

229. Farmers training organized at GKVK, Bangalore

230. Farmers training conducted by ICAR- IISR, Kozhikode

231. Farmers training programme conducted by OUAT, Orissa

232. Farmers training conducted at UAS, Dharwad

233. Input distribution during the Farmers training at Hisar, Haryana

234. Farmers training conducted at JAU, Junagadh

235. Farmers training conducted at KVK, ICAR-CAZRI, Bhuj

236. Farmers training conducted exclusively for women at KVK, Bhuj

237. Demo on Mandipropamid training at CPCRI, Vittal

238. Mega Kisan Mela conducted by ICAR-CPCRI, Vittal

239. Farmers training conducted at PAU, Ludhiana

240. Farmers training conducted at PDKV, Akola

241. Farmers training conducted at SKLTSHU,Telangana

242. Farmers training at SKNAU, Jobner

243. Farmers training Conducted at SVPUT , Meerut

244. TOT at COH, Sirsi, UHS, Bagalkot

245. TOT at Kanwas Village organised by AU, Kota

246. TOT conducted at Manipat dist by IGKV, Chattisgarh

247. TOT conducted at CAU, Pasighat

248. Seeds distributed during FT at BAU&T, UP

249. TOT organised at CS Azad AU, UP

250. TOT organized at Dr.YSPHUF, Solan

251. Training programme conducted at MPUAT, Udaipur

252. TOT organised at Navasari AU, Gujarat

253. Training programme conducted at NDUAT, Ayodhya

254. Farmers training organized at Dr.YSRHU, AP

255. TOT organised at RAU, Bihar

256. TOT programme conducted at CPCRI,Vittal

256. TOT programme conducted at CPCRI, Vittal

258. Awareness programme on Accreditation of Large cardamom

259. Establishment of Large cardamom nursery training at Nagaland

260. Farmers training conducted at KAU, Thrissur

8. Monitoring

The Directorate is responsible for coordinating and monitoring the activities on the development of Arecanut, Spices and aromatic plants under Mission for Integrated Development of Horticulture (MIDH) in the country. MIDH programmes were monitored through periodical review meeting, field visits and discussions with the officers concerned.

8.1 Review Meeting of MIDH programmes being implemented by DASD

The sixteenth Annual Review meeting of the MIDH programmes implemented through the Directorate of Arecanut and Spices Development, was held on 13-14 July 2022 at H C & RI, Periyakulam, TNAU. There were 70 participants representing 45 agencies implementing DASD programmes.

Dr. Senthil, Director, CPMB, TNAU, welcomed the guests and delegates. Dr Homey Cheriyan Director, DASD briefed the background of the 16th Annual Review meeting of MIDH programmes implemented through the Directorate and pointed out the importance of spices in Indian economy. Dr CK Thankamani Director, ICAR-IISR, Dr.P. Paramaguru, Dean, HCRI, Trichy offered felicitation address. After lighting up the lamp for the inaugural programme, Dr. Prabhat Kumar, Horticulture Commissioner, Govt. of India, addressed the delegates. He conveyed that as a result of the mission programmes and thrust given to horticulture, our horticultural production has surpassed the food grain production. In future, more thrust need to be given for diversification in horticulture, import substitution and strengthening of institutional mechanism to make functional business models. He added that the horticultural output data will help policy planners, farmers and otherstake holders to identify the gaps and plan for better. Dr N Mini Raj, former PI, KAU was also felicitated for her contributions to the MIDH programmes. The inaugural session concluded with the vote of thanks by Dr. Rajangam, Dean HC & RI, Periyakulam.

The technical sessions began at 1.00 PM. The Review Team consisted of Dr. Prabhat Kumar, Horticulture Commissioner, Dr. Homey Cheriyan, Director DASD and Dr. Femina, Deputy Director, DASD. Center/institute wise presentation were done by principal Investigators/ representative of the implementing agencies and the review team critically evaluated the progress of implementation in each centre. Suggestions were made for effective implementation of the development programmes.

Best Performer Award

Indira Gandhi Krishi Vishwavidyalaya, Raipur Chhattisgarh was awarded the best performer award for their good performance and utilization of funds consistently for the last three years.

Director DASD has mentioned the following Action Points in his concluding remarks.

1. Regarding USB of Seminar/Workshop/Farmer's training programme. Funds allotted for the component may be fully utilized. Any unspent balance under the component will have to be refunded to the Directorate. Any funds being refunded to the Govt of India under NHM has to be in the name of Director, DASD, Calicut. Details of the programme including photographs needs to be sent to the Dte.
2. The venue and dates of the TOT programmes should be intimated to DASD well in advance. The qualification pack for skill development training programme need to be developed and must be approved by ASCI in advance. The impact of such trainings to farmers must be studied and recorded.
3. Revalidation for only previous years unspent balance will be done, otherwise ministry's approval is needed. Revalidated amount of the previous year is to be utilized only for the already approved components and these funds are to be utilised first before the current year's funds for the same component is used.
4. Refund of funds to DASD. After refund is done, an intimation in this regard is to be sent to DASD. Funds to be refunded to DASD only after approval/directions of DASD.
5. All reports from the university should be sent by PI/DR to DASD. Peacemeal reports from different implementing centres may not be sent to us. Compiled reports from the centres may be sent to DASD by the PI/DOR.
6. As per directions of GOI, all agencies are required to utilize funds as under
   Scheduled Caste Sub Plan – 16.6 % (SCSP)
   Tribal Sub Plan – 8.6 % (TSP).
7. Separate information and records on this are to be maintained by all agencies and submit to DASD as and when required.
8. All nurseries established under NHM funds from the Dte should be accredited by DASD. Private /public spice nurseries in contact with the university may be encouraged to take up nursery accreditation.
9. AUCs are mandatory.
10. MIDH/NHM logo to be placed at all places where funds under NHM are utilized, such as infrastructure, fields, nursery, seminar, farmer's training etc.
11. For all project-based programmes including Seed infrastructure and Nursery centre, a separate completion report is to be sent to the Dte
12. The varieties used in multiplication should be declared at starting itself. Details of planting material distributed to be intimated to DASD. The reports on planting material production should show the variety of the crop produced. Only those varieties which are released in last 10 years are to be multiplied under the programme.
13. Details of the planting material produced at each centre to be uploaded on the DASD website.

14. Articles, success stories in c/w the conduct of the FLDs, innovative projects, infrastructure development, skill trainings, Seminars etc.to be submitted to the Dte for publication in journal.
15. Impact of skill development training programme, placement etc to be intimated in the form of success stories and videos.

The two-day review meeting was concluded with the formal Vote of Thanks delivered by Dr.Femina, Deputy Director, DASD.

261. 16th Annual Review meeting held at TNAU, Periyakulam

262. Delegates from SAU's/ICAR institutes

263. Dr.Prabhat Kumar, Horticulture Commissioner lighting the lamp

264. Inaugural function of the 16th Annual Review meeting

.

3. STATISTICS

The exhaustive, reliable and timely statistics have been identified as the foremost requirement for formulating effective development strategies in the agricultural sector. Since the correct information on area and production of export-oriented commodities like spices is necessary for planning development programmes as well as strategy for export, a more reliable and scientific data base of spices is very essential. With this objective, the Ministry of Agriculture & Farmers Welfare, has rightly put collection, compilation and dissemination of statistics of spices and arecanut as one of the mandates of the Directorate of Arecanut and Spices Development (DASD) since its inception. As of 2008, the DASD has been designated as the nodal agency for collecting and compiling information related to the area and production of spices and arecanuts. The main activities related to compilation of statistics are:

- Collection and compilation of area and production of various spices and arecanut from different States.
- Generate All India estimates for area and production of various spices and arecanut.
- Collection and compilation of data related to export, import, cost of production, price trend of the commodities concerned.
- Dissemination of the generated data to the development agencies, traders, exporters, scientists, researchers etc.
- Review of production and price situation of the crops entrusted to the Directorate.

1. Area and Production Statistics

The Directorate collects the area and production estimates from the reporting agencies (State Agricultural Statistics Authority-SASA) like State Department of Economics and Statistics/ Horticulture / Agriculture and office of the commissioner of land records. The collected data are being compiled for estimating the all-India figures for spices as a whole and for individual spices. Similarly, the Directorate compiles State-wise area and production statistics of arecanut. These estimates are being provided to Horticulture Statistics Division of the Ministry of Agriculture & Farmers Welfare, Government of India periodically for releasing the estimates on area and production of horticultural crops including spices at National level.

1.1 Spices

Production of spices in the country during 2022-23 was 118.30 lakh tonnes from an area of 45.15 lakh ha, which registered an increase of 6% in production and 3.5% in area when compared to 2021-22. Among the various spices, black pepper, red chillies, coriander, fennel, tamarind, fenugreek, dil/poppy/celery, cinnamon/tejpat registered increase in production and other spices registered a decrease in production. All India estimates of area, production and productivity of spices for the years 2021-22 and 2022-23 are given below:-

Table 1. Crop-wise estimates on area, production and productivity of spices

(Area: '000 ha, Production: '000 tonnes, Productivity: kg/ha)

Crops	2021-22			2022-23		
	Area	Production	Productivity	Area	Production	Productivity
Pepper	283.962	95.323	336	299.053	117.067	391
Ginger	210.016	2503.325	11920	190.959	2201.187	11527
Chillies	882.000	1836.222	2082	851.607	2782.009	3267
Turmeric	333.024	1221.717	3669	320.782	1169.982	3647
Garlic	431.218	3523.436	8171	386.832	3239.453	8374
Cardamom	85.828	37.055	432	86.516	36.212	419
Coriander	553.099	735.280	1329	710.613	973.973	1371
Cumin	869.186	555.789	639	937.596	577.273	616
Fennel	64.922	114.971	1771	88.299	151.937	1721
Fenugreek	168.716	252.063	1494	145.363	229.841	1581
Ajwan	38.182	39.763	1041	43.098	39.019	905
Dill/Celery	23.187	28.998	1251	31.836	42.826	1345
Cinnamon/Tejpat	1.682	4.089	2432	2.207	4.999	2265
Nutmeg	23.353	18.429	789	24.250	18.094	746
Clove	1.924	1.209	628	1.952	1.270	651
Tamarind	40.345	152.409	3778	38.855	151.282	3894
Vanilla	0.118	0.050	424	0.105	0.065	619
Mint (Mentha)*	346.299	35.007	101	347.461	35.117	101
Saffron	3.395	0.0026	1	3.435	0.0025	1
Curry Leaf				4.144	58.548	14128
Total	**4360.456**	**11155.137**	**2558**	**4514.963**	**11830.157**	**2620**

**Mint production in terms of mentha oil*

Country-wise area and production of spices are being collected from international organizations like Food and Agriculture Organization (FAO), Rome and International Pepper Community (IPC), Jakarta.

Pepper production in the world was estimated 6.12 lakh tonnes from an estimated area of 6.76 lakh ha in 2021 against a production of 6.25 lakh tonnes from 6.23 lakh ha during 2020. The world production of pepper has decreased in 2020-21 when compared to 2019-20. Vietnam is the largest pepper producing country with a production of 1.8 lakh tonnes from 1.30 lakh ha.

Table 2. Country wise area, production and yield per hectare of pepper during 2020 and 2021.

(Area: ha, Production: tonnes, Productivity: kg/ha)

Country	2020			2021		
	Area	Production	Productivity	Area	Production	Productivity
Brazil	30700	95000	3094	35000	98500	2814
India	259148	104071	402	309363	140641	455
Indonesia	119200	86083	722	116816	83316	713
Malaysia	7587	18500	2438	7499	21597	2880
Sri Lanka	40500	23970	592	41744	25047	600
Vietnam	130000	240000	1846	130000	180000	1385
China	21000	25000	1190	21000	30000	1429
Madagascar	4000	5000	1250	4000	4500	1125
Thailand	600	4500	7500	600	5000	8333
Cambodia	7471	18000	2409	7471	20000	2677
Ecuador & Others	2800	5000	1786	2800	4000	1429
World	**623006**	625124	**1003**	**676293**	**612601**	**906**

Source : India - DASD, Other countries - IPC

1.2 Arecanut

Arecanut production in the country was 16.66 lakh tonnes from an estimated area of 8.49 lakh ha in 2021-22. In 2022-23, the production of arecanut has decreased to 13.69 lakh tonnes, due to the severe incidence of Leaf Spot Disease in Karnataka, Kerala, Assam, Meghalaya, Mizoram, West Bengal etc. are the major arecanut growing states in the country. All India estimates of area, production and productivity of arecanut in India during 2021-22 and 2022-23 are given in Table 3.

Table 3. State-wise area, production and productivity of Arecanut

(Area: '000 ha, Production: '000 tonnes, Productivity: kg/ha)

State	2021-22			2022-23		
	Area	Production	Productivity	Area	Production	Productivity
Andhra Pradesh	3.850	7.640	1984	3.374	20.244	6000
Arunachal Pradesh	1.531	6.839	4467	0.827	3.679	4449
Assam	68.406	53.938	788	67.353	41.854	621
Goa	2.072	4.135	1996	2.081	3.963	1904
Karnataka	603.121	1348.930	2237	674.810	1024.117	1518
Kerala	93.968	103.476	1101	94.553	98.527	1042
Maharashtra	3.285	4.210	1282	3.560	4.176	1173
Meghalaya	18.954	25.091	1324	34.410	51.650	1501

Mizoram	21.418	33.540	1566	21.418	33.540	1566
Nagaland	0.346	0.156	451	0.232	1.352	5828
Odisha				0.642	1.601	2494
Tamil Nadu	8.902	13.001	1460	10.782	21.889	2030
Tripura	7.245	24.850	3430	7.335	24.975	3405
West Bengal	12.073	24.842	2058	12.493	24.791	1984
Andaman & Nicobar	4.106	15.386	3747	4.247	12.519	2948
Pondicherry	**0.052**	**0.078**	**1500**	**0.041**	**0.062**	**1512**
All India	**849.329**	**1666.112**	**1962**	**938.158**	**1368.939**	**1459**

Country-wise area and production of arecanut were collected from Food and Agriculture Organization (FAO), Rome. The latest available data are of 2021. World production of arecanut in 2021 was estimated as 26.33 lakh tonnes from an area of 16.63 lakh ha against 24.54 lakh tonnes from 14.92 lakh ha reported in 2020. India accounts for 51% of area and 63% of production of Arecanut in the world.

Table 4. Country-wise area and production of Arecanut

Country	2020			2021		
	Area (ha)	Production (tonnes)	Productivity (kg/ha)	Area (ha)	Production (tonnes)	Productivity (kg/ha)
India	793511	1563155	1970	849329	1666112	1962
Indonesia	138228	132601	959	151027	65483	434
China, Taiwan Province of	40183	98565	2453	39691	95536	2407
Myanmar	70062	203215	2901	71115	208314	2929
Bangladesh	405014	328610	811	466100	345801	742
Sri Lanka	18208	63986	3514	17716	82131	4636
Thailand	22657	38204	1686	22717	38306	1686
Nepal	2653	8782	3310	4011	14584	3636
Bhutan	1767	17446	9873	2058	21377	10387
Malaysia	1	2	2000	12	39	3249
Maldives	13	13	1000	13	13	1017
Total	**1492297**	**2454579**	**1645**	**1663480**	**2633232**	**1583**

Source: India- DASD, Other countries- FAO

2. Export and Import Data

2.1 Spices

The data on export of spices (item-wise and country-wise) were collected from the Spices Board India, which is the nodal agency for the export promotion of spices in the country. Import data were also collected from Spices Board.

The export of Spices during 2022-23 was 14.04 lakh tonnes valued at Rs.31,761 crores against 15.31 lakh tonnes valued at Rs.30,324 crores during 2021-22. The export has shown a decrease of 8% in quantity and an increase of 4% in value compared to last year. Chilli continued to propel the growth story as India's largest exported spice, accounting for Rs 5.16 lakh tonnes valued at Rs. 10,446 crores. Export of turmeric, coriander, garlic and other spices registered increase during this year. Export of pepper, cardamom, chilli, ginger and cumin decreased during the year 2022-23.

Table 5. Estimated export of Spices during 2021-22 and 2022-23.

Spices	2021-22		2022-23	
	Quantity (tonnes)	Value (Rs. in Lakhs)	Quantity (tonnes)	Value (Rs. in Lakhs)
Pepper	21,863	75,331.23	17,958	72,686.41
Cardamom (Small)	10,571	137,566.95	7,352	87,514.87
Cardamom (Large)	1,981	15,448.21	1,883	13,720.19
Chilli	557,144	858,458.36	516,185	1,044,592.20
Ginger	147,677	83,651.76	50,885	43,246.06
Turmeric	152,758	153,442.05	170,085	166,699.49
Coriander	48,656	48,247.51	54,481	66,501.19
Cumin	216,971	334,367.40	186,509	419,359.76
Celery	7,579	9,854.19	5,248	7,755.76
Fennel	40,139	41,197.20	21,201	31,437.42
Fenugreek	32,402	26,285.83	35,055	26,680.17
Other seeds (1)	47,167	40,445.48	57,431	48,089.08
Garlic	22,135	18,575.04	57,346	24,579.64
Nutmeg & Mace	3,597	21,798.86	3,447	22,127.57
Other spices (2)	109,369	159,957.89	116,260	193,521.41
Curry powder/Paste	52,479	115,836.50	57,924	141,689.27
Mint Products (3)	36,254	444,144.18	26,708	357,386.49
Spice Oils and Oleoresins	21,920	447,823.73	18,398	408,551.25
Total	**1,530,661**	**3,032,432.44**	**1,404,357**	**3,176,138.22**
Value in Million US $		**4068**		**3953**

(1) Include Ajwan seed, Dill seed, Poppy seed, Aniseed, Mustard etc.
(2) Include Asafoetida, Cinnamon, Cassia, Cambodge, Saffron, Spices (NES) etc.
(3) Include menthol, menthol crystals & mint oils.

Source: Spices Board

During the year 2022-23, import of spices in the country registered an increase of 30% in terms of quantity and 19% in terms of value. In 2022-23, India imported 291542 tonnes of various spices and spice products valued at 1208 million US $ against the import of 224393 tonnes valued at 1088 million US $ in 2021-22. In 2022-23, Cassia is the major item in the import contributing 13% of the total spices imported followed by Pepper (12%), ginger (11%), coriander (10%) etc. are the major spices imported into the country during the period. Item-wise import of spices during the year 2021-22 and 2022-23 are given below.

Table 6. Import of Spices in India during 2021-22 and 2022-23.

Spices	2021-22		2022-23	
	Quantity (tonnes)	Value (Rs in lakhs)	Quantity (tonnes)	Value (Rs in lakhs)
Pepper (1)	37188	138490.40	35905	134023.64
Cardamom (Small)	214	3407.60	567	5092.40
Cardamom (Large)	7045	38951.59	9403	48840.33
Chilli/Paprika	2571	5754.67	2698	6859.68
Ginger Fresh/Dry	13101	12813.61	32172	18154.24
Turmeric	24480	24577.00	16769	19579.01
Coriander	15603	13647.42	31383	20961.76
Cumin black/white	4733	7935.16	2013	4395.74
Other seeds (2)	1994	2183.80	1490	1712.20
Poppy seed	0	0.00	24728	64250.11
Garlic	1317	847.44	3014	2496.58
Clove	22511	105079.28	17986	83828.46
Nutmeg	1267	5673.29	1234	6363.40
Mace	2062	24282.13	2169	27183.85
Cassia	29201	68449.99	38545	87120.47
Star anise	8462	59228.25	6741	37140.93
Other Spices (3)	19161	26165.25	23712	32698.41
Oils & Oleoresins	5263	97696.58	4756	106438.01
Mint products (4)	4452	47232.39	4474	48653.30
Caraway/Fennel	5522	18874.68	10927	19873.07
Tamarind	1263	1994.48	1058	2056.71
Cinnamon	2460	6758.40	2192	7216.82
Asafoetida	1476	77248.14	1441	150361.66
Curry powder/paste	7365	15754.29	7960	20371.97
Herbal spices (5)	5683	7638.88	8206	10956.78
Total	**224393**	**810684.72**	**291542**	**966629.53**
Value in Million US $		**1087.58**		**1207.92**

(1) Include white pepper, light pepper & black pepper
(2) Include aniseed, asafoetida, cinnamon, pepper long, cambodge, herbal spices and spices NES
(3) Include saffron, kokam, vanilla, spices husk/spent and spices NES
(4) Include menthol, menthol crystals and other mint oils.
(5) Include basil, hyssop, rose mary, sage, savory, mint, incl. Leaves (all spices), garcinia and greater galangal etc.

2.2 Arecanut

Arecanut is a commodity, which has a very limited export potential. The bulk of the arecanut production is consumed within the country. However, a small quantity of arecanut is exported mainly meant for the Indian settlers abroad. Arecanut is mainly exported in the form of whole, split, ground and other arecanuts. Majority of the export is in the form of whole arecanut. During 2022-23, export of arecanut has increased substantially and India exported 13765 tonnes of arecanut valued at Rs 485 crores against an export of 6663 tonnes valued at Rs 158.26 crores in 2021-22. Vietnam, UAE, Mayanmar, Maldives etc. are the major export destinations of Indian arecanut.

Table 7. Country-wise export of Arecanut from India

Country	2021-22		2022-23	
	Quantity (tonnes)	Value (Rs. in Lakhs)	Quantity (tonnes)	Value (Rs. in Lakhs)
Vietnam	-	-	4043	15296
UAE	719	2357	2992	9283
Myanmar	365	1036	1828	8460
Bangladesh	1880	1180	3386	8322
Maldives	633	3218	394	1812
Malaysia	1	5	170	1355
USA	205	1260	113	758
Sri Lanka	574	1664	206	699
U K	89	595	88	642
Thailand	896	1649	162	387
Bhutan	60	202	80	244
Australia	33	208	32	219
Canada	33	217	30	202
South Africa	26	160	29	181
Indonesia	654	777	109	107
Congo D. Rep.			17	93
Mauritius	14	70	10	50
Kenya	13	56	10	45
Nepal	15	48	15	44
France	4	22	6	43
New Zealand	6	39	5	38
Tanzania	2	9	6	34

Trinidad	6	31	6	33
Singapore	173	209	4	26
Mozambique	5	19	7	24
Germany	9	70	3	22
Fiji	2	8	3	21
Netherland	4	27	1	9
Saudi Arabia	3	21	1	1
Total (Including others)	**6663**	**15826**	**13765**	**48505**

Source: Deptt. of Commerce, Govt. of India

Table 8. Product-wise export of arecanut from India

Product	2021-22		2022-23	
	Quantity (tonnes)	Value (Rs. in Lakhs)	Quantity (tonnes)	Value (Rs. in Lakhs)
Arecanut, whole	1614	5252	720	3429
Arecanut, split	2665	6111	6872	21801
Arecanut, ground	89	246	2	14
Other arecanuts	2296	4217	6170	23261
Total	**6663**	**15826**	**13765**	**48505**

In 2022-23, India imported 73983 tonnes of arecanut valued at Rs 2051.34 crores against an import of 25979 tonnes valued at Rs 674.08 crores in 2021-22. Usually, arecanut is imported in the form of whole, split, ground and other arecanuts. Sri Lanka and Myanmar are the two major sources of arecanut import in the country. Country-wise import of Arecanut in India during the last two years are given below.

Table 9. Country-wise import of Arecanut in India

Country	2021-22		2022-23	
	Quantity (tonnes)	Value (Rs. in Lakhs)	Quantity (tonnes)	Value (Rs. in Lakhs)
Sri Lanka	10447	32475	16755	48837
Myanmar	7646	20434	32228	88310
Indonesia	6106	10604	17105	46681
UAE	1044	1990	5323	15159
Nepal	422	1077	1923	4908
Malaysia	222	583	375	505
Singapore	93	245	216	560
Total	**25979**	**67408**	**73983**	**205134**

Table 10. Product-wise import of Arecanut in India

Country	2021-22		2022-23	
	Quantity (tonnes)	Value (Rs. in Lakhs)	Quantity (tonnes)	Value (Rs. in Lakhs)
Arecanut, whole	4108	10195	11575	31505
Arecanut, split	3595	8273	18552	50980
Other arecanuts	18276	48941	43856	122649
Total	**25979**	**67408**	**73983**	**205134**

3. Price statistics

The price behaviour of agricultural commodities is an area of major concern for policy makers. Prices of most of the spices commodities like pepper, ginger, turmeric, garlic, cumin, chillies etc. are highly volatile. Price instability affects both producers and consumers and has macro economic implications as well. Bearing this in mind, the Directorate has rightly put one of its mandates as collection, compilation and dissemination of price data of spices and arecanut. Weekend wholesale price data of various spice commodities and arecanut are collected from domestic markets across the country. Agricultural Produce Marketing Committees, Regional offices of the Department of Economics and Statistics, State Dept of Marketing, Spices Board etc. are the major sources of price data. Arrivals and sales were also obtained from marketing centers. Monthly average of the weekend-prices of major spices and arecanut recorded in the important markets in the country during the last two years are tabulated below.

Table 11. Monthly average prices of various major spices and arecanut

(Price Rs/quintal)

Month	Pepper Garbled (Cochin)		Ginger Dry (Cochin)		Chillies (Virudhunagar)	
	2021-22	2022-23	2021-22	2022-23	2021-22	2022-23
April	40209	53486	16000	NA	12750	NA
May	39684	52385				
June	42126	50895	20000			
July	41892	50948	17000	NA	11625	NA
August	41578	51688				
September	41845	51788	17500		10812	
October	44052	50991	17500		10000	
November	51564	50361			10000	
December	53638	51351			10700	
January	51050	51300			9000	
February	51814	50833			11806	
March	53195	50808			12344	
Mean	**46054**	**51403**	**17600**		**13924**	

Table 11 contd.

(Price Rs/quintal)

Month	Turmeric (Chennai)		Garlic (Chennai)		Coriander (Chennai)	
	2021-22	2022-23	2021-22	2022-23	2021-22	2022-23
April	12550	10700	8080	4500	8580	12962
May	12375	10500	7875	4063	8312	13375
June	12417	10666	8917	3666	8250	13166
July	12100	10450	8500	4250	8650	13100
August	11650	10437	8500	4250	9812	13250
September	10712	9400	7750	3250	10125	13400
October	10700	9625	8100	3437	9100	12625
November	10875	9437	8500	4375	9375	12737
December	11875	9700	7750	3600	9100	11400
January	8687	9000	5200	3875	9375	9500
February	11375	8687	4750	5125	10562	8562
March	12500	9100	4750	6700	12000	7950
Mean	**11485**	**9809**	**7389**	**4258**	**9437**	**11836**

Table 11 contd.

(Price Rs/quintal)

Month	Cumin (Chennai)		Fennel (Chennai)		Fenugreek (Chennai)	
	2021-22	2022-23	2021-22	2022-23	2021-22	2022-23
April	15410	25500	11440	16500	7680	8000
May	15400	26875	11200	14000	8150	8550
June	15200	27000	11600	13166	8083	8566
July	15140	27450	12320	15075	8080	8500
August	16250	28000	12475	17825	9250	8333
September	17200	27200	15287	17800	10000	6970
October	16500	27312	14750	20500	9620	7562
November	16875	28000	15500	19937	9450	7750
December	17312	31700	15500	21500	9500	7750
January	20000	37250	15500	22700	9000	9000
February	22375	36750	15800	21625	8825	9250
March	23650	38400	16750	24150	8787	8000
Mean	**17609**	**30120**	**14010**	**18736**	**8869**	**8186**

Table 11 contd.

(Price Rs/quintal)

Month	Tamarind (Chennai)		Ajwan (Chennai)		Mace – Rs/kg (Cochin)	
	2021-22	2022-23	2021-22	2022-23	2021-22	2022-23
April	12900	12600	14000	17540	1485	900
May	14875	13250	14000	17850	1233	900
June	15167	10966	15467	17333	1053	900
July	15200	14800	18400	17400	1223	900
August	12625	12125	18100	16375	1152	900
September	12375	11200	18000	15850	830	900
October	12500	11125	18000	16750	900	900
November	12625	11375	18000	19125	900	945
December	13000	11900	17875	21800	900	1143
January	13562	11500	18400	21500	900	1333
February	13375	13187	17500	20625	900	1028
March	13313	14600	17000	18300	900	1315
Mean	**13460**	**12386**	**17062**	**18371**	**1031**	**1005**

Table 11 contd.

(Price Rs/quintal)

Month	Clove (Cochin)		Nutmeg without shell (Cochin)		Arecanut-Dry (Kozhikode)	
	2021-22	2022-23	2021-22	2022-23	2021-22	2022-23
April	59590	75888	52631	54000	32000	33500
May	60062	76896	47916	52500	36000	34000
June	69217	79775	47384	46875	37000	33000
July	71500	82697	50442	51550	39000	35000
August	71500	83937	48695	55125	39000	37500
September	72261	84687	45239	55826	35250	38500
October	72113	83314	53181	57291	36000	NT
November	71636	83740	55500	57250	36000	30500
December	73566	84000	56400	56285	36000	31000
January	73700	87333	56700	59333	34000	32500
February	72275	77700	58925	59820	32000	32500
March	72210	80333	56324	55574	33000	33500
Mean	**69969**	**80858**	**52445**	**55119**	**35438**	**33772**

4. Quick survey to assess the crop prospects of black pepper

Since advance information about the production in the ensuing harvesting season is of considerable importance from the trade point of view as well as for formulation of future development programmes, the Directorate (DASD) conducted a quick survey in the major pepper growing tracts of Kerala, Karnataka and Tamil Nadu to estimate the expected production of black pepper in the country during 2022-23. The field visits in pepper plantations were conducted during the months of October and November 2022. The information was collected through personal interview of the farmers, based on a pre-designed interview schedule, in the major pepper growing districts of these States. The field was then visited to see if the information corroborates with the actual stand of the crop. The sample size was fixed in proportion to the area under cultivation in each district. The pepper gardens were selected from the list of pepper cultivators available at respective Krishi Bhavans in Kerala and office of Assistant Director of Horticulture (ADH) in Karnataka and Tamil Nadu. Krishi Bhavans under Department of Agriculture have helped in data collection in Kerala and Horticulture Dept have helped in data collection in Karnataka and Kerala. As per the survey, the production of pepper in Karnataka registered a marginal decline and that in Kerala and Tamil Nadu registered an increase compared to the previous year.

Pepper Survey 2022- Karnataka

Pepper Survey 2022- Tamil Nadu



Pepper Survey 2022- Kerala




5. Workshop on Horticulture Statistics for North –Eastern states

A one-day Workshop on Horticulture Statistics for North-Eastern States to streamline the procedure of area and production estimation of horticulture crops in eight North-Eastern States including Sikkim was held at Assam Agricultural University, Jorhat, Assam on 24.08.2022. On behalf of the Horticulture Statistics Division, Department of Agriculture & Farmers Welfare, Government of India, the Directorate of Arecanut and Spices Development (DASD) organized the Workshop in association with Assam Agricultural University, Jorhat

Major Decisions:

- Issue letter to all State Horticulture Statistics Authorities (SHOSA) in NE-States requesting them to coordinate with the respective State AYUSH Mission/ State Medicinal Plant Boards for making necessary arrangements for data sharing related to Area and Production of Medicinal Plants for including the same in the Horticulture Area and Production Data. Also write to National Medicinal Plant Board/ AYUSH Ministry and State Medicinal Plant Boards in this regard.
- All the NE States unanimously requested for a uniform methodology specially designed for the NE States considering its geographical situations. Further steps in this regard will be initiated by HSD, DA&FW.
- The methodology document earlier submitted by the NE States will be shared to SHOSA for necessary updation.
- A meeting through Video Conferencing will be conducted with each of the NE States before finalizing the estimates for 2021-22, probably in the month of November 2022.

After the State-level presentation and discussions, the Horticulture Statistics Division, DA&FW made a demonstration of HAPIS Portal, giving special emphasis to provisions for addition of new crops, generation of reports, etc.

It was agreed by HSD that the issues faced by some of the States for using HAPIS portal such as log-in issues, addition of newly formed districts under respective States, etc. will be taken up with NIC.

In the concluding session, all the participants thanked HSD, DA&FW and DASD for recognizing the specific issues and challenges faced by the North-Eastern States and organizing this special workshop for North-Eastern States. They further suggested to have follow-up workshops/ sessions both physically and virtually to take forward the decisions taken during the Workshop.

Workshop on Horticulture Statistics for North-East

4. PUBLICITY

An important aspect of the scientific process is the broadcasting of new results and innovations through publication of Journals, so that the information is disseminated to the larger community.

Transfer of technology plays a vital role as a catalyst for further development which is one of the main mandates of the Directorate. With a view of achieving our target to make the agricultue production system in the country more robust through effective publicity, the Directorate brought out several publications on mandatory crops in English, Hindi and Malayalam and have also participated in various exhibitions during the year.

1. Publications

Indian Journal of Arecanut, Spices and Medicinal Plants

The Directorate publishes a quarterly journal the "Indian Journal of Arecanut, Spices and Medicinal Plants", which has wide circulation among farmers, extension workers, scientists, exporters, industrialists and other stakeholders etc. The journal contains popular articles authored by eminent scientists on adoption of scientific cultivation, processing and marketing aspects of arecanut, spices, medicinal and aromatic plants, thereby providing information on latest technology in the field of Agriculture. Quarterly market reviews, price statistics, area and production statistics, forecast on farm operations etc. are also featured regularly in the journal. Annual subscription for this Journal is Rs.200/-.

Fig. 1. Cover pages of published journals

2. Participation in Exhibitions

Participation in Agriculture Exhibitions and Krishi Melas is an important programme of the Directorate for promotion of cultivation of various spices and dissemination of advanced technologies in crop production all over the country. Usually the Directorate will put up stalls exhibiting banners and display boards depicting various activities of the Directorate and descriptions about various spices. During such exhibitions live spices, dry spices, oleoresins, leaflets, Journals and other publications are also displayed especially for the farming community. During the year, this Directorate participated in the following exhibitions :-

1) Exhibition conducted from 9th to 12th October, 2022 at Deenadayal Sodh Sansthan, Chitrakoot, Madhya Pradesh, organised by the Ministry of Agriculture and Farmers Welfare (Govt. of India), New Delhi.

A view of the DASD's stall

2) Participated in the Value Chain Function held on 9th November, 2022 at Pune, Maharashtra, organised by the Ministry of Agriculture and Farmers Welfare (Govt. of India), New Delhi.

Shri Narendra Singh Tomar, Hon'ble Minister of Agriculture and Farmers Welfare visiting the Directorate's stall

A view of DASD's stall

3) Participated in the Mega Event Krishi Mela and Agri. Exhibition held from 11th to 13th November, 2022 in Morena, Madhya Pradesh. This exhibition was organised by the Ministry of Agriculture and Farmers Welfare (Govt. of India), New Delhi.

Public visiting DASD's stall

4) Participated in the VENGERI AGRI FEST 2022 from 22nd to 31st December, 2022 at the Agricultural Urban Wholesale Market, Vengeri, Kozhikode, organized by the State Agriculture Department, Government of Kerala.

Public visiting DASD's stall

5) The Directorate participated in the Krishi Mahostav: Pradarshani Evam Prashikshan Exhibition from 24th to 25th January, 2023 at Kota, Rajasthan organized by Ministry of Agriculture and Farmers Welfare, New Delhi.

Public visiting DASD's stall

6) The Directorate participated in VAIGA - Value Addition International Expo cum Work-shop on value chain development in agriculture conducted by Department of Agriculture, Kerala at Kanakakunnu, Thiruvananthapuram from 25th February to 2nd March, 2023.

Public visiting DASD's stall

5. OFFICIAL LANGUAGE

राजभाषा कार्यान्वयन

भारत सरकार की राजभाषा नीति को प्रभावपूर्ण ढंग से कार्यान्वयन करने में सुपारी और मसाला विकास निदेशालय सदा सक्रिय है। निदेशालय के 80 प्रतिशत से अधिक कर्मचारी हिंदी में कार्यसाधक ज्ञान प्राप्त कर लिए हैं। इसके अनुसार निदेशालय राजभाषा नियम 10 के उप नियम (4) के अंतर्गत भारत सरकार के राजपत्र में अधिसूचित किया गया है।

राजभाषा कार्यान्वयन समिति

राजभाषा से संबंधित नियमों का अनुपालन सुनिश्चित करने एवं कार्यान्वयन में तेज़ी लाने के उद्देश्य से निदेशालय में राजभाषा कार्यान्वयन समिति गठित की गई है। हर अनुभाग के अध्यक्ष इसमें सदस्य है।

डॉ होमी चेरियान	निदेशक	अध्यक्ष
डॉ.फेमिना	उप निदेशक	सदस्य
श्री.बाबुलाल मीणा	उप निदेशक	हिंदी संपर्क अधिकारी
श्रीमती.सी.वी.दिव्या	सहायक निदेशक	सदस्य
श्री. सी.सनमुख सुंदरम	अधीक्षक	सदस्य
श्री.के.मनोज कुमार	साँख्यकीय अन्वेषक	सदस्य
श्री.के.वी.राजेश	अवर श्रेणी लिपिक	सदस्य
डॉ.पी.एन.ज्योति	कनिष्ठ अनुवाद अधिकारी	सदस्य-सचिव

राजभाषा के प्रयोग की समीक्षा करने के लिए इस समिति की बैठकें हर तिमाही में आयोजित की जाती है। हिंदी के प्रयोग को उत्तरोत्तर बढ़ाने के लिए प्रत्येक अनुभाग के सदस्यों को नियमों के अनुसार निर्धारित लक्ष्य पाने का सुझाव दिया जाता है। बैठक का कार्यवृत्त मंत्रालय के हिंदी अनुभाग, बागवानी प्रभाग, राजभाषा विभाग के क्षेत्रीय कार्यान्वयन कार्यालय और नगर राजभाषा कार्यान्वयन समिति को नियमित रूप से भेज दिया जाता है।

राजभाषा नियम 1976 के धारा 3(3) का अनुपालन

निदेशालय में राजभाषा नियम 1976 के धारा 3(3) का शत प्रतिशत अनुपालन किया जाता है। कार्यालय आदेश, परिपत्र, कार्यालय ज्ञापन आदि द्विभाषी रूप में जारी किए जाते हैं। कार्यालय में पूर्णतः हिंदी-अंग्रेज़ी द्विभाषी मोहरों का प्रयोग किया जाता है। अधिकारियों और अनुभागों के नाम पट्ट, सूचना बोर्ड, कार्यालय वाहन, बैनर आदि द्विभाषी रूप में है। रजिस्टरों और सेवा पंजियों में प्रविष्टियाँ हिंदी में की जाती है। निदेशालय का नाम बोर्ड मलयालम-हिंदी-अंग्रेज़ी त्रिभाषी रूप में है। हिंदी में प्राप्त पत्रों का उत्तर शत प्रतिशत हिंदी में ही दिया जाता है।

आज का शब्द

कर्मचारियों के बीच हिंदी में प्रयुक्त शब्द एवं वाक्यांशों का परिचय देने के उद्देश्य से व्हाइट बोर्ड पर हर दिन अंग्रेज़ी के समानार्थक एक हिंदी शब्द / वाक्यांश लिखा जाता है। हिंदी पखवाड़ा के दौरान इन शब्दों एवं वाक्यांशों के आधार पर प्रतियोगिता चलाकर विजेताओं को पुरस्कार दिया जाता है।

हिंदी दिवस/ पखवाड़ा

कार्यालय में हिंदी के प्रयोग के लिए अनुकूल वातावरण बनाने के उद्देश्य से हर वर्ष निदेशालय में हिंदी दिवस/ पखवाड़ा आयोजित किया जाता है। इस वर्ष मंत्रालय से प्राप्त निर्देशों के अनुसार 14-15, सितंबर, 2022 को सूरत (गुजरात) में राजभाषा विभाग द्वारा आयोजित हिंदी दिवस उद्घाटन समारोह और द्वितीय अखिल भारतीय राजभाषा सम्मेलन में कनिष्ठ अनुवाद अधिकारी भाग लिया। निदेशालय में 19-30 सितंबर, 2022 तक हिंदी पखवाड़ा आयोजित किया गया। सभी अनुभागों में और कार्यालय के अन्य प्रमुख स्थानों पर कृषि मंत्री द्वारा हिंदी पखवाड़ा के दौरान जारी किए गए अपील का प्रदर्शन किया गया। कर्मचारियों को हिंदी के प्रयोग के लिए प्रेरणा एवं प्रोत्साहन देने के उद्देश्य से पखवाड़े के दौरान हिंदी में विभिन्न प्रतियोगिताएँ आयोजित की गई। निबंध लेखन, टिप्पण-आलेखन, टंकण, व्याकरण, वर्तनी, हस्तलिपि, श्रुतलेखन, अंताक्षरी, हिंदी पढ़न आदि प्रतियोगिताएँ चलाई गई। राजभाषा से संबंधित प्रश्नों को शामिल करते हुए हिंदी में प्रश्नोत्तरी कार्यक्रम चलाया गया।

हिंदी पखवाड़ा का समापन समारोह डॉ.होमी चेरियान, निदेशक की अध्यक्षता में संपन्न हुआ। उन्होंने अपने अध्यक्षीय भाषण में हर अनुभाग में अधिकाधिक पत्राचार हिंदी में करके निर्धारित लक्ष्य प्राप्त करने का अनुरोध किया। इस अवसर पर उन्होंने हिंदी प्रतियोगिताओं के विजेताओं को पुरस्कार वितरण किया।

हिंदी कार्यशाला

कर्मचारियों को हिंदी के प्रयोग में प्रशिक्षण देने के उद्देश्य से 08-06-2022 को एक-दिवसीय हिंदी कार्यशाला आयोजित किया गया। इसमें श्री. रामचंद्रन, उप निदेशक (राजभाषा), (सेवा निवृत्त) आयकर विभाग, कालिकट ने हिंदी के सरल प्रयोग और व्याकरण के विषय पर क्लास चलाया और अभ्यास कराया। राजभाषा विभाग द्वारा तिरुवनंतपुरम में दिनांक 27.01.2023 को आयोजित क्षेत्रीय राजभाषा सम्मेलन में कनिष्ठ अनुवाद अधिकारी भाग लिया।

नगर राजभाषा कार्यान्वयन समिति की सदस्यता

कालिकट नगर राजभाषा कार्यान्वयन समिति के तत्वावधान में आयोजित प्रत्येक कार्यक्रम में निदेशालय सक्रिय रूप से भाग ले रहा है। इसकी हर अर्धवार्षिक बैठकों में निदेशक और हिंदी अनुवाद अधिकारी नियमित रूप से भाग ले रहे हैं। समिति द्वारा आयोजित संयुक्त हिंदी पखवाड़ा के कार्यक्रमों में हिंदी अनुवाद अधिकारी भाग लिया।

हिंदी प्रकाशन

निदेशालय द्वारा प्रकाशित '*इंडियन जर्नल ऑफ अरीकनट, स्पाइसेस एण्ड मेडिसिलनल प्लान्ट्स* ' नामक त्रैमासिक पत्रिका में विभिन्न मसाला फसलों पर आधारित वैज्ञानिक लेख, कृषि क्रियाएँ, मसालों के बाज़ार मूल्य की समीक्षा आदि नियमित रूप से हिंदी में प्रकाशित किए जाते हैं।

प्रोत्साहन योजना

कार्यालयीन काम मूल रूप से हिंदी में करने के लिए कर्मचारियों को प्रेरणा देने के लिए लागू किए गए नकद पुरस्कार योजना और हिंदी में टंकण करने के लिए प्रोत्साहन भत्ता योजना का कार्यान्वयन निदेशालय में किया गया है। दोनों योजनाओं में कर्मचारियाँ सक्रिय रूप से भाग ले रहे हैं।

***