वार्षिक रिपोर्ट
ANNUAL REPORT | 2021-22

सत्यमेव जयते

सुपारी और मसाले विकास निदेशालय
कृषि और किसान कल्याण मंत्रालय
कृषि एवं किसान कल्याण विभाग
भारत सरकार, कालीकट- 673005, केरल

Directorate of Arecanut and Spices Development
Ministry of Agriculture & Farmers Welfare
Department of Agriculture & Farmers Welfare
Government of India
Calicut - 673005, Kerala, India

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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 2021-22

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

The Directorate of Arecanut and Spices Development (DASD), a subordinate office under Department of Agriculture and Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India, has the distinction of successfully implementing Central Sector Schemes on Spices, Arecanut, Medicinal and 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 encourage 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 in the country. The Directorate also 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.

The integrated approach adopted for implementing NHM/MIDH programmes helped the objectives of enhanced production and productivity of spices and reflected in the official statistics of area and production of spices in the country. Production of spices, which was 3.90 million tonnes from an estimated area of 2.35 million ha during the year 2005-06 has increased to around 11.16 million tonnes from 4.36 million ha in 2021-22. This surge in production has made available enough exportable surplus of quality spices, due to which export of spices has increased tremendously during the same period from 3.50 lakh tonnes (valued at Rs 2628 crores) to 15.31 lakh tonnes (valued at Rs 30576 crores). This gives me immense satisfaction in bringing out the Annual Report of the Directorate for the year 2021-22.

The Report depicts all the activities undertaken by the Directorate to improve the spices production scenario at National level. Augmenting production of good quality planting materials across the country had been one of the major programmes of the Directorate. Other programmes include dissemination of technologies through frontline demonstration, farmers training programmes, skill development trainings, seminars / workshops, accreditation of nurseries etc.

I take this opportunity to thank Dr. S K Malhotra and Dr. Prabhat Kumar, who served as Horticulture Commissioners during the period under report, 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 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 development 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.

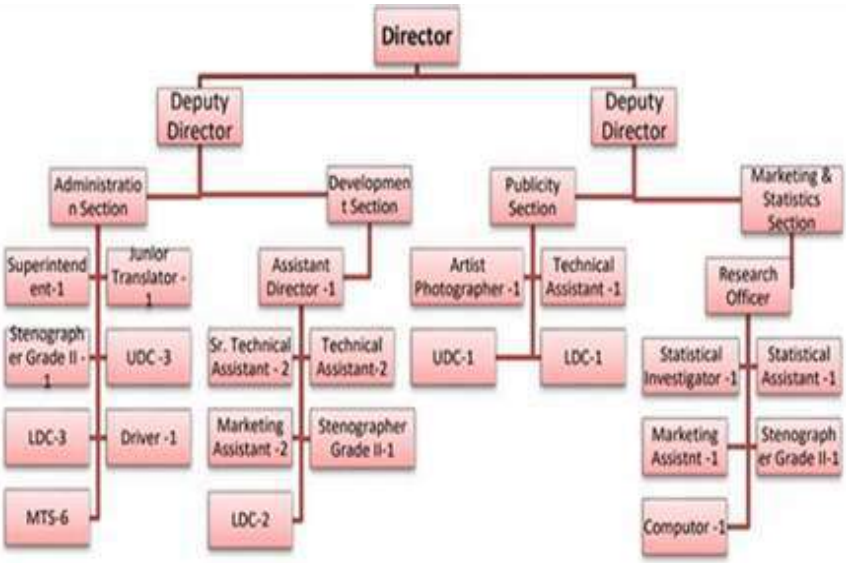


Fig. 2. Organizational Structure

3. Staff

a. Staff strength as on 31-03-2022

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	-
8.	Junior Translator	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	03
15.	Upper Division Clerk	C	04	03
16.	Lower Division Clerk	C	06	03
17.	Staff Car Driver (OG)	C	01	01
18.	Multi Tasking Staff	C	06	05
	TOTAL		**39**	**28**

b. Staff in position as on 31-03-2022

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.	Shri. K. Manojkumar	Statistical Investigator
7.	Dr. P.N. Jyothi	Junior Translator
8.	Shri. C.F.Gedam	Artist Photographer
9.	Smt. M.K. Suma	Technical Assistant
10.	Smt. K. Thejas Das	Technical Assistant
11.	Smt. K. Ushakumari	Marketing Assistant
12.	Smt. K.S.Kanchana	Marketing Assistant
13.	Smt. Sruthi Sreekumar	Statistical Assistant
14.	Shri. P.R. Anil Kumar	Stenographer Grade II
15.	Shri. O.P. Haridasan	Stenographer Grade II
16.	Shri. M.P. Unnikrishnan	Stenographer Grade II
17.	Shri. P.Vinod Kumar	Upper Division Clerk
18.	Shri. P. Baiju	Upper Division Clerk
19.	Shri. K.V. Rajesh	Upper Division Clerk
20.	Shri. Palash Kanti Mollick	Lower Division Clerk
21.	Shri. T. Srikumar	Lower Division Clerk
22.	Shri. Satish Kumar	Lower Division Clerk
23.	Shri. Ranjith M	Staff Car Driver
24.	Shri. E.Ajithkumar	Multi Tasking Staff
25.	Shri. K.S. Santhos	Multi Tasking Staff
26.	Shri. K.V.Chandran	Multi Tasking Staff
27.	Shri. T. Pramoth Kumar	Multi Tasking Staff
28.	Shri. L.Sujeesh	Multi Tasking Staff

4. Plan and non-plan budget

a. Non-plan budget for 2021-22

Particulars of sub-head and name of the scheme etc. 1/2401	Sanctioned budget (Rs in lakhs)	Expenditure (Rs. in lakhs)
570101- Salaries	323.00	279.76
570102- Wages	1.00	1.03
570106 - Medical treatment	5.00	0.29
570111- Domestic Travel Expenses	13.00	6.84
570133- Office Expenses	27.25	11.20
570116- Publications	7.50	1.77
570126- Advertising & Publicity	1.25	0.00
570127- Minor Works	49.60	28.86
5596-Swchhata Action Plan	2.50	0.62
Total	**430.10**	**330.37**

(b) Plan budget under Mission for Integrated Development of Horticulture (MIDH) 2021-22

Particulars of Sub-Head and name of the Scheme etc.	Sanctioned budget (Rs. in lakhs)	Expenditure (Rs. In lakhs)
MIDH	1200	1178

5. Right to Information (RTI) in DASD

During the year 2021-22, the Directorate received requests under various provisions of RTI Act 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 is 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
12	12	NIL	NIL

6. Vigilance Awareness Week

In accordance with the instructions received from the Ministry, Vigilance awareness week 2021 was observed in the Directorate during the period from 26th October to 1st November, 2021. Posters and Banners were prepared and displayed in prominent places of the Directorate. On 26th October, 2021 all the Officers and staff assembled in the Office. Smt C. V. Divya, Assistant Director,

DASD addressed the staff explaining the importance of eradicating corruption and to raise public awareness regarding the threat caused by corruption. Afterwards, the Assistant Director administered the integrity pledge to all the staff at 11.00 am on 26th October, 2021.

On 1st November, 2021, a workshop on Vigilance Awareness was organized in this Directorate. Shri Ganesh Kumar, Circle Inspector of Police, Vigilance and Anti Corruption Bureau (Special Cell), Kozhikode, gave detailed lecture on vigilance awareness with the support of Power Point Presentation in this Directorate and officers and staff attended the workshop.

Fig. 3. Banner displaying Vigilance Awareness Week

Fig. 4. Shri Ganesh Kumar, Circle Inspector of Police, Vigilance, Anti-Corruption Bureau (Special Cell), Kozhikode taking class

Fig.5. Integrity pledge by the staff

7. Sadbhavana Diwas

"Sadbhavana Diwas" was observed on 20th August, 2021 on the birth anniversary of former Prime Minister (Late) Shri. Rajiv Gandhi. All officials 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, 2021 on the birth anniversary of Sardar Vallabhabhai Patel and all officials were gathered and took Rashtriya Ekta Diwas Pledge on 31st October, 2021.

9. One day awareness programme on Sexual Harassment Act

In accordance with the instructions received from the Ministry, one day awareness programme on Sexual Harassment Act was conducted in the Directorate on 9th December 2021 at 03.00 PM.

Smt A.R. Vidya, Assistant Professor, KMCT Law College, Kuttipuram, had conducted a class on Sexual Harassment of women at work place (prevention, prohibition and redressal) Act 2013. All the officers and staff attended the class. Shri Babulal Meena, Deputy Director, welcomed the gathering, Smt C V Divya, Assistant Director, has extended the vote of thanks and the programme ended at 05.00 PM.

10. Swachhta Pakhwad 2021

In accordance with the instructions received from the Ministry, Swachhta Pakhwada 2021 was observed from 16th to 31st December, 2021 in this Directorate. A webinar on Swachhata Pakhwada had been conducted on 20.12.2021 (Monday at 4.00 PM) under the Chairmanship of Joint Secretary (Admin), Govt. of India. Officials of DASD had attended this webinar. All staff had taken pledge on 23.12.2021 at 11.00 AM. Swachhata Message had been displayed in the website of the Directorate. Cleaning activities were carried out in the office premises on 23.12.2021. Extensive exercise of weeding out of old files was carried out on 30/12/2021.

2. DEVELOPMENT PROGRAMMES

The Directorate has the national mandate for the development of Arecanut, Spices (other than Cardamom), Betel vine and Aromatic plants. Arecanut, Spices, Betelvine and Aromatic Plants 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 Central 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. The objective of the Mission based approach was to give impetus to encourage growth in spices production so as to double the production by 2010. 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.

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 Governments 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 use in the planning process.

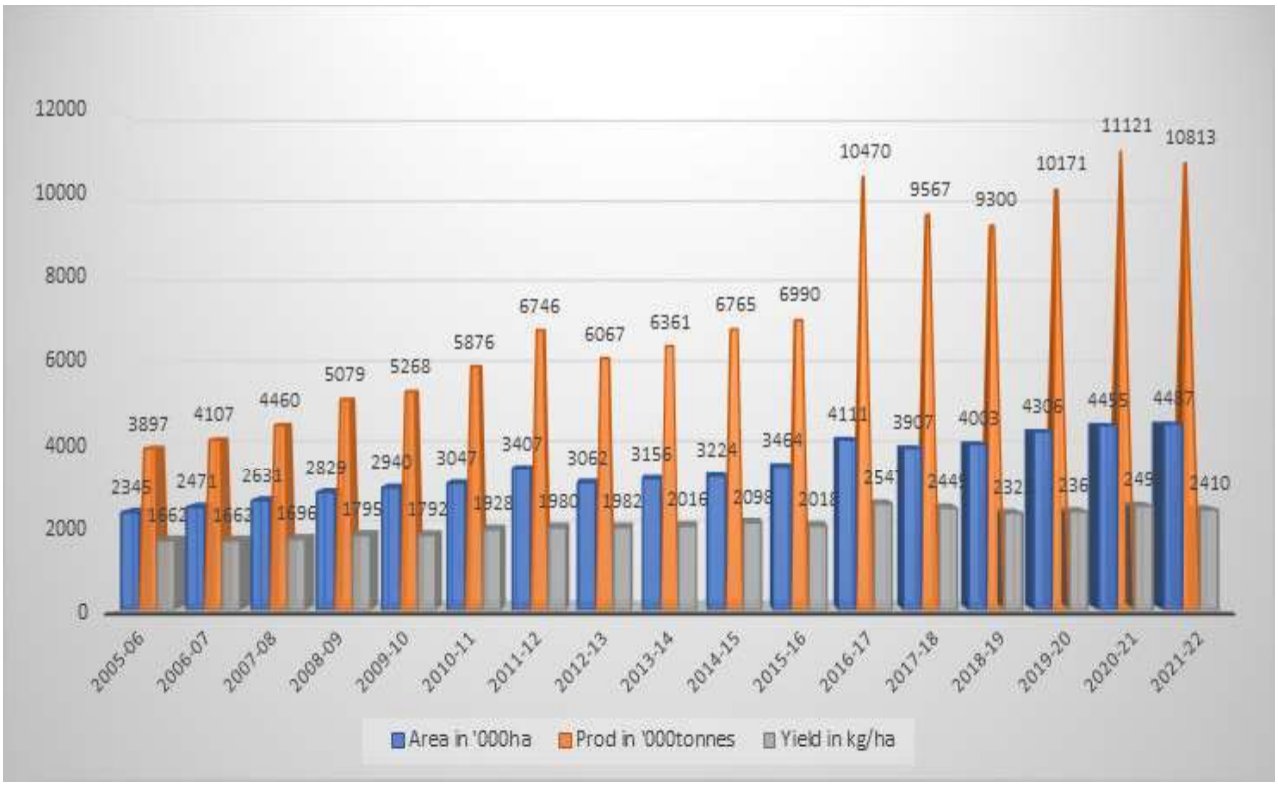
1.2 Strategies identified for development of Spices and Aromatic Plants under MIDH

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. 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 have helped tremendously in achieving spectacular growth in production of spices. During the period of NHM/MIDH, from 2005-06 to 2021-22, the area of spices has increased from 23.45 lakh ha to 44.87 lakh ha and production from 38.97 lakh tonnes to 108.13 lakh tonnes with a CAGR of 4.14% and 6.59% respectively. Productivity has also increased to the tune of 2.35%.

Growth in area and production of Spices in India



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.
- Quality regulation of the private and public sector nurseries is also thrust area of the Directorate, which is ensured through nursery accreditation programme.
- 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 & 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.

2. Development Programmes taken up by DASD under MIDH during 2021-22

The activities of the Directorate during the year 2021-22 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 mandate 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 2021-22, the Directorate implemented the NHM programmes with an outlay of Rs.12.00 crores for the development of Spices and Aromatic Plants.

Table 1. Major programmes implemented and achievements made during 2021-22 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	8.000	24.495	195.960	24.000	194.275
2	Ginger rhizomes	Qty in tones	0.300	192.700	57.810	192.700	57.810
3	Ginger Protray seedlings	Nos in lakhs	1.200	3.975	4.770	3.975	4.770
4	Turmeric rhizomes	Qty in tones	0.300	577.000	173.100	577.000	173.100
5	Turmeric protray seedlings	Nos in lakhs	1.200	5.475	6.570	5.475	6.570
6	Chilli seeds	Qty in (qtls)	0.750	32.050	24.038	32.050	24.038
7	Seed spices	Qty in tones	0.400	162.500	65.000	162.500	65.000
8	Garlic	Qty in tones	0.500	81.500	40.750	81.500	40.750
9	Bush Pepper	Nos in lakhs	40.000	0.395	15.800	0.395	15.800
10	Tree spices grafts / seedlings						
i.	Nutmeg grafts Orthotropic)	Nos in lakhs	140.000	0.067	9.310	0.067	9.310
ii.	Nutmeg grafts (Plagiotropic)	Nos in lakhs	80.000	0.495	39.600	0.495	39.600
iii	Tamarind / Kokum grafts	Nos in lakhs	20.000	1.615	32.300	1.615	32.300
iv	Clove /Allspice seedlings	Nos in lakhs	20.000	0.307	6.140	0.307	6.140
v	Cinnamon /Cassia / Curry leaf seedlings	Nos in lakhs	5.000	4.342	21.710	4.342	21.710
11	Aromatic Plants	Ha.	0.750	60.000	45.000	60.000	45.000
12	Nursery Centre for spices and Aromatic Plants	Nos	15.000	3.000	45.000	3.000	45.000
13	Upgradation of spice nurseries	up to 10 lakhs/4ha	up to 10 lakhs/4ha				
14	Seed processing and storage infrastructure	10 lakh/unit	10.000	5.000	50.000	5.000	50.000
15	Production of nucleus planting material of Betelvine in Bundelkhand region of Uttar Pradesh	Nos		1.000	15.600	1.000	15.600
16	Estt of Large Cardamom nursery	Nos		2.000	10.000	1.000	5.000
	Sub Total				**858.458**		**851.772**

II	**Accreditation of spice nurseries**	LS		25.000	3.000	20.000	0.046
III	**Technology Dissemination through Frontline Demonstration**						
i.	Organic Farming Spices	Nos in ha	0.60/1.00	25.000	25.000	25.000	25.000
ii.	Maintenance of demonstration plots of pepper established during 2020-21	Nos in ha	0.200	50.000	10.000	50.000	10.000
	Estt of Demo plots for Chilli	Nos in ha	0.500	15.000	7.500	15.000	7.500
iii.	Demonstration plots of seed spices	Nos in ha	0.400	64.000	25.600	64.000	25.600
iv.	Demonstration plots of aromatic plants	Nos in ha	0.800	46.000	36.800	46.000	36.800
v	On farm water management by micro irrigation	Nos in ha	LS	43.000	19.650	43.000	19.650
vi.	Multi species cropping in Arecanut Gardens in karnataka (Nutmeg)	Nos in ha	LS	2.000	3.390	2.000	3.390
vii.	Multi species cropping in Arecanut Gardens in Karnataka (Cocoa)	Nos in ha	LS	2.000	2.550	2.000	2.550
viii	Demonstration of Arecanut Dwarf Hybrids	Nos in 0.5 acre	LS	2.000	1.750	2.000	1.750
ix	Demonstration of Fruit rot disease management in areanut using mandipropamid fungicide	Nos in ha	LS	3.000	3.990	3.000	3.990
x	Participatory Demonstration Plots of Cinnamon intercropping in coconut	Nos in ha	LS	25.000	30.000	25.000	30.000
xi	Demonstration of Entomopathogenic nematode in Arecanut	Nos in acre	LS	4.000	4.740	4.000	4.740
xii	Demonstration of integrated mgt of inflorescence dieback disease in Arecanut	Nos in acre	LS	3.000	4.250	3.000	4.250
xiii	Demonstration of disease free ginger seed production using microrhizomes and IDM at multiple locations	Nos in acre	LS	25.000	8.240	25.000	8.240
xiv							
	Sub total				**183.460**		**183.460**
IV	**Project based programmes**						
a.	Hi tech prod system for quality disease free seed rhizomes of Turmeric and Ginger		LS	1.000	5.000	1.000	5.000

b.	Scaling up of microrhizome technology based ginger seed production	LS	LS		21.550		21.550
c.	Establishment of essential Oil Distillation Unit	Nos	LS	2.000	7.000	2.000	7.000
	Sub Total				**33.550**		**33.550**
V	**Transfer of Technology programmes**						
a.	District Level Seminar Workshops	Nos	2.000	1.000	2.000	1.000	2.000
b.	Farmers Training programme	Nos	0.750	61.000	45.750	61.000	45.750
	Sub Total				**47.750**		**47.750**
VI	**Skill Development Schemes**	Nos in lakhs	LS	3.000	12.315	3.000	12.315
VII	**T S G (Monitoring, Evaluation, Mass Media, Publicity etc)**			LS	4.000		0.048
VIII	**Mission Management**				57.468		49.998
	GRAND TOTAL				**1200.000**		**1178.938**

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 spice crops. 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 2021-22 also with a financial outlay of 851.77229 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

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 24.00 lakhs of planting materials were produced and distributed with a financial utilization of Rs.194.27 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:-

Table 2. Planting material production of black pepper 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	2.400
2	Banda Agricultural University, UP	0.500	4.000
3	Bidhan Chandra Krishi Vishwavidyalaya, WB	0.800	6.400
4	ICAR - Central Island Agricultural Research Institute, Port Blair	0.200	1.600
5	Central Agricultural University, Manipur	0.050	0.400
6	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	2.500	20.000
7	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	0.400	3.200
8	ICAR - Central Coastal Agricultural Research Institute, Goa	0.250	2.000
9	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	0.100	0.800
10	ICAR - Indian Institute of Spices Research, Kozhikode, Kerala	1.250	10.000
11	Kerala Agri University, Thrissur, Kerala	7.500	60.000
12	Navsari Agri University, Gujarat	0.025	0.200
13	Orissa University of Agriculture and Technology, Bhubaneshwar, Orissa	0.220	1.760
14	Tamil Nadu Agricultural University, Tamil Nadu	4.000	32.000
15	University of Agriculture and Horticulture Sciences, Shimoga, Karnataka	3.100	24.800
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, WB	1.000	8.000
20	Directorate of Arecanut and Spices Development, Calicut	0.450	3.115
	Total	**24.000**	**194.270**

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.

2.1.2 Ginger

The Directorate produced and distributed 192.7 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.57.81 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 2021-22 (University-wise)

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. In lakhs)
1	Assam Agri University, Assam	10.000	3.000
2	Banda Agricultural University, UP	1.000	0.300
3	Bidhan Chandra Krishi Vishwavidyalaya, WB	5.000	1.500
4	Birsa Agricultural University, Ranchi, Jharkhand	5.000	1.500
5	ICAR - Central Island Agricultural Research Institute, Port Blair	5.000	1.500
6	Central Agricultural University, Manipur	7.000	2.100
7	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	6.000	1.800
8	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	13.000	3.900
9	Dr. Y S Parmar University of Horticulture and Forestry, HP	2.000	0.600
10	Dr YSR Horticulture University, Andhra Pradesh	1.000	0.300
11	ICAR - Central Coastal Agricultural Research Institute, Goa	5.000	1.500
12	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	15.000	4.500
13	ICAR - Indian Institute of Spices Research, Kozhikode, Kerala	5.000	1.500
14	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, MP	2.000	0.600
15	Kerala Agri University, Thrissur, Kerala	6.200	1.860
16	Vasantrao Naik Marathwada Agriculture University, Parbani, Maharashtra	8.000	2.400
17	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	10.000	3.000
18	Orissa University of Agriculture and Technology, Bhubaneshwar, Orissa	7.000	2.100
19	Dr. Rajendra Prasad Central Agriculture University, Bihar	2.000	0.600
20	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, MP	5.000	1.500
21	Sri Konda Laxman Telangana State Horticulture University, Telangana	15.000	4.500
22	Tamil Nadu Agricultural University, Tamil Nadu	1.500	0.450
23	University of Agriculture and Horticulture Sciences, Shimoga, Karnataka	35.000	10.500

24	University of Agriculture Sciences, Bangalore, Karnataka	2.000	0.600
25	University of Agriculture Sciences, Dharwad, Karnataka	10.000	3.000
26	University of Horticulture Sciences, Bagalkot, Karnataka	2.000	0.600
27	Uttar Banga Agricultural University, Pundibari, WB	7.000	2.100
	Total	**192.700**	**57.810**

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, 3.975 Lakhs ginger protray seedlings were produced and distributed under this programme, utilizing a financial assistance of Rs.4.77 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	0.100	0.120
2	Central Agricultural University, Manipur	1.500	1.800
3	ICAR - Central Coastal Agricultural Research Institute, Goa	0.200	0.240
4	Kerala Agri University, Thrissur, Kerala	0.325	0.390
5	Sri Konda Laxman Telangana State Horticulture University, Telangana	0.500	0.600
6	University of Agriculture Sciences, Dharwad, Karnataka	0.250	0.300
7	University of Horticulture Sciences, Bagalkot, Karnataka	1.100	1.320
	Total	**3.975**	**4.770**

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.25,000/- tonnes of turmeric seed rhizomes produced. By the implementation of the programme, 577 tonnes of turmeric seed rhizomes were produced and distributed and Rs.173.10 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, Gujarat	8.000	2.400
2	Assam Agri University, Assam	10.000	3.000

3	Banda Agricultural University, UP	10.000	3.000
4	Bidhan Chandra Krishi Vishwavidyalaya, WB	35.000	10.500
5	Birsa Agricultural University, Ranchi, Jharkhand	12.000	3.600
6	Choudhary Charan Singh Haryana Agriculture University, Hissar, Haryana	3.000	0.900
7	ICAR - Central Island Agricultural Research Institute, Port Blair	2.000	0.600
8	Central Agricultural University, Manipur	13.000	3.900
9	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	20.000	6.000
10	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	40.000	12.000
11	Dr. Y S Parmar University of Horticulture and Forestry, HP	2.000	0.600
12	Dr YSR Horticulture University, Andhra Pradesh	31.000	9.300
13	ICAR - Central Coastal Agricultural Research Institute, Goa	8.000	2.400
14	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	40.000	12.000
15	ICAR - Indian Institute of Spices Research, Kozhikode, Kerala	10.000	3.000
16	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, MP	5.000	1.500
17	Kerala Agri University, Thrissur, Kerala	16.000	4.800
18	Vasantrao Naik Marathwada Agriculture University, Parbani, Maharashtra	25.000	7.500
19	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	15.000	4.500
20	Narendra Dev University for Agriculture and Technology, Ayodhya, UP	6.000	1.800
21	Navsari Agri University, Gujarat	18.000	5.400
22	Orissa University of Agriculture and Technology, Bhubaneshwar, Orissa	7.000	2.100
23	Punjab Agricultural University, Ludhiana, Punjab	35.000	10.500
24	Dr. Rajendra Prasad Central Agriculture University, Bihar	50.000	15.000
25	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, MP	13.000	3.900
26	Sri Konda Laxman Telangana State Horticulture University, Telangana	16.000	4.800
27	Tamil Nadu Agricultural University, Tamil Nadu	32.000	9.600
28	University of Agriculture and Horticulture Sciences, Shimoga, Karnataka	20.000	6.000
29	University of Agriculture Sciences, Bangalore, Karnataka	10.000	3.000
30	University of Agriculture Sciences, Dharwad, Karnataka	30.000	9.000
31	University of Horticulture Sciences, Bagalkot, Karnataka	5.000	1.500

32	Uttar Banga Agricultural University, Pundibari, WB	30.000	9.000
	Total	**577.000**	**173.100**

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, 5.475 Lakhs turmeric protray seedlings were produced and distributed, utilizing a financial assistance of 6.57 lakhs during this year. Following implementing agencies implemented this programme in 2021-22.

Table 6. Turmeric 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 Agricultural University, Assam	0.100	0.120
2	Central Agricultural University, Manipur	1.500	1.800
3	ICAR - Central Coastal Agricultural Research Institute, Goa	0.200	0.240
4	Kerala Agri University, Thrissur, Kerala	0.075	0.090
5	Sri Konda Laxman Telangana State Horticulture University, Telangana	2.000	2.400
6	University of Horticulture Sciences, Bagalkot, Karnataka	1.600	1.920
	Total	**5.475**	**6.570**

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 2021-22, a quantity of 32.05 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.24.038 lakhs was incurred for this purpose during the year.

Table 7. The planting material production of chilli seeds during 2021-22

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. In lakhs)
1	Agriculture University, Jodhpur, Rajasthan	0.500	0.375
2	Anand Agricultural University, Gujarat	1.000	0.750
3	Choudhary Charan Singh Haryana Agriculture University, Hissar, Haryana	1.000	0.750
4	C S Azad Agricultural University, Kanpur, UP	0.030	0.0225

5	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	2.000	1.500
6	Dr YSR Horticulture University, Andhra Pradesh	8.000	6.000
7	Kerala Agri University, Thrissur, Kerala	1.520	1.140
8	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	4.000	3.000
9	Narendra Dev University for Agriculture and Technology, Ayodhya, UP	2.000	1.500
10	Sardar Khushinagar Agriculture University, Jagudan, Gujarat	1.000	0.750
11	Sri Konda Laxman Telangana State Horticulture University, Telangana	1.000	0.750
12	Sher-e-Kashmir University of Agriculture Sciences and Technology, Kashmir, J & K	1.000	0.750
13	Tamil Nadu Agricultural University, Tamil Nadu	3.000	2.250
14	University of Agriculture Sciences, Bangalore, Karnataka	1.000	0.750
15	University of Agriculture Sciences, Dharwad, Karnataka	2.000	1.500
16	University of Horticulture Sciences, Bagalkot, Karnataka	3.000	2.250
	Total	**32.050**	**24.038**

2.1.7 Seed Spices

Seed spices occupy about 50% of area under spices and contributes 20% of total spices production in the country. This group of spices has a prominent place in our national economy because of its large domestic consumption and growing demand for export. 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 162.50 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.65.00 lakhs were incurred for this programme.

Table 8. University-wise details of seed spices seed production programme 2021-22

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. In lakhs)
1	Agriculture University, Jodhpur, Rajasthan	20.000	8.000
2	Agriculture University, Kota, Rajasthan	23.000	9.200
3	Anand Agricultural University, Gujarat	3.000	1.200
4	Banda Agricultural University, UP	3.000	1.200
5	Choudhary Charan Singh Haryana Agriculture University, Hissar, Haryana	8.000	3.200
6	C S Azad Agricultural University, Kanpur, UP	1.000	0.400

7	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	3.000	1.200
8	Dr. Y S Parmar University of Horticulture and Forestry, HP	0.500	0.200
9	Dr YSR Horticulture University, Andhra Pradesh	1.000	0.400
10	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	6.000	2.400
11	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, MP	1.000	0.400
12	Junagadh Agri University, Gujarat	2.000	0.800
13	Maharana Pratap University for Agriculture and Technology, Udaipur, Rajasthan	5.000	2.000
14	Vasantrao Naik Marathwada Agriculture University, Parbani, Maharashtra	2.000	0.800
15	Narendra Dev University for Agriculture and Technology, Ayodhya, UP	3.000	1.200
16	ICAR – National Research Centre for Seed spices, Ajmer, Rajasthan	25.000	10.000
17	Punjab Agricultural University, Ludhiana, Punjab	4.000	1.600
18	Dr. Rajendra Prasad Central Agriculture University, Bihar	1.000	0.400
19	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, MP	10.000	4.000
20	Sardar Kushinagar Dantiwada Agriculture University, Jagudan, Gujarat	20.000	8.000
21	Sardar Vallabh Bhai Patel University for Agri and Technology, Meerut, UP	1.000	0.400
22	Sher-e-Kashmir University for Agriculture and Technology, Kashmir	2.000	0.800
23	SKN Agriculture University, Jobner, Rajasthan	7.000	2.800
24	Tamil Nadu Agricultural Univesity, Tamil Nadu	4.000	1.600
25	University of Agriculture Sciences, Bangalore, Karnataka	1.000	0.400
26	University of Agriculture Sciences, Dharwad, Karnataka	6.000	2.400
	Total	**162.500**	**65.000**

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 2021-22 so as to make available enough materials for further multiplication and distribution among the farmers.

Table 9. Nucleus seed production programme of Garlic 2021-22.

S No	Institute	Quantity produced and distributed (Nos in lakhs)	Financial utilisation (Rs. In lakhs)
1	Agriculture University, Kota	7.500	3.750
2	Banda Agricultural University, UP	8.000	4.000
3	Choudhary Charan Singh Haryana Agriculture University, Hissar, Haryana	6.000	3.000
4	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	5.000	2.500
5	Dr. Y S Parmar University of Horticulture and Forestry, HP	2.000	1.000
6	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, MP	4.000	2.000
7	Junagadh Agri University, Gujarat	3.000	1.500
8	Vasantrao Naik Marathwada Agriculture University, Parbani, Maharashtra	2.000	1.000
9	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	4.000	2.000
10	Narendra Dev University for Agriculture and Technology, Ayodhya, UP	2.000	1.000
11	Punjab Agricultural University, Ludhiana, Punjab	15.00	7.500
12	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, MP	8.000	4.000
13	Sri Konda Laxman Telangana State Horticulture University, Telangana	1.000	0.500
14	Sardar Vallabh Bhai Patel University for Agri and Technology, Meerut, UP	1.000	0.500
15	Sher-e-Kashmir University for Agriculture and Technology, Kashmir	1.000	0.500
16	Tamil Nadu Agricultural Univesity, Tamil Nadu	8.000	4.000
17	University of Agriculture Sciences, Dharwad, Karnataka	4.000	2.000
	Total	**81.500**	**40.750**

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, 12 implementing agencies produced 39,500 Nos. of bush pepper plants/ grafts with a total financial assistance of Rs. 15.80 Lakhs.

Table 10. Bush pepper planting material production programme

S No	Institute	Quantity produced and distributed (Nos in lakhs)	Financial utilisation (Rs. In lakhs)
1	Assam Agri University, Assam	0.005	0.200
2	Bidhan Chandra Krishi Vishwavidyalaya, WB	0.005	0.200
3	ICAR - Central Island Agricultural Research Institute, Port Blair	0.005	0.200
4	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	0.100	4.000
5	ICAR - Central Coastal Agricultural Research Institute, Goa	0.060	2.400
6	Kerala Agri University, Thrissur, Kerala	0.010	0.400
7	Orissa University of Agriculture and Technology, Bhubaneshwar, Orissa	0.005	0.200
8	Tamil Nadu Agricultural Univesity, Tamil Nadu	0.015	0.600
9	University of Agriculture and Horticulture Sciences, Shimoga, Karnataka	0.100	4.000
10	University of Agriculture Sciences, Bangalore, Karnataka	0.020	0.800
11	University of Agriculture Sciences, Dharwad, Karnataka	0.060	2.400
12	Uttar Banga Agricultural University, Pundibari, West Bengal	0.010	0.400
	Total	**0.395**	**15.800**

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 & tamarind and seedlings of clove, cinnamon, curry leaf, allspice, cassia were included in the programme. Approximately Rs.6.8255 lakh grafts/ seedlings of various tree spices were produced and distributed with a financial utilization of Rs.109.06 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)
i.	Nutmeg grafts (Orthotropic)	Nos in lakhs	140.00	0.0665	9.3100
ii.	Nutmeg grafts (Plagiotropic)	Nos in lakhs	80.00	0.4950	39.6000

iii.	Tamarind / Kokum grafts	Nos in lakhs	20.00	1.6150	32.3000
iv.	Clove /Allspice seedlings	Nos in lakhs	20.00	0.3070	6.1400
v.	Cinnamon /Cassia /Curry leaf seedlings	Nos in lakhs	5.00	4.3420	21.7100
	Total			**6.8255**	**109.0600**

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	ICAR-Central Coastal Agricultural Research Institute, Goa	0.005	0.700
2	Kerala Agri University, Thrissur, Kerala	0.0615	8.610
	Total	**0.067**	**9.310**

Nutmeg (Plagiotropic)

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. In lakhs)
1	Dr. Balasaheb Sawant Konkan Krishi Vidya Peeth, Dapoli, Maharashtra	0.400	32.000
2	ICAR-Central Coastal Agricultural Research Institute, Goa	0.010	0.800
3	ICAR-Indian Institute of Spices Research, Kozhikode, Kerala	0.025	2.000
4	Tamil Nadu Agricultural University, Tamil Nadu	0.010	0.800
5	University of Agricultural Sciences, Bangalore, Karnataka	0.030	2.400
6	University of Agricultural Sciences, Dharwad, Karnataka	0.020	1.600
	Total	**0.495**	**39.600**

(b) Tamarind/Kokum grafts

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. In lakhs)
1	Banda Agricultural University, UP	0.020	0.400
2	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	0.850	17.000
3	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	0.075	1.500
4	Dr YSR Horticulture University, Andhra Pradesh	0.150	3.000
5	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, MP	0.020	0.400
6	Kerala Agri University, Thrissur, Kerala	0.1800	3.600

7	Tamil Nadu Agricultural Univesity, Tamil Nadu	0.030	0.600
8	University of Agriculture Sciences, Bangalore, Karnataka	0.060	1.200
9	University of Agriculture Sciences, Dharwad, Karnataka	0.150	3.000
10	University of Horticulture Sciences, Bagalkot, Karnataka	0.080	1.600
	Total	**1.615**	**32.300**

(c) Clove/Allspice Seedlings

S No	Institute	Quantity produced and distributed (Nos. in lakhs)	Financial utilisation (Rs. In lakhs)
1	ICAR - Central Island Agricultural Research Institute, Port Blair	0.050	1.000
2	Kerala Agri University, Thrissur, Kerala	0.085	1.700
3	Orissa University of Agriculture and Technology, Bhubaneshwar, Orissa	0.020	0.400
4	Tamil Nadu Agricultural Univesity, Tamil Nadu	0.010	0.200
5	University of Agriculture Sciences, Bangalore, Karnataka	0.100	2.000
6	University of Horticulture Sciences, Bagalkot, Karnataka	0.042	0.840
	Total	**0.307**	**6.140**

(d) Cinnamon/Cassia/Curry leaf

S No	Institute	Quantity produced and distributed (Nos in lakhs)	Financial utilisation (Rs. In lakhs)
1	Banda Agricultural University, UP	0.020	0.100
2	Bidhan Chandra Krishi Vishwavidyalaya, WB	0.800	4.000
3	ICAR - Central Island Agricultural Research Institute, Port Blair	0.100	0.500
4	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	0.600	3.000
5	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	0.100	0.500
6	Dr YSR Horticulture University, Andhra Pradesh	0.100	0.500
7	ICAR - Central Coastal Agricultural Research Institute, Goa	0.080	0.400
8	ICAR - Indian Institute of Spices Research, Kozhikode, Kerala	0.050	0.250
9	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, MP	0.010	0.050
10	Kerala Agri University, Thrissur, Kerala	0.567	2.835
11	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	0.100	0.500
12	Orissa University of Agriculture and Technology, Bhubaneshwar, Orissa	0.025	0.125

13	Sri Konda Laxman Telangana State Horticulture University, Telangana	0.050	0.250
14	Tamil Nadu Agricultural Univesity, Tamil Nadu	0.150	0.750
15	University of Agriculture Sciences, Bangalore, Karnataka	1.200	6.000
16	University of Agriculture Sciences, Dharwad, Karnataka	0.350	1.750
17	University of Horticulture Sciences, Bagalkot, Karnataka	0.040	0.200
	Total	**4.342**	**21.710**

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 21 Universities/ICAR Institutes spread across the country. A total of 60 hectares were covered under the programme with a financial outlay of Rs.45.00 lakhs during 2021-22, 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, Gujarat	1.000	0.750
2	Banda Agricultural University, UP	1.000	0.750
3	Bidhan Chandra Krishi Vishwavidyalaya, WB	2.000	1.500
4	Choudhary Charan Singh Haryana Agriculture University, Hissar, Haryana	2.000	1.500
5	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	5.000	3.750
6	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	7.000	5.250
7	Dr. Y S Parmar University of Horticulture and Forestry, HP	1.000	0.750
8	ICAR – Directorate of Medicinal and Aromatic Plants, Anand, Gujarat	4.000	3.000
9	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	6.000	4.500
10	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, MP	1.000	0.750
11	Kerala Agri University, Thrissur, Kerala	4.000	3.000
12	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	4.000	3.000
13	Narendra Dev University for Agriculture and Technology, Ayodhya, UP	4.000	3.000
14	Orissa University of Agriculture and Technology, Bhubaneshwar, Orissa	1.000	0.750
15	Punjab Agricultural University, Punjab	1.000	0.750

16	Sri Konda Laxman Telangana State Horticulture University, Telangana	5.000	3.750
17	Sher-e-Kashmir University for Agriculture and Technology, Kashmir	1.000	0.750
18	Tamil Nadu Agricultural Univesity, Tamil Nadu	5.000	3.750
19	University of Agriculture Sciences, Bangalore, Karnataka	2.000	1.500
20	University of Agriculture Sciences, Dharwad, Karnataka	2.000	1.500
21	University of Horticulture Sciences, Bagalkot, Karnataka	1.000	0.750
	Total	**60.000**	**45.000**

Quality planting material production programmes 2001-22

1. Black pepper cuttings produced at UAHS Shimoga

2. Quality planting material of Black pepper raised at Pundibari,UBKV,West Bengal

3. Black pepper cuttings produced at AAU, Jorhat

4. Column method of Black pepper planting material production at Chintapalli, YSRHU ,A P

5. Pepper cuttings multiplied by serpentine method at BCKV, West Bengal

6. Different stages of production of quality Black Pepper cuttings at UHS,Bagalkot

7. Quality planting materials of Betelvine raised at PDKV Akola

8. Black Pepper cuttings raised at GKVK,Bangalore

9. Betelvine quality planting material production at GKVK,Bangalore

10. Betelvine Baroj at UBKV, West Bengal

11. Black Pepper cuttings produced at Dr.BSKKVP,Dapoli

12. Quality planting materials of black pepper produced at IISR

13. Disease free Ginger seed production using microrhizomne technolgy at KAU, Vellayani

14. Field view of Ginger QPM plot at KVK Betul JNKVV, Jabalpur, Madhya Pradesh

15. Quality plantimg material of Ginger seed produced at YSPHU&F, Solan

16. Quality seed rhizomes of ginger produced at BCKV, West Bengal

17. Ginger protray seedlings raised at AAU, Jorhat

18. Ginger seed production using Micro rhizome technology at KAU, Thrissur

19. Ginger QPM plot at PDKV, Akola

20. IISR Pragathi -Turmeric variety multiplied at UAS Dharwad

21. Protray seedlings of Ginger & Turmeric raised by CHF, Pasighat

22. Field view of Turmeric rhizome production at AAU, Anand

23. Quality Seed production of Turmeric at IGKV, Chattisgarh

24. Quality seed rhizome production of Turmeric at YSRHU, A P

25. QualityTurmeric rhizome seeds produced at MPKV, Rahuri

26. Quality planting material production of Turmeric at TNAU, Coimbatore

27. Quality planting material production of Turmeric at NAU, Gujarat

28. Quality Turmeric seed prduction at PAU, Ludhiana

29. Quality Planting Material production of Turmeric at PDKV, Akola

30. Quality seed rhizomes of Turmeric produced at AAU, Jorhat

31. Roma variety of Turmeric multiplied at KVK Panna JNKVV

32. Field view of Turmeric seed production at Kharibari, UBKV

33. Field view of Turmeric QPM at IISR ,Calicut

34. Turmeric seed production in sapota orchard at PDKV, Akola

35. Field preparation for Turmeric seed production at CHF, Pasighat

36. Field view of Chilli seed production at AAU, Anand

37. Quality Chilli seed production at NDUAT, Ayodhya

38. Field view of quality seed production of Chilli at GKVK, Bangalore

39. Chilli seedlings raised at UHS, Bagalkot

40. Byadgi chilli seed preparation by drying in solar tunnel at UAS, Dharwad

41. Quality Chili seed production plot at SKUAST, Srinagar

42. Fruiting stage of Chilli plants at MVRS, AAU, Anand

43. Ajmer Cr-1 variety of coriander multiplied at YSPHU&F, Solan

44. Quality seed production of Coriander at RVSKVV, Gwalior

45. Field view of Coriander seed multiplication at UAS, Dharwad

46. Fenugreek threshing at PAU,Ludiana

47. Coriander seed production at ARSS, Aklera, AU Kota

48. Coriander Var.Haritma multiplied at SVBPUAT, Meerut

49. RKD 18 variety of Coriander seeds multiplied at AU, Kota

50. Quality seed production of Coriander at SKUAST, Srinagar

51. Coriander seed production plot at TNAU

52. Cumin GC 4 variety produced at AAU, Anand

53. Cumin and Fenugreek seed production at , AU, Jodhpur

54. Cumin seeds produced at NRCSS, Ajmer

55. Field view of Fenugreek RMt-1 variety at RVSKVV, Gwalior

56. Field view of ML 150 variety of Fenugreek multiplied by PAU, Ludiana

57. Dill seed multiplication at AAU, Anand

58. Field view of Dill seed production plot at AAU, Anand

59. Ajwain seed production at UAS, Dharwad

60. Seed spices multiplied at IGKV, Chattisgarh

61. Yamuna Safed 3 variety of Garlic produced at BAUT, Banda

62. Quality planting material of Garlic var.G 282 produced at JNKVV

63. PG-18 variety Garlic seed produced at PAU, Ludiana

64. Garlic ssed production at HRS,OOty, TNAU

65. Garlic seed production at YSPHU&F, Solan

66. Garlic seed production at PDKV, Akola

67. Garlic crop multiplication at SKUAST, Srinagar

68. Clove seedlings raised at KAU, Thrissur

69. Nutmeg grafts produced at IISR, Calicut

70. Nutmeg grafts produced at KAU, Thrissur

71. Kokum fruit harvesting at GKVK, Bangalore

72. Kokum grafts produced at Dr. BSKKVP, Dapoli

73. Konkan Swad -Kokum grafts produced at ICAR-CCARI, Goa

74. Konkan Tej Cinnamon layers produced at ICAR-CCARI, Goa

75 .Cinnamon layers produced at CIARI, Port Blair

76. Quality planting material of Garcinia produced at KAU, Thrissur

77. Quality planting material of Cinnamon cv. Konkan Tej produced at Dr. BSKKVP, Dapoli

78. Curry leaf seedling var.Suhasini production at UHS, Bagalkot

79. Curry leaf seedlings raised at YSRHU, AP

80. Mother block of Curry leaf established at BCKV. West Bengal

81. Curry leaf - smruti vatiety produced at PDKV, Akola

82. Tamarind Thettu vartiety multiplied at YSRHU, AP

83. Approach grafts of Tamarind produced at, HC& RI, Periyakulam, TNAU

84. Tamarind grafts produced at HREC,UHS, Bagalkot

85. Field view of Palmrosa multiplication, DMAPR, Gujarat

86. Mother garden of Aromatic plants at UAS, Bangalore

87. Planting material production of aromatic crops at UAS, Bangalore

88. Field view of Citronella multiplication at MPKV, Rahuri

90. Field view of Palmarosa multiplication at DMAPR, Gujarat

91.Quality planting material of Lavender at SKUAST, Srinagar

92. Lemon grass quality planting material production at PDKV, Akola

93. Lemon grass multiplied at DMAPR, Gujarat

94. Tulsi planting material production done at AAU, Anand

95. Multiplication field for aromatic plants at PDKV, Akola

96. Planting material production of Citronella at UAS, Dharwad

97. Aromatic Plants production at YSPHU&F, Solan

98. Tulsi seed production at TNAU, Coimbatore

99. Ramathulsi multiplied at CCSHAU, Hisar

100. Director, DASD visiting Seed production plots of UAS, Bangalore

2.2 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. Cent percentage 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. Maharana Pratap University for Agriculture and Technology, Udaipur, Rajasthan
3. Sri Konda Laxman Telangana State Horticulture University, Telangana
4. SKN Agriculture University, Jobner, Rajasthan
5. Tamil Nadu Agricultural University, Tamil Nadu

2.3 Nursery centre for 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, the Directorate established 3 small nurseries in different SAUs. An amount of Rs. 15.00 lakhs were provided per each centre for establishing the nursery centre. Total Rs.45.00 lakhs were incurred for this purpose.
Following SAUs implemented this programme during 2020-21;

1. Dr. Balasaheb Sawant Konkan Krishi Vidya Peeth, Dapoli, Maharashtra
2. Kerala Agri University, Thrissur, Kerala
3. University of Agriculture Sciences, Dharwad, Karnataka

101. Seed processing and storage structure for Turmeric & Seed spices at AAU, Anand

102. Seed threshing floor cnstructed at MPUAT, Udaipur

103. Threshing Floor constructed at KVK, AU, Jodhpur

104. Aromatic Nursery Centre constructed at ANDUAT, Ayodhya

105. Nursery structure established at KVK, Sirsi, UHS, Bagalkot

2.4 Production of nucleus planting material of Betelvine in Bundelkhand region of Uttar Pradesh

Mahoba district of UP is major betel vine producing area of Bundelkhand which involves around 620 to 700 farming families exclusively involved in pan cultivation. Bangla, Calcuttia, Kapuri are the major promising varieties of betelvine cultivated in Bundelkhand region. There is a well-established market for the Betel leaf of this area which creates scope for area expansion. The traditional area under cultivation of this crop has declined substantially during the recent years due to several factors. Betel leaf cultivation requires regular watering; four times a day in summer and twice a week in winter. The traditional areas of pan cultivation are situated near water sources, but the prolonged drought has dried up most ponds and dug wells in Mahoba, non-availability of quality planting material have also been listed as a major issue faced by growers in this area.

To address these issues, DASD has established nucleus planting material production centre for betelvine at Mahoba in association with the BUAT, Banda with the following objectives.

- To provide disease free planting material of promising cultivars.
- To introduce advanced technologies in betel production.
- To supplement the efforts for area expansion of betelvine.

As a part of the programme, Betelvine plants were raised in bareja system (closed structure) under shadenet structure of 500 sq m at Regional Research Station, Belatal, Mahoba district. As the area is facing shortage of water, provision for borewell was also made under the programme.
The facilities established under the programme during 2021-22 includes;

- One shade net house with dome shape top and one conservatory (Bareja/Baroj) with flat top is constructed for growing the stock plants. Size of each structure is 500sqm.
- Both the structure is equipped with drip and micro-sprinklers to address the water requirement issue as well as tedious existing irrigation pattern among farmers.
- To provide disease free planting material of betel vine to farmers, planting of single node betel vine cuttings of Bangla and Deshawari cultivars have been done during last week of March, 2022.
- About 10000 cuttings had been planted in each structure exclusively for planting material production. It is expected that more than 75000 single node cuttings can be produced for distribution in upcoming planting season during February, 2023.

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, 5 large cardamom nurseries have been established and accredited by DASD in Sikkim, in association with State Dept. of Horticulture.

During 2021-22, the Directorate initiated similar programme in Arunachal Pradesh in association with department of Horticulture. Initially, awareness trainings were conducted for Dept officials and nurserymen of Arunachal Pradesh, on importance of nursery concept for producing healthy and disease-free planting material. A motherblock of one acre area and one nursery structure was established in Kanubari of Longding District under Department of Horticulture, Govt of Arunachal Pradesh.

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 & 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 around 60 nurseries have been accredited by DASD till March, 2022.

Table 15. List of spice nurseries accredited by DASD during 2021-22

S. No.	Nursery Details	State	Crop certified	Variety/ Cultivar	Star rating	Production capacity (Nos.) / annum
1	Horticulture Department Rongli Sub Division East Sikkim	Sikkim	Large Cardamom	Varlangey	One Star	1,00,000
2	Govt Horticulture Farm 14th Mile, Kewzing Road Ravangla, South Sikkim	Sikkim	Large Cardamom	Sawney	Two Star	1,50,000
3	Horticulture Department Tikjuk, Gyalshing, West Sikkim	Sikkim	Large Cardamom	Sawney	One Star	1,00,000
4	Sangdong Horticulture Farm Mangan, Pentok, Sikkim	Sikkim	Large Cardamom	Sawney	One Star	1,50,000

5	M/s Yashaswi Apoorva layout Aryapu post, Puttur - 574210, DK, Karnataka	Karnataka	Black Pepper	Panniyur-1, 5 and Karimunda	One Star	55,000
6	M/s New Evergreen Nursery Farm, Chikmanglore, Karnataka	Karnataka	Black Pepper	Panniyur - 1	One Star	5,00,000
7	M/s Kamandala Nursery Chikmanglore, Karnataka	Karnataka	Black Pepper	Panniyur - 1	One Star	30,000
8	College of Horticulture UHS, Bagalkot Sirsi, Karnataka	Karnataka	Black Pepper Cinnamon	Panniyur - 1 Konkan Tej and other varieties	One Star	50,000 2,000
9	M/s Sigandini Nursery Siddapur, UK, Karnataka	Karnataka	Black Pepper	Sigandhini, Panniyur - 1 and Thevam	One Star	75,000
10	M/s Mallikarjun Nursery Siddapur, U K, Karnataka	Karnataka	Black Pepper	Panniyur-1 and Karimunda	One Star	50,000
11	M/s Amba Nursery Siddapur, UK, Karnataka	Karnataka	Black Pepper	Panniyur - 1, Thevam and Karimunda	One Star	50,000
12	M/s Home Grown Nursery & Farms Kottayam District, Kerala	Kerala	Nutmeg	Kallivayal, Kochukudy and Kadukanmackal	One Star	11,500
13	Model Nursery on Spices, College of Horticulture, KAU, Vellanikara, Thrissur, Kerala	Kerala	Black Pepper	Panniyur varieties, Vijay, Panjami, Pournami, Sreekara, Subhakara, IISR Shakthi, IISR Malabar Excel, IISR Thevam, Neelamundi and Karimunda	Two Star	50,000
			Nutmeg	Identified promising farmers selections		4,600
			Cinnamon	Identified promising farmers selections		500
			Ginger	Athira, Karthika, Aswathy, Varada, Rejatha, Mahima		550 kg
			Turmeric	Kanthi, Sobha, Sona, Varna		1,000 kg

14	Small Nursery on spices, KAU, Vellanikara, Thrissur, Kerala	Kerala	Black Pepper	Panniyur – 1 - 9, Vijay, Panjami, Pournami, Sreekara, Subhakara, IISR Shakthi, IISR Malabar Excel and IISR Thevam	Two Star	1,00,000
15	Kinattukara Nutmeg Plantation and Nursery Pvt Ltd, Kottayam, Kerala	Kerala	Nutmeg	Kinattukara	One Star	4,25,000
16	RFRS Vengrula, Sindhudurg District, Dr. BSKKVP, Dapoli Maharashtra	Maharashtra	Black Pepper Nutmeg Cinnamon Kokum	Panniyur - 1 Konkan Swad, Konkan Sugandha, Konkan Shrimanti Konkan Tej Konkan Amruta, Konkan Hatis	Two Star	10,000 12,000 5,000 7,000
17	College of Horticulture, Mulde, Dr. BSKKVP, Dapoli, Maharashtra	Maharashtra	Black Pepper Nutmeg Cinnamon Kokum	Panniyur - 1 Konkan Swad, Konkan Sugandha, Konkan Shrimanti Konkan Tej, Konkan Tejpatta Konkan Amruta, Konkan Hatis	One Star	10,000 8,000 1,000 10,500
18	Agricultural Research Station, Awashi, Dr. BSKKVP, Dapoli Maharashtra		Black Pepper Cinnamon	Panniyur - 1 Konkan Tej	One Star	20,000 3,000
19	AICRP on Spices, College of Horticulture, Dr. BSKKVP, Dapoli Maharashtra	Maharastra	Black Pepper Nutmeg Cinnamon Kokum	Panniyur - 1 Konkan Swad, Konkan Sugandha, Konkan Shrimanti, Konkan Sanyukta Konkan Tej, Konkan Tejpatta Konkan Amruta, Konkan Hatis	One Star	50,000 4,000 4,000 4,000

20	Agricultural Research Station, Palghar, Dr. BSKKVP, Dapoli Maharashtra	Maharashtra	Black Pepper Cinnamon Turmeric	Panniyur - 1 Konkan Tej Waigaon and Salem	One Star	10,000 2,000 17 tonnes

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

106. Record verification by Accreditation team at Karnataka

107. Accreditation team visiting Kamandala Nursery at Karnataka

108. Accreditation team evaluating the Kinattukara Nutmeg Nursery,Kinattukara, Kerala

109. DASD Accreditation team visiting pepper mother block at KAU, Thrissur

110. DASD accreditation team at Model Nursery, KAU

111. Evaluating Evergreen Nursery at Karnataka

112. Evaluation of nursery at COH - Sirsi, UHS, Bagalkot

113. Solarization practice at Amba Nursery, Karnataka

114. Mother Block of Cinnamon at RFRS Vengurle, Dr. BSKKVP, Dapoli

115. Cinnamon Mother block at ARS, Awashi, Dr. BSKKVP, Dapoli

116. Field visit by accreditation team at AICRP centre, Dapoli

117. Accreditation team at ARS, Palghar
Dr. BSKKVP, Dapoli

118. Mother garden at Yashaswi Nursery, Karnataka

119. DASD team at Sigandhini Nursery, Karnataka

120. Awareness programme on Accreditation of Large cardamom at Arunachal Pradesh

121. Accreditation team at State Horticulture Nursery, Buriakshop, Sikkim

122. DASD Accreditation team evaluating the Horticulture Nursery at Dzongu, Sikkim

123. DASD accreditation team evaluating the Horticulture Nursery at Lingtham, Sikkim

124. DASD accredited Large cardamom nursery at Nazitam, Sikkim

125. Accreditation team visiting the Horticulture Nursery at Rabangala, Sikkim

4. Technology Dissemination through Frontline Demonstration

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 2021-22 are detailed below:

4.1 Aromatic Crops in Korea District of Chhattisgarh (IGKV)

Cultivation of Aromatic Crops becomes New Profitable Venture for Tribal Farmers of Korea district of Chhattisgarh. Korea is a tribal dominated district of Chhattisgarh under the northern hill region agro climatic zone of the state. A base line survey was done before the start of the project related activities. Most of the tribal farmers were cultivating rice and vegetable in upland. Considering the need for crop diversification, cluster demonstrations of aromatic crops have been conducted in 50 hectares of land of tribal community in cluster during 2020- 21 and 2021-22 through KVK- Korea with the technical guidance of Center of Excellence, Indira Gandhi Krishi Vishwavidyalaya, Raipur (Chhattisgarh) under CSS-MIDH project sponsored by this Directorate . Basic resources *viz.* fencing, tube well, drip irrigation works for demonstration programme were developed during 2020-21 in 25 hectares of land in five different tribal dominated villages *viz.*, Dudhniya, Lai, Tarabahara, Vishrampur and Shivgad of Chhattisgarh state with the financial support of MGNREGA and District Administration. Similarly, during 2021-22, new area of 25 hac of land of the three villages *viz.*, Tilwandan, Nagar and Umjhar was also added with all similar facilities (With the support of Zila Panchayat) under the project supported by DASD, Calicut in CSS-MIDH. Different species of aromatic crops *i.e* Lemon grass, Citronella, Palmarosa and Vetiver were planted. All the critical inputs such as slips of improved variety of aromatic plants, fertilizers, bio pesticides, vermicompost etc. arranged against the funds received from the Directorate through Centre of Excellence on MAPs and NTFP, IGKV, Raipur. In order to make the participant farmers aware, field day and training on cultivation of aromatic crop were also imparted from this budget. The details of crops in different villages of Chhattisgarh state under frontline demonstration programme is summarized below:

S No	Village Name	Year	Block	Crop	Area (ha)	No of farmers
1	Dudhniya	2020-21	Baikunthpur	Lemongrass, Palmrosa, Citronella and Vetiver	5	10
2	Lai		Manendragad		5	12
3	Tarabahara		Manendragad		5	12
4	Vishrampur		Manendragad		5	17
5	Shivgad		Manendragad		5	12
6	Tilwandan	2021-22	Baikunthpur		10	28
7	Nagar		Baikunthpur		10	30
8	Umjher		Baikunthpur		5	17
				Total	**50**	**138**

The district administration also provided financial support for installation of distillation units at KVK Farm which could be helpful for extraction of essential oil of the farmers produce. In addition, 500 kg capacity SS distillation unit is also installed at village Tarabarah with the financial assistance of Zila Panchayat. In addition, in order to make the participant farmers particularly

woman group self sustained to improve their livelihood, some value added product development related activities such as preparation of small packing of essential oils, handmade soap, incense sticks, room freshner, mosquito repellant, lemon grass herbal leaves etc. were also initiated. Market Linkages for effective marketing have also been developed.

Impact of demonstration programme :

The activities of crop diversification and use of fellow land started in 5 villages of Korea district during 2020-21 became very popular throughout the state. The demonstration further added 25 ha land in three more villages under CSS-MIDH project of DASD, Calicut has helped to expand the area in the district. The farmers have multiplied the area at their own and maintaining the crop under the supervision of the KVK and COE, MAPs & NTFP scientists. They have created a Farmers Producer Organization (FPO) and registered as "Korea Agro Producer Company" for selling of their produce with the brand name of "Karma". The FPO is successfully marketing various processed products of lemon grass and other essential oil such as handmade soap, incense sticks, mosquito repellant, small packing of 15 ml bottles etc. are being marketed through TRIFED, Khadi Gram Udyog Board and Handicraft Development Board, University sale counter etc. in online mode. Dr Homey Cheriyan, Director, DASD, Calicut along with Dr Femina, Dy. Director visited the fields and monitored the progress of demonstration programme and appreciated the effort of the involved scientists and farmers group for introduction of aromatic crops in the tribal dominated district. Hon'ble Chief Minister and Agriculture Minister, Chhattisgarh also appreciated the activities and univeristy efforts to upgrade livelihood of tribal community. The demonstration programme has changed the livelihood pattern and economy of the tribal group members of FPO tremendously. Since the crop in 25 ha. was planted during January/February 2022, its first cutting is expected in the month of May/June.

126. Demonstration plot of Aromatic crops at IGKV, Chattisgarh

127.Value addition of aromatic crops IGKV

128. Demonstration plot of Aromatic plants at IGKV, Chattisgarh

4.2 PDKV-Waigaon turmeric in Vidarbha Area (Dr. PDKV, Akola)

In this project, frontline line demonstrations were given on organic production of turmeric var. PDKV-Waigaon which is a selection from local Waigaon, having 24% more rhizome yield and curcumin more than 6.2%. The objectives of the programme were:-

- Production of Export oriented high curcumin content turmeric.
- Development of export hub for PDKV-Waigaon turmeric in Vidarbha through cluster approach.
- Demonstration of elite variety of Turmeric (PDKV- Waigaon)
- Production of Quality planting Material of turmeric

The project was implemented in Wardha District of Maharashtra. This area is identified for Geographical Indication of Waigaon turmeric.The selection of farmers for conducting the FLD programme was done with the help of State Agriculture Department through District SAO, SDO and Agriculture Assistant. Two online meetings/training were conducted at beginning of FLD programme due to Covid-19 situation. The selection of farmers were done as per the guidelines given by the Directorate including farmers from SC and ST farmers. Selected farmers were given training about use of different organic inputs. The pure planting material of turmeric var. PDKV-Waigaon was provided by the University. At various crop stages, visits were made by scientists and trainings were conducted and the distribution of inputs were done, especially biofertilizers. At harvesting, FLD farms were visited by Agriculture Assistant and recorded the average productivity. More than 10 thousand quintals organically produced fresh turmeric rhizomes were produced under the programme.

Buyer-seller meet:

In FLD programme the productivity was ranged between 270 to 310q/ha. As per the objective of the project, there was need to open new avenue of market of quality Waigaon turmeric. Therefore, the turmeric farmers and Exporters meet was conducted on 14.03.2022 at Girad, Tah. Samudrapur, Dist Wardha. For this programme, turmeric growers and turmeric exporters were invited and exhibition of fresh turmeric rhizome, processed powder and other processed product of turmeric was organized. This meet and exhibition of turmeric planting material and processed products was inaugurated by Dr.Homey Cheriyan, Director, DASD, Calicut and Chaired by Dr.V.M.Bhale, Vice Chancellor, and other dignitaries were Dr.Yayati Taiade, Dean (Agri), Dr.P.K.Nagre, Dean (Hort), Sri. Anil Ingale, Dist. Superintendent of Agriculture, and Dr.A.M.Sonkamble, Head, (Veg. Sci.), Dr.Vijay S.Kale (Principal Investigator of Project). 145 beneficiaries including 130 turmeric producers, two exporters and 13 traders participated in the event. In the interactive session, the opportunities for export of Waigaon turmeric were discussed, also the online contact was made with exporters those who could not attend. It was the first programme of this kind in this area and made positive impact on both turmeric producer and exporters.

129. Waigon Turmeric at Dr. PDKV, Akola

130.Field visit at FLD demo plot of Waigon Turmeric at Dr. PDKV, Akola

131.Exporters meet on Waigon Turmeric held at Dr. PDKV, Akola

132. Exporters meet on Waigon Turmeric held at Dr. PDKV, Akola

4.3 Establishment of demo plots for hybrid chilli

Chilli (*Capsicum annum* 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 defence 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, IIHR- ICAR, 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. IIHR- ICAR 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 from core chilli growing areas during the year 2021-22.

The objective of the programme was to establish demonstration plots of virus resistant, high yielding pungent chilli varieties using IPM/IDM practices in different locations for popularizing the variety and cultivation practices among the farmers.

Working Procedure followed : Frontline demonstration plots for the five hybrid chilli varieties was established in the three SAUs ; RVSKVV, Gwalior (Madhya Pradesh) , UAS, Dharwad and 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 total demonstration covered was 7.5 acre (0.5x5x3) @ 2.5 acres for each university. The seed rate adopted as per the package of practices is 40-80 gm per acre.

The cultural practices followed by the universities for implementation of the demo programme as per the recommendations of ICAR-IIHR are listed below:

- Nursery raising under nylon net cover 40 to 60 mes.h
- Raising of the seedlings in protrays filled with properly fermented and 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. (30 microns) (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 confidon (@ 15 day interval) 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 the implementing centres after completion of the demonstration programme:

	RVSKVV Gwalior	UAS Darwad	UAS Bagalkot	RVSKVV Gwalior	UAS Darwad	UAS Bagalkot	RVSKVV Gwalior	UAS Darwad	UAS Bagalkot	RVSKVV Gwalior	UAS Darwad	UAS Bagalkot
Name of the F1 Hybrid	**Dry Yield q/ha**			**Average 20 fruit weight (g)**			**Fruit length (cm)**			**Fruit diameter (cm)**		
Arka Yashasvi	37.13	98.13	46.88	74	60.15	78.4	9	7.9	7.67	0.92	1.05	0.69
Arka Saanvi	39.10	82.62	44.69	69.1	80.05	85.1	10	8.25	8.87	1.2	1.08	0.8
Arka Gagan	36.58	71.80	37.00	54.16	56.2	58.1	8.5	7.8	8	0.7	1.03	0.72
Arka Tejasvi	35.80	85.16	38.25	66	98.2	76	8.5	8.15	8.2	0.98	0.95	0.78
Arka Tanvi	40.33	82.62	51.88	92	64.65	55.2	10.5	8.95	8.14	1.3	0.95	0.62
Local Check 1	19.10	17.27	0.00	39.2	114.6	0	6.8	10.15	0	0.8	1.23	0

Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior: The maximum yield (40.33 q/ha), average 20 fruit weight (92g), maximum fruit length (10.5 cm) and maximum fruit diameter (1.3 cm) were observed in Arka Tanvi.

UAS Dharwad : The maximum yield (98.13 q/ha) observed in Arka Yashasvi, maximum 20 fruit weight (80.1g) in Arka Saanvi, maximum fruit length (8.95 cm) in Arka Tanvi and maximum fruit diameter (1.08 cm) in Arka Saanvi.

UAS Bagalkot : The maximum yield (51.88q/ha) reported in Arka Tanvi where as maximum 20 fruit weight (85.1g),maximum fruit length (8.87 cm) and maximum fruit diameter(0.80 cm) were observed in Arka Saanvi.

S. No.	Name of the Hybrid	RVSKVV Gwalior			UAS Dharwad			UAS Bagalkot		
		ChCLV	Powdery Mildew	Sucking pests	ChCLV	Powdery Mildew	Sucking pests	ChCLV	Powdery Mildew	Sucking pests
1	Arka Yashasvi	Low	Low	Low	Low	Low	Low	Low	Low	Low
2	Arka Saanvi	Low	Low	Low	Medium	Low	Low	Medium	Low	Low
3	Arka Gagan	Low	Low	Low	Low	Low	Low	Medium	Low	Low
4	Arka Tejasvi	Low	Low	Low	Low	Low	Low	Low	Low	Low
5	Arka Tanvi	Low	Low	Low	Low	Low	Low	Low	Low	Low
6	Local Check 1	High	Low	Medium	Low	Low	Low	Low	Low	Low

Conclusion: The performance of the hybrid chilli varieties to resistance/susceptibility towards ChiLCV and other diseases and pests were shown in the above table .

Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior : The result shows that all hybrid varieties are less susceptible towards the chilli leaf curl disease, powdery mildew and sucking pests compared to local variety.

UAS Dharwad: The result shows that Arka Saanvi is moderately susceptible to ChCLV and less susceptible towards powdery mildew and sucking pests. Other hybrid varieties are less susceptible towards the chilli leaf curl disease, powdery mildew and sucking pests.

UAS Bagalkot : The result shows that Arka Saanvi and Arka Gagan are moderately susceptible to ChCLV and less susceptible towards powdery mildew and sucking pests.Other three hybrid varieties are less susceptible towards the chilli leaf curl disease, powdery mildew and sucking pests.

133. FLD plots on hybrid varieties of chilli at UAS, Dharwad

134.Harvested Green fruits of Arka Tanvi at UAS, Dharwad

135.Harvested Green fruits of Arka Yashaswi at UAS, Dharwad

136. FLD plot of Chilli hybrid variety at UHS, Bagalkot

137. FLD plot of Chilli Hybrid at RVSKVV, Gwalior

4.4 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 64 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.25.60 lakhs was utilized for this programme.

Table 16. Institute-wise details on FLDs established for seed spices

S No	Institute	No. of Plots (in ha)	Financial utilisation (Rs. In lakhs)
1	Agriculture University, Jodhpur, Rajasthan	6.00	2.400
2	Agriculture University, Kota, Rajasthan	6.00	2.400
3	Bidhan Chandra Krishi Vishwavidyalaya, WB	1.00	0.400
4	C S Azad Agricultural University, UP	1.00	0.400
5	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	1.00	0.400
6	Dr. Y S Parmar University of Horticulture and Forestry, HP	1.00	0.400
7	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	2.00	0.800
8	Junagadh Agri University, Gujarat	2.00	0.800
9	Maharana Pratap University for Agriculture and Technology, Udaipur, Rajasthan	4.00	1.600
10	Narendra Dev University for Agriculture and Technology, Ayodhya, UP	2.00	0.800
11	ICAR – National Research Centre for Seed spices, Ajmer, Rajasthan	10.00	4.000
12	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, MP	4.00	1.600
13	Sardar Khushinagar Agriculture University, Jagudan, Gujarat	10.00	4.000
14	Sher-e-Kashmir University of Agriculture Sciences and Technology, Kashmir, J & K	2.00	0.800

15	SKN Agriculture University, Jobner, Rajasthan	6.00	2.400
16	Tamil Nadu Agricultural University, Tamil Nadu	3.00	1.200
17	University of Agricultural Sciences, Dharwad, Karnataka	2.00	0.800
18	ICAR – Central Arid Zone Research Institute, Bhuj, Gujarat	1.00	0.400
	Total	**64.00**	**25.60**

138. FLD on organic farming of Coriander conducted at SKLTSHU, Telangana

139. Awareness program on FLD Cumin conducted at SDAU, Jagudhan

140. Cumin crop at farmer field NRCSS, Ajmer

141. FLD on Aromatic crop, YSRPHU, Solan

142. Demonstration plot of Micro irrigation in Ginger at UAHS, Shimogga

143. Seed material distribution as input for FLD at ANDUAT, Ayodhya

144. Distribution of materials for FLD at TNAU, Coimbatore

145. Input materials distributed at KVK, Jhalawar, NRCSS, Ajmer

146. Fenugreek seeds distribution for FLD at MPUAT, Udaipur

147. FLD on seed spices at UAS, Dharwad

4.5 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. Nowadays, 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 country and also educate the farming community about the latest technologies in cultivation and processing. With this view, this Directorate established 46 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.36.80 lakhs was utilized for this purpose.

Table 17. 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, UP	2.00	1.600
2	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	2.00	1.600
3	Dr. Y S Parmar University of Horticulture and Forestry, HP	1.00	0.800
4	ICAR – Directorate of Medicinal and Aromatic Plants, Anand, Gujarat	5.00	4.000
5	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	25.00	20.000
6	Kerala Agri University, Thrissur, Kerala	1.00	0.800
7	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	2.00	1.600
8	Narendra Dev University for Agriculture and Technology, Ayodhya, UP	1.00	0.800
9	Orissa University of Agriculture and Technology, Bhubaneshwar, Orissa	2.00	1.600
10	Sher-e-Kashmir University for Agriculture and Technology, Kashmir	3.00	2.400
11	Tamil Nadu Agricultural Univesity, Tamil Nadu	2.00	1.600
	Total	**46.00**	**36.8000**

148. FLD organic farming of aromaticplant tuberose TNAU

149. FLD on lemon grass conducted at DMAPR, Gujarat

150. Distrbution of seed materials for FLD at GKVK, Bangalore

151. FLD plot forTulsi at DMA PR

152. Distribution of Inputs for FLD at IISR, Kozhikode

153. Field visit at FLD plot in Bhuj, Gujarat

154. Demonstration of Drip irrigation in Copriander field at TNAU

4.6 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. Demonstration plots of spice, 43 Nos. 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

S. No.	Demonstration Plot – Crop	No of Demonstration plots established	Rate of Assistance	Financial Requirements (Rs. In lakhs)
1	Black Pepper	6	0.50	3.00
2	Ginger	10	0.45	4.50
3	Turmeric	9	0.45	4.05
4	Chilli	8	0.45	3.60
5	Seed spices	10	0.45	4.50
	Total	**43**		**19.65**

Table 19. Demonstration of drip irrigation in Black pepper

S No	Institute	No. of plots	Financial (Rs. In lakhs)
1	Assam Agri University, Assam	1.00	0.50
2	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	1.00	0.50
3	Kerala Agri University, Thrissur, Kerala	1.00	0.50
4	University of Agriculture and Horticulture Sciences, Shimoga, Karnataka	1.00	0.50
5	University of Agriculture Sciences, Bangalore, Karnataka	1.00	0.50
6	University of Horticulture Sciences, Bagalkot, Karnataka	1.00	0.50
	Total	**6.00**	**3.00**

Table 20. Demonstration of drip irrigation in Ginger

S No	Institute	No. of plots	Financial (Rs. In lakhs)
1	College of Horticulture and Forestry, CAU, Pasighat, Arunachal Pradesh	2.00	0.90
2	Dr. Balasaheb Sawant Konkan Krishi Vidya Peeth, Dapoli, Maharashtra	1.00	0.45
3	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	1.00	0.45
4	ICAR - Indian Institute of Spices Research, Kozhikode, Kerala	1.00	0.45
5	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, MP	1.00	0.45
6	Vasantrao Naik Marathwada Agriculture University, Parbani, Maharashtra	1.00	0.45
7	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, Madhya Pradesh	1.00	0.45
8	Sri Konda Laxman Telangana State Horticultural University, Telangana	1.00	0.45
9	University of Agri. and Horticulture Sciences, Shimoga, Karnataka	1.00	0.45
	Total	**10.00**	**4.50**

Table 21. Demonstration of Drip irrigation in Turmeric

S No	Institute	No. of plots	Financial (Rs. In lakhs)
1	College of Horticulture and Forestry, CAU, Pasighat, Arunachal Pradesh	1.00	0.45
2	Dr. Balasaheb Sawant Konkan Krishi Vidya Peeth, Dapoli, Maharashtra	1.00	0.45
3	Dr. Punjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra	1.00	0.45

4	Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh	1.00	0.45
5	ICAR - Indian Institute of Spices Research, Kozhikode, Kerala	1.00	0.45
6	Vasantrao Naik Marathwada Agriculture University, Parbani, Maharashtra	1.00	0.45
7	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, Madhya Pradesh	1.00	0.45
8	Sri Konda Laxman Telangana State Horticultural University, Telangana	1.00	0.45
9	University of Horticulture Sciences, Bagalkot, Karnataka	1.00	0.45
	Total	**9.00**	**4.05**

Table 22. Demonstration of Drip irrigation in Chilli

S No	Institute	No. of plots	Financial (Rs. In lakhs)
1	College of Horticulture and Forestry, CAU, Pasighat, Arunachal Pradesh	1.00	0.45
2	Dr. Balasaheb Sawant Konkan Krishi Vidya Peeth, Dapoli, Maharashtra	2.00	0.90
3	Dr. Punjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra	2.00	0.90
4	Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra	4.00	1.80
5	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	1.00	0.45
6	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, Madhya Pradesh	2.00	0.90
7	Sri Konda Laxman Telangana State Horticultural University, Telangana	1.00	0.45
8	University of Agricultural Sciences, Bangalore, Karnataka	2.00	0.90
9	University of Horticultural Sciences, Bagalkot, Karnataka	1.00	0.45
	Total	**16.00**	**7.20**

Table 23. Demonstration of drip irrigation in seed spices

S No	Institute	No. of plots	Financial (Rs. In lakhs)
1	Agriculture University, Kota, Rajasthan	2	0.9
2	Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior, Madhya Pradesh	4	1.8
3	Sri Konda Laxman Telangana State Horticultural University, Telangana	4	1.8
4	University of Agricultural Sciences, Bangalore, Karnataka	2	0.9
	Total	**12.00**	**5.40**

On farm water management Demonstrations taken up in 2021-22

155.On farm water management at SLKTSHU at Telangana

156. On farm water management -Drip irrgn at SLKTSHU, Telangana

157. On farm warer management in Chilli at CAU, Pasighat

158. Input distribution for FLD at AAU,Jorhat

159.Demonstration plot of Black Pepper at AAU, Jorhat

160. Director, DASD visiting the FLD plot of Basil at BAUT, Banda

4.7 Multi species cropping in Arecanut Gardens

Arecanut (*Areca catechu* L.) is one of the important commercial crops grown in the parts of Kerala, Karnataka, Assam and West Bengal. The long pre-bearing period, low returns during the initial bearing period, violent fluctuation in market prices, unexpected loss due to pests and diseases, especially yellow leaf disease are some of the problems associated with the cultivation of Arecanut. Introduction of multi species cropping in Arecanut gardens aimed at increasing the net returns from unit area helps the farmers to withstand the fluctuating prices of Arecanut. Multiple cropping has tremendous potential to generate employment for improving quality of rural life. Multiple cropping, not only provides additional income from inter/mixed crop and employment, it can also act as a social security against instability of prices of main crop. Therefore, establishing demonstration plots in few farmers' gardens will encourage many others to follow arecanut based cropping system for the improvement of their livelihood. This Directorate had been establishing demonstration plots of one hectare each in Arecanut growing areas of Kerala, Karnataka and Assam during 2007-08, 2012-13, 2016-17, 2017-18, 2018-19 and 2019-20 which were highly successful in disseminating the information to the farmers.

The following demo plots established during previous years were maintained during 2021-22 under this programme :

- Two demo plots on Arecanut based cropping system with Nutmeg + Black Pepper + Banana intercrops established at farmers field in Dakshin Kannada district of Karnataka during 2019-20.
- Four Demonstration plots on Arecanut based cropping system with Arecanut + Cocoa + Black Pepper + Banana which were established at farmers field in Dakshin Kannada district of Karnataka during 2019-20.

The field survey conducted by the CPCRI, Kasargod in two districts of Karnataka (Dakshina Kannada and Udupi) showed that about 73% of farmers have adopted multi cropping systems in arecanut. This is a clear indication that farmers are accepting this technology.

4.8 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 district 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 plots 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, Kasaragod 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 palms 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 chali yield (1400 to 1450 kg/acre) was recorded in Mandipropamid 23.3%SC sprayed palms in all the three demo plots.

Two awareness cum farmers training programmes were conducted on "Demonstration of arecanut fruit rot disease management using Mandipropamid fungicide" on 07. 10. 2021 at Enmakaje, Kasaragod district and at ICAR-CPCRI, Kidu, Dakshina Kannada district, Karnataka on 28.03.2022. Senior scientists from ICAR – CPCRI delivered lectures on Arecanut cultivation practices and management of pest and diseases in arecanut with special emphasis to fruit rot disease of arecanut.

4.9 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 farmer's 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 rootgrubs in the plantation. The imposed IPM includes twotime 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 Dakshin 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 as follows : -

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

EPN based white grub management treatments imposition

In the first year, data on population of white grub larvae *(Leucopholis* sp.), number of palm death, stem tapering and yield before imposition of treatments were recorded from the selected plots. Number of grubs ranged between 9-16 grubs per palm in all the three farmers garden. Palm death of 25 to 30% with more than 45 to 55% yield reduction was reported in the area over five years periods of infestation. To manage the grub infestation, ¾ Application of the Kalpa EPN (CPCRI – SC1), *Steinernema carpocapsae* liquid formulation @ 1.5 billion IJs/palm twice in a year (June – July & September – October) followed by application of Neem cake @ 2 kg/palm during December – January was adopted in the demonstration plots.

4.10 Demonstration of Arecanut Dwarf Hybrids

Arecanut tall varieties even though possess high yield potential, are frequently prone to wind damage and sun-scorching and also become difficult to manage. The tall nature of the palm hinders various operations like spraying and harvesting which are quite labour intensive and cumbersome. Dwarf hybrids with high yield potential will directly benefit the growers by way of enhanced returns and reduced cost of various cultural operations like harvesting, spraying and also without causing much damages to palms due to sun-scorching and heavy wind and gives mechanical support to stem. The Directorate established demonstrations on arecanut dwarf hybrids (HYV released from CPCRI, VYTLAH1 & VYTLAH 2) in farmers' fields (2 units of 0.5 acre each) during 2019-20 at Puttur and Sullia taluks of Karnataka in association with CPCRI, Kasaragod to promote its advantages among progressive farmers. The selected beneficiary farmers are :

S No	Name and address
1	Shri. Suresh Kumar Sorake, Sorake House, Serve Post and Village, Puttur Tk.
2	Shri. Ganesh Rai K, Aramane, Gutthu House, Ubaradka Mithoor Post, Sullia Tk

The spacing followed for planting was 9ft.x9ft. between palms. Technical guidance on cultivation of arecanut was provided to the selected beneficiary farmers and seasonal operations were carried out. The inputs for maintainance of the demo plots were distributed to beneficiary farmers and gap filling was done in 2020-21.

During the year 2021-22, inputs and plant protection items like Trichoderma talc, neem cake, rock phosphate, copper sulphate and lime were procured for supplying to beneficiaries. Technical guidance on cultivation of arecanut was provided to beneficiary farmers and seasonal operations were carried out. Dr. Nagaraja N. R., Scientist-SS (Plant Breeding) delivered a radio talk on 'Improved high yielding varieties and hybrids of arecanut and quality planting materials production in arecanut' in the Kisan vani programme of All India Radio, Mangaluru, which was broadcasted on 3rd August 2021.

A Field Day on "Arecanut Dwarf Hybrids" was organized at Mundoor Primary Agricultural Coooperative Society Hall, Puttur Taluk, on 9th March 2022. The event was witnessed more than 150 participants. During the technical sessions, Dr. N. R. Nagaraja, Scientist-SS, ICAR-CPCRI, Regional Station, Vittal, delivered lecture on establishing demonstration plots on arecanut dwarf hybrids, varietal wealth in arecanut and quality planting material production in arecanut. Dr. Rajkumar, Scientist-SS, ICAR-CPCRI, Kasaragod, apprised the farmers about the advances in pest and disease management in arecanut. Mr. Bhavishya, Scientist, ICAR-CPCRI, Regional Station, Vittal, briefed the farmers about production technologies of arecanut.

4.11 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, Kasaragod 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. During 2021-22 the Directorate established demonstration plots of one acre each on intensive cultivation of cinnamon as an intercrop in traditional coconut gardens in the selected State Agricultural Universities 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

a. Dr. Balasaheb Sawant Konkan Krishi Vidya Peeth, Dapoli, Maharashtra
b. Dr YSR Horticulture University, Andhra Pradesh
c. University of Agri. and Horticulture Sciences, Shimoga, Karnataka
d. University of Agricultural Sciences, Dharwad, Karnataka
e. ICAR - Central Island Agricultural Research Institute, Port Blair

4.12 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 and button shedding disease (IDB) 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 up to 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, Kasaragod 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.

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 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.

161. Demonstration plot on arecanut dwarf hybrids at CPCRI, Vittal

162.Dr. SK Malhotra visiting demonstration plot on arecanut based croping system at CPCRI, Kasargod

163. EPN supplied to farmer for FLD CPCRI, Kasargod

164.Farmers visit to EPN demonstrtion plot CPCRI, Kasargod

165.Demonstration of integrated mgt of inflorescence dieback disease in Arecanut CPCRI, Vittal

166. FLD of arecanut fruit rot disease management using Mandipropamid 23.3% SC fungicide. CPCRI,Vittal

167. Cinnamon intercropping at UAS, Dharwad

168. Demonstration of Cinnamon bark extraction at CPCRI, Kasargod

169. Pentagonal model planting of Cinammon seedlings in CPCRI, Kasargod

170. Visit of Director DASD to field of Cinnamon intercropping in coconut garden in CPCRI, Kasargod

4.13 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 micro–rhizomes 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% C_aCl_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 Agricultural 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 2021-22:

The project was initiated at CPBMB, College of Agriculture, Vellanikkara in the year 2021-22. Five KVKs in ginger growing districts, identified as project network centres, viz. KVK Kottayam, KVK Thrissur, KVK Wayanad, KVK, Palakkad and KVK, Kannur selected five beneficiary farmers from each centre to establish the ginger demo plots. An online meeting of the participating centres was convened from CPBMB, on 13th October, 2021, to give orientation about the project and to plan the execution of the project in a stepwise manner. The list of five beneficiary farmers from each of the centres was finalised. Then the farmers were given classes by subject experts on the ginger microrhizome technique, the cultivation and management practices, the conduct of the project and the relevance of the project for the farming community, at the respective centres. At CPBMB, microrhizomes of ginger induced *in vitro* were hardened and used for raising in grow bags within polyhouse. Rhizomes harvested were made into single bud transplants, by planting in protrays with coir pith and perlite and supplied to different network centres.

The land preparation and soil solarisation was initiated at the farmer's field. The Polythene sheets for soil solarisation were procured by the CPBMB and were given to the KVKs for distribution in April 2022. Calcium chloride for soil drenching was also supplied to the participating centres.

As per the programme, each farmer are raising 10 cents of crop, 5 cents with microrhizome derived single bud transplants along with $CaCl_2$ treatment and solarization for 65 days (March-mid May) prior to planting and 5 cents using conventional rhizomes and standard package of practices.

Time frame of the programme

April – May 2021	June 2021 – March 2022	March 2022	April – May 2022	June 2022 – March 2023	March 2023
Solarization	Planting, $CaCl_2$ application, standard practices of production	Harvest, compilation of results	Solarization	Planting, C_aCl_2 application, standard practices of production	Harvest, compilation of results

The demonstrations will be continued with another set of farmers by each implementing centres during 2022-23.

5. Innovative 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 Establishment of Distillation Unit

Aromatic crops are some of the most profitable but underutilized crops, which have immense potential to alleviate socio-economic conditions of small and marginal farmers. Essential oils of these crops have very high demand in national and international market. India stands third in world's total essential oil production with a share of 16-17 percent and stands second in terms of value with the share of 21-22 percent. The country's Rs.15,000-crore fragrances and flavors market (aromatic sector) are witnessing buoyant times with consumption /demand going up in the Fast Moving Consumer Goods (FMCG) sector, rapid penetration in the rural market, and growing acceptance of Indian items in the global market. Aromatic essential oils are mainly used by pharmaceutical, fragrance, perfumery and aromatherapy industries. The market for industrial fragrances, which go into end products, from toothpaste, talcum powder, soaps and agarbattis, and flavours that go into food items, have been driven by several factors – the growth of the FMCG sector in the country, affordability for products in the rural parts of the country and growing acceptance of Indian materials in the global market place. However, the growth opportunities in this sector have not been fully utilized.

To promote aromatic crops, the Directorate has been implementing planting material production programme, frontline demonstration of production technologies, trainings for growers and skill development trainings on essential oil extractor for rural youth. As the area under the aromatic crops is increasing, there is a lack of expertise and facilities for processing of the herbage produced to yield quality essential oils. The quality of the aromatic oil produced depends on the technology used for distillation. Steam distillation process involves the use of a distillation unit wherein plant material is distilled with the steam generated outside the unit in a standalone boiler. Essential oil passes with the steam into a condenser and subsequently oil separator where it is separated.

The Directorate has initiated demonstration of the essential oil extraction process through steam distillation unit under MIDH assistance in potential areas. This demonstration will encourage small and marginal farmers for extraction of essential oil, processing and marketing and thus help them become self-reliant to earn appropriate profits from cultivation of aromatic crops. Under this programme, the Directorate allotted funds to 2 agencies for establishing demo distillation units during the year 2021-22. The list is as under:

a) Banda Agricultural University, UP
b) University of Horticulture Sciences, Bagalkot, Karnataka

5.2. 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 nad 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 the 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 the microrhizome derived protray seedlings to the 10 different network centres in 2020-21. 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. Financial assistance to renovate, upgrade and establish poly house structures in these centres was also provided. On completion of the programme, it is proposed to produce 30 lakhs single bud transplants which will be distributed to licensed farmers / university centres for further multiplication and distribution covering an area of 50 ha to yield a minimum of 1000 tonnes of disease-free ginger seed material.

Glimpses of innovative programmes implemented in 2021-22

171. Demonstration of Distillation unit installed at DMAPR, Anand, Gujarat

172. Distillation unit established at IGKV

173. Distillation unit at CHEFT. UHS, Bagalkot

174. Microrhizomes prepared at KAU, Thrisssur

175. Raising single bud protray seedlings of ginger at KAU, Thrissur

176. Ginger seedlings planted under Scaling Up programme at KAU

177. Scaling up of microrhizome technology in ginger seed production at KAU, Vellayani

178. Micro rhizome technology - Ginger Rhizome harvested

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 2021-22, 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.

Sher-e-Kashmir University for Agriculture and Technology, Kashmir conducted 200 hrs. skill trainings successfully on different job roles. The details are as under :-

a. Skill development training programme on Vermicompost Production was conducted on 25th February, 2022 at KVK Nyoma, SKUAST- Leh Ladakh. The event was inaugurated by Dr. Jigmet Yangchan, Head cum Course Trainer / Course Director of Skill training KVK, Nyoma. The trainee's team arrived at the venue one day before, on 24th Feburary, 2022, to receive briefing regarding agendas of training and coordination of facilitation. Dr Jigmet Yangchan inaugurated the training programme with a brief introduction on organic farming scenario of Ladakh and stated that Vermicompost technology is an alternative source of livelihood under Ladakh condition. The major topics on which the lectures held were on Scope of organic farming in India by Dr. Stanzin Angmo, Project Officer, Agriculture Deptt., Leh, on Morphology of earth worms and its life cycle by Dr. Jigmet Yangchan; Identifying and procurement of correct species of earthworms from authentic sources by Dr. Jigmet Yangchan; Practicals on taking reading of moisture and temperature measurement before harvesting, Lecture cum practical Harvest mature vermicompost at appropriate stage using heap method, Practical on Harvesting and Packing of vermicompost and Practical on storing vermicompost.

b. Skill development training programme on "Medicinal Plants Grower" under MIDH was conducted at Faculty of Forestry, SKUAST, Kashmir from 10th March to 5th April, 2022. The training was inaugurated by Prof. Nazir Ahmad Ganaie, Hon'ble VC, SKUAST, Kashmir in the presence of Prof. Sarfaraz Ahmad, Director of Research and other senior officials of the university. Prof. S.A. Gangoo, Dean, Faculty of Forestry welcomed the guests and trainees, and briefly highlighted the genesis of the programme. Prof. T.H. Masoodi spoke on the occasion and highlighted the importance of the medicinal plants sector in a growing economy. The training course was conducted as per the qualification packs of ASCI and the syllabus/training delivery plan was developed by the institute as per the QPs/Nos of ASCI. The total duration given to both theory and practical parts of the training was 200 hours (Theory: 70 Hrs, and Practical: 130 Hrs). During the 25 days training programme, the participants were trained for different theoretical and practical aspects of medicinal plants growing including "Selection of Proper Nursery Site for Production of Quality Medicinal Plant Material, Management of Medicinal Plants Nursery, Good Cultivation Practices for Medicinal Plants, Post-Harvest Management of Medicinal Plants, Basics of Medicinal Plants Marketing and Health & Safety Practices at Work Place" among others. The theoretical lecture classes were conducted in the class rooms and the practical were conducted in the lab as well as in the field.

179.Trainees at Skill Devp Training on medicinal plants grower at SKAUST, Kashmir

180. Skill Devp Training of Vermicompost production SKAUST, Kashmir

181. Farmers training conducted at SVP, Meerut

182. Farmers Training at KAU,Thrissur

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:-

183. Distribution of seed materials during FT conducted at PAU, Ludhiana

184. Training on Cinnamon bark extraction at CCARI, Goa

185. Distribution of planting materials during FT at JNKVV

186. Farmers training pgme at KVK,Jalaun, BUAT

187. Farmers training programme conducted for ST category at Narnada Dist, by DMAPR, Gujarat

188.Exhibition arranged during FT at BSKKVP, Dapoli

189. Training programme at HAU, Hisar, Haryana

190. FT programme conducted at VRS, Junagadh

191. Training programme organized at AAU, Jorhat

192. Participants of FT pgme at AAU, Jorhat

193. Participants of FT pgme at AAU, Anand

194. FT conducted at BCKV, West Bengal

195. Farmers Training at KVK Bhuj,Gujarat

196. Hands on training at CCARI,Goa during FT programme

197. Planting material distribution during the FT at BSKKVP, Dapoli

198. FT programme conducted at IGKV, Chattisgarh

199. Farmers training programme at KVK, Arnej

200. Scientist delivering lecture during FT pgme at MPKV, Rahuri

201. FT at MPUAT Udaipur on Improved production technlogy of Spices

202. FT pgme organised by OUAT, Orissa

203. Participants of FT held at SKUAST, Kashmir

204. Farmers training organized at YSPHU& F. Solan

205. Input distribution during District level Seminar at UBKV, Malda

206. Farmers Training at CSSHU, Hisar

207. Farmers Training program at HC&RI, Trichy, TNAU

208. FT programme on Chilli conducted at Dr.YSRHU, AP

209. FT on organic ginger and turmeric cultivation at Koraput, OUAT, Bhubaneshwar

210.Training pgme on Processing and value addition CCARI, Goa

211. FT pgme organised at UAHS, Shimoga

212. Farmers training at IISR, Appangala

213.Input distribution during FT at Bhuj, Gujarat

214. FT conducted at RPCAU, Bihar

215. Seed production training programme conducted at KVK,Waghai, by Navsari AU

216.Training programme at JNKVV

217.Director, ICAR-NRCSS, Ajmer, interacting with participants during FT pgme

218.District level workshop on spices production, processing and value addition, UAHS, Shimoga

219.Farmers training programme at UAS, Bangalore

220. FT on spices at JAU, Junagadh

221.Registration of participants at FT organised by NRCSS

7.1 Farmers Training Programmes

S No	Institute	Training topic	Date & Venue	Training details
1	Indian Institute of Spices Research, Calicut	Improved production technologies of major spices (Black pepper, Cardamom and Ginger)	22nd March , 2022 at IISR Regional Station, Appangala	The Training programme was conducted on recent advances in improved varieties, production and plant protection technologies of black pepper, cardamom and ginger. Lectures were delivered by Dr. S. J. Ankegowda, Dr. M. S. Shivakumar, Dr. Honappa Asangi and Dr. Balaji Rajakumar M. of ICAR-IISR Regional Station, Appangala. More than 130 farmers from different regions of Karnataka attended the training programme. The farmers were provided with a training kit consisting of training e-manual CD, booklet (organic spice production), black pepper extension folder (Kannada), monthly operation schedule for cardamom and black pepper. Turmeric rhizomes (one kg) and black pepper micronutrient mixture (half kg) were given to the participants.
2	Junagadh Agril. Univ., Junagadh, Gujarat	Seed Spices Scientific Cultivation, Value Addition and Export	7th March, 2022 at Chiroda, Mendarda, Junagadh	Trainings were organized on the topics (a) Development & Scope of Seed Spices Crops in Gujarat (b) Pest Management in Seed Spices Crops (c) Improved Variety of Seed Spices Crops (d) Disease Management in Seed Spices Crops (e) Important Keys for Increase Production of Seed Spices Crops (f) Certified Seed Production of Seed Spices Crops

				and (g) Organic Farming in Seed Spices Crops. One Training Manual in vernacular language on Seed Spices Scientific Cultivation, Value Addition and Export (Beej Masala Pako Ni Vaignanik Kheti, Mulyavardhan Ane Nikas in vernacular language) was released and distributed among the participants on this occasion. Total 80 farmers including women/ SC and ST farmers took part in the programme.
3	Agricultural University, Jodhpur, Mandor	Good agriculture practices in seed spices crops	16th Feb, 2022 at KVK, Gudamalani (Barmer)	The Training programme was conducted on cultivation practices of seed spices and cumin. Lectures were delivered on weed management in cumin, Seed production in cumin and Improved production technology in seed spices. 50 farmers from the scheduled caste category took part in the programme.
		Scientific crop production technology in spices crops	16th March, 2022 at Khudiyala, Balesar (Jodhpur)	The Training was organised on Integrated pest & disease management in seed spices, Post-harvest management in spices. Lectures on Production technologies in seed spice crops and Weed management in seed spices crop were delivered. 70 farmers from the scheduled caste category took part in the programme.
		Improved Production Technology of Seed Spices	15th Jan, 2022 at University adopted Village Madar, Badgoan, Udaipur	The training programme was on cultivation of spice crops. The chief guest of the program Dr. S. K. Sharma, Director Research, Udaipur motivated the farmers to use spice crops and earn more economic profit by cultivating them. Dr. Rekha Vyas, Zonal Director Research, Agricultural Research Center, Udaipur in her lecture encouraged the farming women to increase their participation in the cultivation of spice crops. Four other resource persons from the university delivered lectures on various aspects of spices production, improvement and protection. Total 35 farmers took part in the programme.

4	Maharana Pratap University of Agri. &Tech., Udaipur, Rajasthan	Improved Production Technology of Spice Crops	15th Jan, 2022 at KVK, Bhilwara	The training programme was organised on Improvement and protection, importance and scope of seed spices in southern Rajasthan, important aspects of improved cultivation of spice crops, post-harvest management of seed spices, integrated insect-pest management in spice crops were the other topics that were discussed. Resourse persons for the training programme were from the university. During the training, chilli and garlic seedlings were distributed along with training material to all the farmers. Total 35 farmers took part in the programme.
		Improved Production Technology of Spice Crops	29th Jan, 2022 at KVK, Dungarpur	Training were organized on the topics (a) importance of spice crops in Rajasthan (b) tips to the farmers for getting higher production in spice crops and (c) integrated management of insect pests in spice crops integrated Disease Management in spices. 41 framers took part in the training progarmme.
		Improved Production Technologies for Spice Crops	3rd Feb, 2022 at KVK, Chittorgarh	Resource persons from the university delivered lectures on various aspects of spices production, improvement and protection. Status and importance of seed spices in the southern region, post-harvest management of important seed spices, cultural practices for improved cultivation of seed spices integrated disease and insect-pest management in spice crops were also discussed in the programme. Around 40 framers took part in the training progarmme.
5	Navsari Agril. University, Navsari, Gujarat	Off-Campus Seed production training programme on turmeric and black pepper	15th Feb,2022 at KVK, Waghai	The training programme was organised on Quality seed production techniques, higher yield potential varieties, crop management, pest and disease management, post harvest handling and storage. Lectures on the topics were delivered by the scientists from the university. Over 80 and 75 farmers each took part in the

		Off-Campus Seed production training programme on turmeric and black pepper	23rd March, 2022 at KVK, Waghai	training programme with a majority being female participants in different village of Dang dist. The district has a population of about 94% belonging to the Schedule Tribe category.
6	Central Agriculture. University, Pasighat	Improved production technology of spices grown in Arunachal Pradesh	9th & 10th March, 2022 at College of Horticulture & Forestry, Pasighat	The training programme was inaugurated by Prof. B.N. Hazarika, Dean, CHF. He highlighted the scope and importance of spices cultivation in Arunachal Pradesh and also encouraged the farmers for growing of cash crops like ginger and turmeric. Dr. Pranabjyoti Sarma, Professor, Department of Vegetable Science & PI of the scheme delivered a presentation on "Status of spices cultivation in Arunachal Pradesh". Dr. Anil Kumar, Assistant Professor delivered a lecture on "Ginger and turmeric cultivation in Agroforestry based farming system". 75 farmers from East Siang district of Arunachal Pradesh attended the programme
7	Directorate of Medicinal and Aromatic Plants Research, Anand, Gujarat	Awareness-cum-Training Program on MAPs	21st January 2022 at Alindra, Nadiad	The aim of this training was to provide knowledge to SC farmers on aromatic and medicinal plants. The introduction about the programme was given by Dr. Khadke G. N. Scientist and In charge of the Scheme, ICAR-DMAPR, Anand. Lectures were delivered on sustainable collection of MAPs from the wild sources and production technology of tulsi and jal brahmi, improved production technology of the aromatic grasses for the high income generation, importance of GAPs in medicinal and aromatic plants and role of MAPs in human health. About 82 farmers took part in the programme.

		Improved Production Technology of MAPs	5th January, 2022 at Dhamadra Village of Narmada District	A farmers training on "Improved Production Technology of MAPs" for the tribal farmers was conducted at Dhamadra Village of Narmada District on 5th January, 2022.The aim of this training was to provide knowledge to tribal farmers on aromatic and medicinal plants. Lectures were delivered by Dr. P.L. Saran, Principal Scientist, ICAR-DMAPR, Anand, Dr. Khadke G. N., Scientist and PI and Dr. Prince Choyal Scientist, ICAR-DMAPR, Anand. About 80 farmers took part in the programme.
8	Anand Agril. University, Anand, Gujarat	Scientific Cultivation of Seed Spices	28th Feb, 2022 at KrishiVigyan Kendra, AAU, Arnej.	One day training programme on scientific cultivation of seed spices conducted at KVK AAU, Arnej on 28th February,2022. Lectures were delivered on Importance of Spice Crops and their Varieties, Scientific Crop Cultivation of Spice Crops, Value Addition in Spices, Irrigation Management in Spices Crops, Importance of Spices and Medicinal Crops in Animal Science, Plant Protection Measures in Spice Crops and Nutrient Management in Spice Crops. About 100 farmers including women and SC/ST farmers took part in the programme.
		Spices Condiments Vegetable Crops	5th January, 2022 TRTC, Devadhbaria, District: Dahod	One day training programme on spices, and condiments was conducted at TRTC, Devadhbaria, Dahod on 5th January, 2022. Lectures were delivered on Importance of Vegetable and Spices Crops, Medicinal Importance of Vegetable and Spices Crops, New Approaches in the Cultivation of Chilli, Fertilizer and Irrigation Management in Vegetable and Spices Crops, Scientific Cultivation of Ginger and Turmeric, Advanced Cultivation in Onion and Garlic and Protective Crop Cultivation in Vegetable and Spices Crops.Total 75 progressive women farmers from different villages of Dahod district participated in the training programme.

9	Bidhan Chandra Krishi Viswa Vidyalaya, W.B.	Spices & Aromatic Plants	28th March. 2022 at Seminar Hall, Directorate of Extension , BCKV, Dt - Nadia	The training programme was organised on the topics (a) Scope and importance of Spices in West Bengal, Role of MIDH project for farmers (b) History of spices, Agroclimatic advantages of west Bengal for Growing Spices and aromatic crops (c) Improved Production technology, Ginger/Turmeric under fruit based multiple cropping system (d) Protected cultivation and soil less culture of important herbal crops and (e) Indigenous spices and medicinal crops, Spices for rural livelyhood. About 95 farmers including SC and ST took part in the programme.
		Spices & Aromatic Plants	30th March, 2022 at Seminar Hall, North 24 pgs KVK, University of Animal & Fishery Sciences, WB Dt – North 24 Parganas	The training was organised on the topics - Scope of Spices in West Bengal North 24 pgs. a Potential area for seed spices, chilli and turmeric, Black Pepper multiplication, Turmeric, Aromatic Crops and ginger growing, Cultivation of seed spices and curry leaf, Black Pepper, Ginger and Turmeric. Field level problems and prospects of spices, Soil and fertilizer management in Spice cultivation and Organic Production of Spices was also discussed during the pgme. About 98 farmers including SC and ST farmers took part in the programme.
10	National Research Centre on Seed Spices, Ajmer.	Organic cultivation of cumin and coriander"	26th February, 2022 at ICAR-NRCSS, Ajmer (Rajasthan)	The programme was inaugurated by Director, ICAR-NRCSS, Ajmer. In his inaugural speech he briefed farmers about importance of organic farming in present scenario and scope of organic production in cumin and coriander. Dr. D. Meena, Dr. Shiv Lal and Dr. B. K. Mishra delivered lectures. The training programme was attended by 87 farmers of SC community of different villages of Ajmer District.

		Clean and safe production of seed spices for better health and more income	11th March, 2022 at ICAR-NRCSS, Ajmer	The training progamme was inaugurated by Director, ICAR-NRCSS, Ajmer. He insisted upon the farmers to grow safe and clean seed spices in the view of better health and more income. Scientists from ICAR-NRCSS delivered lectures on management of diseases by eco-friendly measures, pesticide free cumin production, organic seed production in seed spices, importance and scope of organic farming in seed spices. 75 farmers of SC community of different villages of Ajmer district participated in the training programme.
		Economical cropping system and organic farming in seed spices	24th March, 2022 at Som Panchayat Samiti, Phalasia, Udaipur	During the training, Mr. S. D. Meena, AAO, Phalasia, Udaipur briefed the participants on the introduction of seed spices in tribal areas. Dr. N. Chaudhary and Dr. R. D. Meena, scientists of ICAR-NRCSS delivered lectures on seed spices based economical cropping system and management of diseases by eco-friendly measure respectively. 83 farmers of ST community of different villages of Phalasia, Udaipur district participated in the training programme.
11	Sardar Krushi Nagar Dantiwada Agri University, Gujarat	Seed Spices	10th February, 2022 at Antarwada, Tal. Dantiwada, Dist. Banaskanth	Three farmers training prorammes on seed spices at Santarwada village of Dantiwada taluka, Antro village of Tharad taluka of (Banaskantha district) and Matarwada village of Poshina taluka of Sabarkantha district of Gujarat. The main topics of the trainings 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.

		Seed Spices	7th March, 2022 at Antrol, Tal. Tharad, Dist. Banaskantha	technology (d) Crop production and protection technologies of seed spices under organic farming condition (e)Integrated Pest and disease Management in seed spices (f) Processing, post harvest and Value addition in seed spices (g)Improved varieties and seed production technologies in seed spices with special reference to seed village concept (h)Export barriers and quality standards in seed spices. During three different trainings total 352 farmers from different talukas of Banaskantha and Sabarkantha districts of Gujarat took part in the programme.
		Seed Spices	21st March, 2022 at Matarwada, Tal. Poshina, Dist. Sabarkantha	
12	Uttar Banga Agricultural University, W.B.	Training programme on spices	9th and 10th March, 2022 at Manikchak, Malda	Training was organized on the topics (a) Importance and scope of spices cultivation in Malda district of West Bengal (b)Turmeric Rhizome and ginger Production Protocol in nutrient and weed management and (c) Seed Spices with special reference to Black cumin & Coriander production under Conservation Agriculture technology. About 112 farmers took part in the programme.
13	Banda university of Agril. & Technology, Banda, U.P.	Production Technology of Spices & Betelvine in Bundelkhand Region	9th March, 2022 at KVK, Lalitpur.	The training programme was conducted by the resource persons from KVKs and faculty members of BUAT, Banda. Topics covered by them were Practices of Organic Farming in Cultivation of Seed Spices, Insect, pest and Disease Management in Spices and Betelvine, Good Agricultural Practices for Cultivation of Betelvine, Prospects of Entrepreneurship Development through Betelvine Cultivation, Value Addition in Spices Opportunities and Avenues, Technique of Vermicompost Production and Waste Management in Agriculture. Total 87 farmers including women/ SC/ST/OBC and general farmers took part in the programme.

		Production Technologyof Spices in Mahoba Region	14th March,2022 at KVK, Jalaun	The training of the farmers was conducted by Resource persons from KVKs of Banda AU. Topic covered included Various Methods of Composting, Value Addition and Post-Harvest Management of Spice Crops and Prospects of Spice Production in Bundelkhand Region.Total 86 farmers including women/SC/ ST /OBC and general farmers took part in the programme
14	Kerala Agricultural University, Thrissur	Field day on Micro rhizome Technology in Ginger	25th Sep., 2021 at Training Hall, Model Nursery on Spices & Plantation.	One day farmers training program was conducted on "Field day on Micro rhizome Technology in Ginger" at Training Hall, Model Nursery on Spices & Plantation on 25th September, 2022. Total 18 farmers took part in the programme.
		Harvest festival of Micro rhizome Technology in Ginger	15th Jan, 2022 at KAU	One day farmers training program was conducted on 'Advanced production technologies of ginger using microrhizomes' at KAU on 15th January, 2022. Total 30 farmers took part in the programme.
		Role of bio fertilizers in Spice Crops	30th March, 2022 at Mulam-kunnathkaavu Krishi Bhavan	One day farmers training program was conducted on 'Role of bio fertilizers in Spice Crops ' at Mulamkunnathkaavu Krishi Bhavan on 30th March, 2022. Total 30 farmers took part in the programme.
15	Choudhary Charan Singh Haryana Agricultural University, Hissar, Haryana	Training programme on spices	11th March, 2022 at HAU, Main campus	The Department of vegetable science conducted the FT programme on production technology of spices crops at their centre. Extension activities on spice crops were conducted during the period to create awareness among the farmers regarding cultivation of the crops for diversification in agriculture. Training material and kit were distributed to the participants. Resource persons from the university delivered lectures on package of practives and usefulness of these crops. Over 75 farmers including women farmers took part in the programme.

16	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	Training programme on spices	31st Oct, 2021 at Girad, Wardha district	The Training programme on "Advances in production technology of spice crops for farmers was organised on 31st Oct 2021. The programme was couducted exclusively for Tribal farmers of ST category. Dr. P K Nagre and Dr. V S Kale handled the technical sessions and delivered lectures on production technology of Turmeric, Ginger and Seed spices. A detailed interaction with the farmers followed by the training programme and querries from them were replied to. A field visit to a Turmeric plot at Girad was also organised.
		Production technology of spices	4th March 2022 at College of Horticulture, Dapoli	The training programme was conducted on production of quality material spices in Konkan region, Production technology of Black Pepper, Cinnamon, Nutmeg, Turmeric, Clove etc. Intercropping with spices in coconut orchard. Dr. B R Salvi and other scientists from the university handled the technical sessions. 150 farmers took part in the training programme with a majority being female participants. The training programme was exclusively for SC and ST communities of Dapoli and Madangad tehsils.
17	Dr. Balasaheb Sawant Krishi Vidyapeeth, Dapoli, Maharashtra	Production technology of spices	14th March, 2022 at College of Horticulture, Dapoli	The training programme was conducted on production of quality material spices in Konkan region, production technology of Black Pepper, Cinnamon, Nutmeg, Turmeric, Clove etc. Intercropping with spices in coconut orchard. Dr. B R Salvi and other scientists from the university handled the technical sessions. 137 farmers took part in the training programme with a majority being female participants. The training programme was exclusively for SC and ST communities of Dapoli and Khed tehsils
		Production technology of spices	21st March, 2022 at Shirsoli, Dapoli	The training programme was conducted on production of quality material spices in Konkan region, production technology of Black Pepper, Cinnamon, Nutmeg, Turmeric, clove etc. Intercropping with spices in coconut orchard. Dr. B R Salvi and other scientists from the university handled the technical sessions. 103 farmers took part in the training programme with a majority being female participants. The training programme was exclusively for SC community of Shirsoli village.

18	Jawaharlal Nehru Krishi Vishwavidya-laya, Jabalpur, Madhya Pradesh	Production technology of spices	16th March 2022 at Directorate of Extn. Service, JNKVV	The training was organised to update the knowledge and skills of farmers in modern agricultural technologies of spice crops. The topics covered were Integrated nutrient management, pest management and disease management in spice crops and advances in coriander and fenugreek production technology. Dr. Rajnee Sharma, PI and other senior scientists from the university delivered lectures during the programme. 77 farmers including women farmers took part in the programme. A field visit was also organised.
19	Indira Gandhi Krishi Vishwav-idyalaya, Raipur, Chhattisgarh	Production technology, processing and value addition of spices and aromatic crops	11th and 12th Jan, 2022 at KVK Kanker	The main emphasis of the training was on the aspect of post harvesting technique and processing of turmeric. Other topics of the training were production technology of Lemongrass and Citronella, production technology of palmrosa and tulsi, disease control in Ginger and production technology of spices as a whole. Dr. P K Joshi, Dr. S S Tuteja and other senior scientists from the university delivered lectures during the programme Over 100 farmers from the tribal district took part in the programme. Training kit and literature were distributed to the farmers
		Production technology, processing and value addition of spices and aromatic crops	24th and 25th March, 2022 at KVK Ambikapur	The main emphasis of the training was on the aspect of post harvesting technique and processing of turmeric. Other topics of the training were production technology of Lemongrass and Citronella, production technology of palmrosa and tulsi, disease control in Ginger and production technology of spices as a whole. Dr. P K Joshi, Dr. S S Tuteja and other senior scientists from the university delivered lectures during the programme Over 75 farmers from the tribal district took part in the programme. Training kit and literature were distributed to the farmers.

20	Punjab Agriculture University, Ludhiana, Punjab	Cultivation and processing of Aromatic and spice crops	26th Nov, 2021 at KVK, Patiala	Training schedule were planed as per the needs of the farmers and accordingly lectures related to importance, scope, uses, cultivation practices, processing and marketing of aromatic and spice crops were delivered. Director, School of Organic Farming, PAU, Dr. Rajinder Kumar, PI and other scientists from the university having expertise and experience in the relevant field delivered lectures during the programme. The machinery developed by PAU for turmeric processing was displayed and explained. An exhibition, displaying live plant samples of different aromatic, medicinal and spice crops were also arranged at the training venue. Besides plant samples, seed samples of different medicinal, aromatic and spice crops were displayed. Besides technical know-how, the farmers were also benefitted through distribution of planting material comprising different herbal plants and one kg fenugreek of variety ML Over 75 Farmers took part in the programme.
		Cultivation and processing of Aromatic and spice crops	30th Nov 2021 at KVK Langroya	Training schedule were planned as per the needs of the farmers and accordingly lectures related to importance, scope, uses, cultivation practices, processing and marketing of aromatic and spice crops were delivered. Director, School of Organic Farming, PAU, Dr. Rajinder Kumar, PI and other scientists from the university having expertise and experience in the relevant field delivered lectures during the programme. The machinery developed by PAU for turmeric processing was displayed and explained. An exhibition, displaying live plant samples of different aromatic, medicinal and spice crops were also arranged at the training venue. Besides plant samples, seed samples of different medicinal, aromatic and spice crops were also displayed. Besides technical know-how, the farmers were also benefitted through distribution of planting material comprising different herbal plants and one kg fenugreek of variety ML. Over 75 Farmers took part in the programme.

21	Orissa University for Agriculture and Technology, Bhubaneshwar, Orissa	Organic Ginger and Turmeric Cultivation	4th March, 2022 at RRTTS, Semiliguda	Lectures were delivered on soils suitable for organic ginger cultivation and soil conservation measures, Intercropping in ginger and turmeric, use of Mulching in ginger cultivation and value addition of ginger, Cultivation practices of ginger and turmeric, Weed Management and irrigation in ginger cultivation and Rapid multiplication techniques of ginger and turmeric cultivation. Over 75 farmers from the ST community took part in the programme
		Organic Ginger and Turmeric Cultivation	16th March, 2022 at HRS, Pottangi	Lectures were delivered on Soils suitable for organic ginger cultivation and soil conservation measures, Intercropping in ginger and turmeric, use of Mulching in ginger cultivation and value addition of ginger, Cultivation practices of ginger and turmeric, Weed Management and irrigation in ginger cultivation and Rapid multiplication techniques of ginger and turmeric cultivation. Over 75 farmers from the ST community took part in the programme.
22	University of Agricultural Sciences, Bangalore	Production of spices and Aromatic crops	3rd March, 2022 at Bearambadi Village	One day Farmers training Programme on production of "Spices and Aromatics Crops" was organized by the University of Agricultural Sciences, Bangalore on 3rd March 2022 at Bearambadi village, Gundelpet, Karnataka. The programme was inaugurated by Mrs. Sanju Kumari, H.N., Grama Panchayath President, Berambadi village. The welcome address was done by Dr. Srinivasappa, K. N.,PI-MIDH and Professor of Horticulture, Department of Horticulture, UAS (B), GKVK, Bengaluru. Topics covered during training programme were Cultivation, harvesting, and post-harvest practices of Spice crops, Value addition and Marketing of Spices and Aromatic crops, Demand for Aromatic & Spice crops in pharmaceuticals, cosmetics and other related industries, and production of Turmeric and Ginger. Seventy five farmers from different villages of Chamarajanagar Dist, Karnataka were attended the training programme.

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, discussions with the officers concerned.

8.1 Review Meeting of MIDH programmes being implemented by DASD

The fifteenth Annual Review meeting of the MIDH programmes implemented through the Directorate of Arecanut and Spices Development, was held on 25-26 June 2021 through video conferencing. There were around 85 participants representing 45 agencies implementing DASD programmes.

Dr. Homey Cheriyan, Director, DASD, welcomed the guests and delegates to the online meeting and in his introductory remarks, briefed about the scenario of production and export of spices and relevance of MIDH programmes implemented by the Directorate in improving the same.

Dr. S. K. Malhotra, Agriculture & Horticulture Commissioner, Govt of India inaugurated the review meeting. In the inaugural address, he commented that in the present pandemic situation, importance of spices has increased and demand has upsurged as immunity boosters. To enhance productivity and income through spices cultivation, shortage of quality planting material must be addressed on priority. He also mentioned that establishing network of nurseries with accreditation, producing quality planting material following standard protocols developed and mother blocks should be given top priority. He pointed out that the Govt of India closely monitors progress of development programmes implemented for high value crops like spices and the issues related to implementation at institute level need to be addressed to achieve the expected outcome. Dr. N.K Patle, Addl Commissioner (Hort), Dr. K.Nirmal Babu, Former Director, IISR, Dr. EVD Sastry also addressed the participants during the inaugural session.

The technical session began at 10.30 AM under the chairmanship of Dr. S. K. Malhotra, Agriculture & Horticulture Commissioner where Dr. N.K Patle, Addl Commissioner (Hort), Dr. K.Nirmal Babu, Former Director, IISR, Dr. EVD Sastry and Dr. Gopal Lal were invited as experts to review the programme. Center/institute wise presentation were done by principal Investigators/ representatives 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.

On completion of the agencywise review, Director, DASD, invited Agri & Horti Commissioner for concluding remarks. He called upon all the universities for taking forward technologies like organic production, protray technique etc, building nursery infrastructure facilities and better utilization of resources. He suggested that priority to be given for nursery accreditation in perennial crops. The shortfalls in achievements of the scheme programmes are of concern, but many of them were due to lockdown and natural calamities like cyclone and floods. It may be kept in mind that the effective implementation of the scheme programmes supports state system. Indents for planting material may be taken from state department before planning targets for planting material production. Only new varieties / highly performing varieties released /notified

are to be multiplied under the programme. He encouraged the implementing centres to do more programmes and to make better utilization of resources so that our country's planting material production system is strengthened. More focus may be given for priority crops like Cinnamon, Cumin and Large cardamom.

The Agriculture and Horticulture Commissioner announced best performer award to the best implementing agency in 2020-21 (based on highest score achieved for criteria fixed by DASD) and certificate of appreciation for project leaders of best three projects implemented last year under DASD-MIDH programmes.

a. Best Performer Award

Tamil Nadu Agricultural University was awarded the best performer award for their good performance and utilization of funds consistently for the last three years.

b. Certificate of Appreciation – for best project leader

Dr. P Jayaraj – For the implementation of the "Pilot project on participatory mode rehabilitation of Black Pepper in Cheruthazham Panchayat" under the Mission for Integrated Development of Horticulture (MIDH) scheme implemented by this Directorate during the year 2015-16 to 2019-20 through KVK Kannur, Kerala Agricultural University.

Dr. Krishna Kant – For the implementation of the project on "Establishment of demonstration plots for pesticide free cumin production in Nagaur district of Rajasthan" under the Mission for Integrated Development of Horticulture (MIDH) scheme implemented by this Directorate during the year 2020-21 through ICAR-NRCSS , Ajmer.

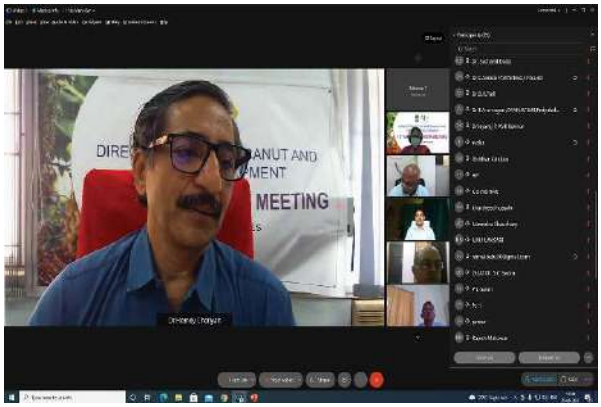
Dr. S S Tuteja – For the implementation of the project on "Establishment of frontline demonstration plots of Aromatic Plants in tribal areas of Chattisgarh" under the Mission for Integrated Development of Horticulture (MIDH) scheme implemented by this Directorate during the year 2020-21 through IGKV, Raipur.

The Agriculture and Horticulture Commissioner congratulated the award winners and said that this would be inspiring for other participants to perform better.

Action points as emerged from Agriculture & Horticulture Commissioner's concluding remarks.

1. Multiplication of seed and planting material of notified varieties only need to be taken up.
2. Nurseries supported under this programme should immediately apply for accreditation. If any institute does not apply, the funds may be stopped. It may be strictly followed.
3. Seed produced through this scheme should be for 10 year old varieties and it should undergo the process of seed certification through respective states.
4. Cinnamon, Large Cardamom and Cumin should receive special emphasis in planting material programmes.
5. DASD should update the availability of planting material in its spice nurseries portal.

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



222. Dr. Homey Cheriyan , Director, DASD delivering the welcome address at ARM 2021

223. Dr. S. K. Malhotra, Horticulture Commisioner delivering the inaugural address

224. Dr Naveen Kumar Patle, Additional Commissioner interacting with the delegates

225. Dr.Nirmal Babu, Director IISR addressing the delegates

226. Dr.Femina , Dy Director DASD delivering the vote of thanks

3. STATISTICS

The exhaustive, reliable and timely statistics have been identified as the foremost requirement for evolving the development strategies in agriculture 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

As per the third advance estimates for 2021-22, production of spices in the country is 108.13 lakh tones from an area of 44.87 lakh ha, which registered a decrease of 2.76 % in production and an increase of 0.73% in area when compared to 2020-21. Among the various spices, turmeric, garlic, cinnamon, clove, tamarind, fenugreek and ajwain 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 2020-21 and 2021-22 are given below :-

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

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

Spices	2021-22			2021-22 (3rd Adv.Est.)		
	Area	Production	Productivity	Area	Production	Productivity
Black Pepper	309.363	140.641	455	288.274	96.729	336
Ginger (Fresh)	204.508	2219.813	10854	192.869	2172.485	11264
Red Chillies	700.563	2048.622	2924	851.800	1577.622	1852
Turmeric (Dry)	292.753	1135.174	3878	349.430	1334.310	3819
Garlic	392.232	3190.255	8134	429.299	3498.307	8149
Cardamom	84.871	33.942	400	85.782	26.824	313
Coriander	656.075	888.760	1355	638.623	823.718	1290
Cumin	1087.010	795.310	732	934.038	628.788	673
Fennel	82.767	137.388	1660	64.932	115.037	1772
Fenugreek	156.156	241.183	1544	168.664	254.871	1511
Ajwain	42.008	35.569	847	38.175	39.305	1030
Dill/Poppy/Celery	25.279	30.510	1207	22.936	28.310	1234
Cinnamon/Tejpat	1.956	4.880	2495	1.660	3.973	2394
Nutmeg	24.431	15.595	638	24.099	15.385	638
Clove	1.944	1.185	610	2.208	1.333	604
Tamarind	41.626	156.268	3754	44.532	161.725	3632
Vanilla	0.110	0.044	399	0.175	0.076	432
Mint (Mentha)*	347.278	45.799	132	346.299	35.007	101
Saffron	3.657	0.004	1	3.565	0.004	1
Total	**4454.589**	**11120.939**	**2497**	**4487.361**	**10813.809**	**2410**

**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 6.20 lakh tonnes from an estimated area of 6.08 lakh ha in 2020 against a production of 6.81 lakh tonnes from 6.03 lakh ha during 2019. The world production of pepper has decreased in 2019-20 when compared to 2018-19. Vietnam is the largest pepper producing country with a production 2.5 lakh tonnes from 1.13 lakh ha.

Table 2. Country wise area, production and productivity of pepper during 2019 and 2020

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

Country	2019			2020		
	Area (ha)	Production (tonnes)	Productivity (kg/ha)	Area (ha)	Production (tonnes)	Productivity (kg/ha)
Brazil	30700	95000	3094	35000	99000	2829
India	259148	104071	402	309363	140641	455
Indonesia	119200	86083	722	116816	81000	693
Malaysia	7587	18500	2438	7499	21000	2800
Sri Lanka	40500	23970	592	41744	25000	599
Vietnam	130000	240000	1846	130000	180000	1385
China	21000	25000	1190	21000	30000	1429
Madagascar	4000	4500	1125	4000	5000	1250
Thailand	600	5000	8333	600	5000	8333
Cambodia	7471	18000	2409	7471	20000	2677
Ecuador & Others	2800	5000	1786	2800	4000	1429
Total	**623006**	**625124**	**1003**	**676293**	**610641**	**903**

Source : India - DASD, Other countries - IPC

1.2 Arecanut

Arecanut production in the country was 15.59 lakh tonnes from an estimated area of 7.93 lakh ha in 2020-21. As per the third advance estimates for 2021-22, area under Arecanut have decreased to 7.89 lakh ha and production also decreased to 14.24 lakh tonnes. 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 2020-21 and 2021-22 are given in Table 3.

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

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

State	2020-21			2021-22		
	Area	Production	Yield	Area	Production	Yield
Karnataka	549.661	1238.014	2252	540.000	1100.000	2037
Kerala	96.570	103.159	1068	96.223	104.227	1083
Assam	67.729	53.404	788	68.406	53.938	788
Meghalaya	18.242	24.059	1319	18.218	24.001	1317
West Bengal	11.911	23.671	1987	12.075	24.842	2057
Tamil Nadu	7.762	11.908	1534	9.051	17.973	1986
Tripura	7.195	24.678	3430	7.250	24.868	3430
Mizoram	21.420	33.540	1566	21.418	33.540	1566

Andaman & Nicobar Islands	4.018	13.731	3418	4.351	11.564	2658
Maharashtra	3.002	4.745	1581	3.285	4.162	1267
Goa	2.000	4.100	2050	2.072	4.135	1996
Andhra Pradesh	1.318	11.887	9019	3.850	7.640	1984
Nagaland	0.220	1.219	5541	0.282	1.637	5805
Pondicherry	0.052	0.083	1596	0.051	0.079	1549
All India	**793.705**	**1559.754**	**1965**	**789.137**	**1424.162**	**1805**

Country-wise area and production of arecanut were collected from Food and Agriculture Organization, Rome. World production of arecanut in 2020 was estimated as 24.55 lakh tonnes from an area of 14.92 lakh ha against 21.74 lakh tonnes from 14.50 lakh ha reported in 2018. India accounts for 49% of area and 58% of production of Arecanut in the world.

Table 4. Country-wise area and production of Arecanut

Country	2019			2020		
	Area (ha)	Production (tonnes)	Yield (kg/ha)	Area (ha)	Production (tonnes)	Yield (kg/ha)
India	731652	1352839	1849	793511	1563155	1970
Indonesia	188490	149450	793	138228	132601	959
China (Taiwan Province)	40920	103767	2536	40183	98565	2453
Myanmar	56545	135664	2399	70062	203215	2901
Bangladesh	386957	316715	818	405014	328610	811
Sri Lanka	18275	53645	2935	18208	63986	3514
Thailand	23485	40037	1705	22657	38204	1686
Nepal	1737	5542	3191	2653	8782	3310
Bhutan	1747	16107	9220	1767	17446	9873
Malaysia	60	206	3433	1	2	2000
Kenya		113			113	
Maldives	37	27	730	13	13	1000
Total	**1449905**	**2174112**	**1499**	**1492297**	**2454692**	**1645**

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.

Due to COVID 19 Pandemic, Indian Spices Export has showed a downward trend in 2021-22 when compared to 2020-21. The export of spices during 2021-22 was 15.31 lakh tonnes valued at Rs.30576 crores against 17.58 lakh tonnes valued at Rs.30973 crores (US $ 4.179 billion) during 2020-21. The export has shown a decrease of 1.28% in rupee value and 13% in quantity compared to last year. Chilli continued to propel the growth story as India's largest exported spice, accounting for Rs 5.57 lakh tonnes valued at Rs 8581.89 crores. Export of pepper, cardamom, turmeric, fennel, celery, garlic, other spices and mint registered significant increase during this year. Export of chilli, turmeric, coriander, cumin and fenugreek decreased during the year 2020-21.

Table 5. Estimated export of Spices during 2020-21 and 2021-22.

Spices	2020-21		2021-22	
	Quantity (tonnes)	Value (Rs. in Lakhs)	Quantity (tonnes)	Value (Rs. in Lakhs)
Pepper	19,980	57,069	21,882	75,393
Cardamom (Small)	6,486	110,347	10,572	137,570
Cardamom (Large)	1,220	9,636	1,984	15,454
Chilli	649,815	924,127	557,168	858,189
Ginger	145,974	84,982	147,614	83,734
Turmeric	183,868	172,265	153,154	178,434
Coriander	57,359	49,628	48,658	48,251
Cumin	298,423	425,155	216,996	334,434
Celery	7,438	9,815	7,579	9,854
Fennel	33,742	29,396	40,136	41,186
Fenugreek	40,340	26,703	32,406	26,285
Other seeds (1)	68,266	42,629	46,842	40,164
Garlic	17,643	14,971	22,181	18,620
Nutmeg & Mace	3,812	19,115	3,596	21,799
Other spices (2)	54,908	88,959	67,694	101,747
Curry powder/Paste	51,347	117,064	52,444	115,835
Mint Products (3)	27,519	366,713	36,254	444,144
Spice Oils and Oleoresins	16,997	340,569	21,921	447,838
Total	**17,58,985**	**30,97,332**	**15,31,154**	**30,57,644**
Million US $		**4179**		**4102**

(1) Include Ajwain 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.

During the year 2021-22, import of spices in the country registered an increase of 0.3% in terms of quantity and 15% in terms of value. In 2021-22, India imported 224314 tonnes of various spices and spice products valued at 1087 million US $ against the import of 223626 tonnes valued at 949 million US $ in 2020-21. In 2020-21, pepper is the major item in the import contributing 17% of the total spices imported followed by Cassia (13%), turmeric (11%), clove (10%) etc. are the major spices imported into the country during the period. Item-wise import of spices during the year 2020-21 and 2021-22 are given below.

Table 6. Import of Spices in India during 2020-21 and 2021-22

Spices	2020-21		2021-22	
	Quantity (tonnes)	Value (Rs. in Lakhs)	Quantity (tonnes)	Value (Rs. in Lakhs)
Pepper (1)	29416	78135	37188	138490
Cardamom (Small)	311	5663	214	3408
Cardamom (Large)	7799	39811	7045	38952
Chilli/Paprika	1808	4264	2571	5755
Ginger Fresh/Dry	15385	13927	13101	12814
Turmeric	25709	22917	24480	24577
Coriander	8777	5881	15603	13647
Cumin black/white	7139	11121	4733	7935
Other seeds (2)	414	304	1994	2184
Poppy seed	879	1311		
Garlic	7586	3600	1317	847
Clove	27176	98582	22511	105079
Nutmeg	912	2906	1266	5673
Mace	1669	19600	2062	5673
Cassia	37897	79498	29201	68450
Star anise	4218	19075	8462	59228
Oils & Oleoresins	4998	88760	5263	97696
Mint products (3)	4967	52857	4452	47232
Caraway/Fennel	8443	20390	5522	18875
Tamarind	2456	2461	1263	1994
Cinnamon	2632	7633	2460	6758
Asafoetida	1399	78942	1485	77270
Curry powder/paste	4902	11452	7364	15754

Herbal spices (4)	5676	8005	5595	7524
Other spices (5)	10694	25309	19161	26165
Total	**223626**	**703056**	**224314**	**810593**
Value in Million US $		**949**		**1087**

(1) Include white pepper, light pepper & black pepper
(2) Include Aniseed, Asafoetida, Cinnamon, Pepper long, Cambodge, Herbal spices and Spices NES
(3) Include menthol, menthol crystals and other mint oils.
(4) Include basil, hyssop, rose mary, sage, savory ,mint, incl. Leaves (all species), garcinia and greater galangal etc.
(5) Include saffron, kokam, vanilla, spices husk/spent and spices NES

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 2021-22, export of arecanut has increased substantially and India exported 6663 tonnes of arecanut valued at Rs 158.26 crores against an export of 3195 tonnes valued at Rs 85.90 crores in 2020-21. Sri Lanka, Maldives, UAE, USA etc. are the major export destinations of Indian arecanut.

Table 7. Country-wise export of Arecanut from India

Country	2020-21		2021-22	
	Quantity (tonnes)	Value (Rs. in Lakhs)	Quantity (tonnes)	Value (Rs. in Lakhs)
Maldives	650.67	2549.08	633.28	3217.95
USA	150.61	825.66	204.66	1260.38
Sri Lanka	183.07	688.28	574.38	1663.53
UAE	203.40	662.90	718.58	2356.52
U K	92.66	442.93	89	595.42
Singapore	180.04	356.02	172.63	209.32
South Africa	38.74	173.33	26.07	160.38
Australia	27.27	143.58	32.93	207.51
Canada	29.13	136.21	33.12	217.43
Bhutan	35.29	107.15	60.44	201.56
Saudi Arabia	25.04	82.83	2.97	21.01
Nepal	18.63	46.57	14.52	48.01
New Zealand	7.19	41.84	5.71	39.26
Mozambique	9.85	41.56	4.61	18.71
Kenya	10.82	38.55	13.39	55.77
Mauritius	8.12	30.81	13.97	69.55

Germany	3.61	22.52	9.2	69.92
Uganda	3.07	12.13	0.51	1.12
Fiji	2.43	7.75	1.58	7.88
Netherland	0.77	4.30	4.08	26.91
Congo D. Rep.	1.10	3.97		
Trinidad	0.43	2.12	5.81	31.39
Bangladesh	0.50	0.36	1879.57	1180.19
Total (Including others)	**3195.62**	**8590.53**	**6663.37**	**15826.43**

Source: Dept of Commerce, Govt of India

Table 8. Product-wise export of arecanut from India

Country	2020-21		2021-22	
	Quantity (tonnes)	Value (Rs. in Lakhs)	Quantity (tonnes)	Value (Rs. in Lakhs)
Arecanut (whole)	854.68	3442.82	1613.84	5252.38
Arecanut (split)	1151.39	1833.07	2664.85	6111.15
Arecanut (ground)	1.36	4.34	88.58	245.82
Other arecanuts	1188.19	3310.31	2296.1	4217.08
Total	3195.62	8590.53	6663.37	15826.43

In 2021-22, India imported 25979 tonnes of arecanut valued at Rs 674.08 crores against an import of 23988 tonnes valued at Rs 508.58 crores in 2020-21. Usually, arecanut is imported in the form of whole, split, ground and other arecanuts. Sri Lanka and Indonesia are the two major sources of arecanut import in the country. Country-wise import of Arecanut in the country during the last two years are given below.

Table 9. Country-wise import of Arecanut in India

Country	2020-21		2021-22	
	Quantity (tonnes)	Value (Rs. in Lakhs)	Quantity (tonnes)	Value (Rs. in Lakhs)
Sri Lanka	10004	27644	10447	32475
Myanmar	3818	9994	7646	20434
Indonesia	9861	12383	6106	10604
UAE	217	570	1044	1990
Nepal			422	1077
Malaysia			222	583
Singapore	89	267	93	245
Total	23988	50858	25979	67408

Table 10. Product-wise import of Arecanut in India

Product	2020-21		2021-22	
	Quantity (tonnes)	Value (Rs. in Lakhs)	Quantity (tonnes)	Value (Rs. in Lakhs)
Arecanut (whole)	2731	6421	4108	10195
Arecanut (split)	7163	9702	3595	8273
Arecanut (ground)	89	267	0	0
Other arecanuts	14005	34469	18276	48941
Total	**23988**	**50859**	**25979**	**67408**

3. Price statistics

Price behavior 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 macroeconomic 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 centres. 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)	
	2020-21	2021-22	2020-21	2021-22	2020-21	2021-22
April	33023	40209	27000	16000	NT	12750
May	32764	39684	27000		8900	11625
June	33400	42126	27000	20000	8875	
July	32468	41892	28000	17000	11500	10812
August	33533	41578	28750		11000	10000
September	34462	41845	29000	17500	12812	10000
October	34164	44052	28800	17500	16250	10700
November	34800	51564	27250		13833	9000
December	35376	53638	26750		13450	11806
January	34611	51050	24800		13187	12344
February	34667	51814	23250		13000	13924
March	37504	53195	20625		12562	13893
Mean	**34231**	**46054**	**26519**	**17600**	**12306**	**11532**

Table 11 contd... (Price Rs/quintal)

Month	Turmeric (Chennai)		Garlic (Chennai)		Coriander (Chennai)	
	2020-21	2021-22	2020-21	2021-22	2020-21	2021-22
April	11750	12550	4500	8080	-	8580
May	-	12375	-	7875	-	8312
June	-	12417	-	8917	-	8250
July	11750	12100	6000	8500	10500	8650
August	11750	11650	11000	8500	10500	9812
September	11750	10712	11500	7750	11250	10125
October	11600	10700	11040	8100	11300	9100
November	11562	10875	9687	8500	9562	9375
December	11500	11875	8450	7750	9000	9100
January	11725	8687	8500	5200	8750	9375
February	12500	11375	8187	4750	8250	10562
March	12500	12500	6562	4750	8250	12000
Mean	**11839**	**11485**	**8543**	**7389**	**9707**	**9437**

Table 11 contd... (Price Rs/quintal)

Month	Cumin (Chennai)		Fennel (Chennai)		Fenugreek (Chennai)	
	2020-21	2021-22	2020-21	2021-22	2020-21	2021-22
April	-	15410	-	11440	-	7680
May	-	15400	-	11200	-	8150
June	-	15200	-	11600	-	8083
July	14750	15140	9250	12320	6250	8080
August	14750	16250	9187	12475	7300	9250
September	14650	17200	9250	15287	7575	10000
October	14600	16500	9500	14750	7650	9620
November	15000	16875	9437	15500	7887	9450
December	15000	17312	9210	15500	7270	9500
January	14875	20000	9162	15500	7050	9000
February	14500	22375	9062	15800	6925	8825
March	14850	23650	10750	16750	7425	8787
Mean	**14775**	**17609**	**9423**	**14010**	**7259**	**8869**

Table 11 contd... (Price Rs/quintal)

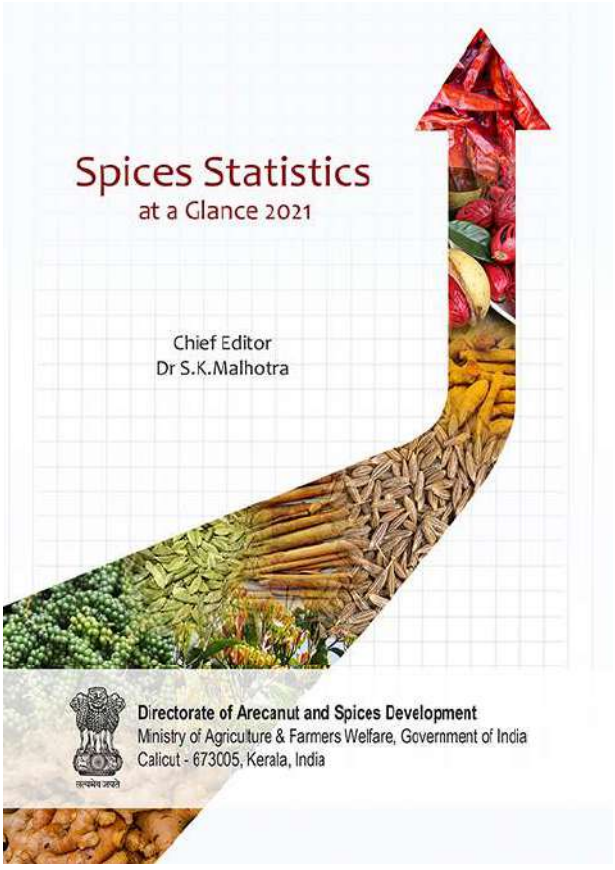
Month	Tamarind (Chennai)		Ajwain (Chennai)		Mace – Rs/kg (Cochin)	
	2020-21	2021-22	2020-21	2021-22	2020-21	2021-22
April	13000	12900	-	14000	1110	1485
May	-	14875	-	14000	-	1233
June	-	15167	-	15467	750	1053
July	12500	15200	12000	18400	912	1223
August	12625	12625	13000	18100	1020	1152
September	13000	12375	14250	18000	1080	830
October	14000	12500	13500	18000	1000	900
November	15250	12625	14375	18000	1016	900
December	13850	13000	13600	17875	1323	900
January	15500	13562	13000	18400	1177	900
February	14750	13375	13000	17500	1183	900
March	14250	13313	14500	17000	1476	900
Mean	**13873**	**13460**	**13469**	**17062**	**1095**	**1031**

Table 11 contd... (Price Rs/quintal)

Month	Clove (Cochin)		Nutmeg without shell (Cochin)		Arecanut-Dry (Kozhikode)	
	2020-21	2021-22	2020-21	2021-22	2020-21	2021-22
April	56750	59590	39875	52631	NT	32000
May	56947	60062	-	47916	23250	36000
June	56208	69217	33060	47384	26000	37000
July	55083	71500	36680	50442	27250	39000
August	54525	71500	40041	48695	NT	39000
September	55571	72261	41667	45239	30000	35250
October	54000	72113	41386	53181	31000	36000
November	51956	71636	46360	55500	29333	36000
December	51913	73566	51000	56400	26500	36000
January	51442	73700	51673	56700	30000	34000
February	52636	72275	55104	58925	31500	32000
March	55660	72210	56120	56324	31750	33000
Mean	**54391**	**69969**	**44815**	**52445**	**28658**	**35438**

4. Spices Statistics at a Glance 2021

To give added impetus to the growth in production of spices and resultant export, it is necessary that we re-orient our development programmes. For such strategic planning and exploitation of vast opportunities, exhaustive and reliable database is needed. In view of this, the Directorate brought a publication (ISBN-978-96-5526-979-9), "Spices Statistics at a Glance 2021", which is a compendium of all the official statistics like area, production, export, import, price and value of various spices produced in the Country. It is an authentic source of data for policy makers, scientists, researchers, farmers and other stakeholders in the Spices Sector. The book was released by Honourable Union Minister for Agriculture & Farmers Welfare, Shri. Narendra Singh Tomar at New Delhi on 21 December 2021.



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 mandate of the Directorate. With a view to achiev 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/-.

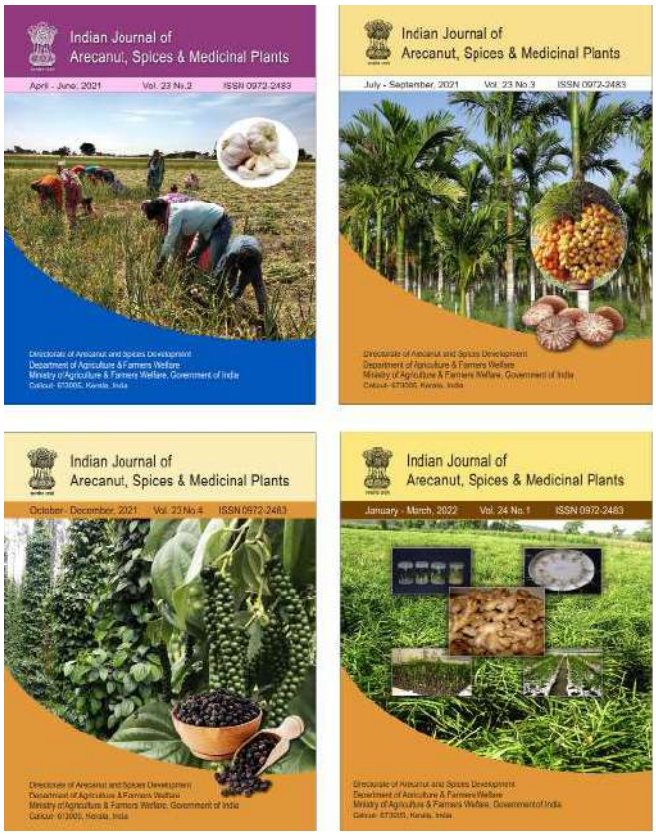


Fig. 1. Cover pages of published journals

2. Participation in Exhibitions

Participation in exhibitions and fairs 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.

The Directorate participated in the India International Trade Fair (IITF) held during 14th to 17th November, 2021 at Pragati Maidan, New Delhi.

Public visiting DASD 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
श्री.सी.सनमुख सुंदरम	अधीक्षक	सदस्य
श्रीमती.सी.वी.दिव्या	सहायक निदेशक	सदस्य
श्री.के.मनोज कुमार	साँख्यकीय अन्वेषक	सदस्य
श्री.के.वी.राजेश	प्रवर श्रेणी लिपिक	सदस्य
डॉ.पी.एन.ज्योति	कनिष्ठ अनुवादक	सदस्य-सचिव

राजभाषा के प्रगामी प्रयोग को उत्तरोत्तर बढ़ाने के लिए इस समिति की बैठकें हर तिमाही में आयोजित की जाती है। हिंदी के प्रयोग को बढ़ावा देने 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।

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 प्रतियोगिताएं 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 14 सितंबर, 2021 को हिंदी पखवाड़ा का शुभारंभ किया। डॉ. होमी चेरियान, निदेशक ने दीप जलाकर पखवाड़ा का उद्घाटन किया। उन्होंने निरंतर प्रयास करके हिंदी के प्रयोग बढ़ाने का अनुरोध किया। इस अवसर पर निदेशक ने सभी अधिकारियों और स्टाफ सदस्यों को मंत्रालय से प्राप्त राजभाषा प्रतिज्ञा दिलाई। डॉ.फेमिना, उप निदेशक ने स्वागत भाषण दिया और कहा कि हिंदी मे निर्धारित लक्ष्य प्राप्त होने के लिए सबको एकजुट होकर काम करना चाहिए।

श्री.बाबुलाल मीणा, उप निदेशक ने हिंदी पखवाड़ा का सराहना करते हुए सभी स्टाफ सदस्यों को हिंदी प्रतियोगिताओं में सक्रिय होकर भाग लेने का अनुरोध किया। श्री. सनमुख सुंदरम, अधीक्षक ने कहा कि अनेकता में एकता भारत की पहचान है। इसको कायम रखने में हिंदी का स्थान महत्वपूर्ण है। डॉ.पी.एन.ज्योति, कनिष्ठ अनुवादक ने हिंदी के प्रयोग को बढ़ाने की विभिन्न तकनीकी सुविधाओं का विवरण किया और कार्यालय में उपलब्ध मानक प्रपत्र और तकनीकी शब्दावली के प्रयोग करते हुए हिंदी के प्रयोग को बढ़ाने का अनुरोध किया। साथ ही उन्होंने पखवाड़ा केलिए प्रस्तावित कार्यक्रमों का ब्योरा प्रस्तुत किया।

कर्मचारियों के बीच राजभाषा का प्रयोग बढ़ाने के उद्देश्य से इस अवसर पर कार्यालयीन टिप्पणियों और विभिन्न अनुभागों में प्रयुक्त द्विभाषी प्रोफार्मे, जाँच-बिंदुओं आदि का संकलन द्विभाषी रूप में तैयार करके वितरण किया गया।

हिंदी भाषा के प्रचार-प्रसार करने के उद्देश्य से हिंदी भाषा के महत्व से संबंधित राजभाषा विभाग द्वारा तैयार की गई सूक्तियों के पोस्टर बनाकर कार्यालय में प्रदर्शन किया गया।

हिंदी दिवस के अवसर पर कर्मचारियों को हिंदी के प्रयोग में उपयोगी विभिन्न प्रकाशनों का परिचय देने के लिए संदर्भ ग्रंथों, हिंदी में तैयार किए गए पोस्टरों और अन्य प्रदर्शन सामग्रियों, निदेशालय द्वारा प्रकाशित हिंदी पत्रकें, कार्यालय में उपलब्ध हिंदी पत्रिकाएँ, पुस्तकें, समाचार पत्र आदि शामिल करते हुए राजभाषा प्रदर्शनी तैयार किया गया।

हिंदी पखवाड़ा – उद्घाटन समारोह की झलकियाँ

आठवीं अनुसूची में सम्मिलित 22 भाषाओं को भारत की पृष्ठभूमि में सजाकर रंगीन पोस्टर और मसाले फसलों एवं औषधीय पौधों से संबंधित नई सूचना सामग्रियाँ भी प्रदर्शनी में शामिल की गई।

हिंदी पखवाड़ा –समापन समारोह की झलकियाँ







कर्मचारियों को हिंदी के प्रयोग के लिए प्रेरणा एवं प्रोत्साहन देकर हिंदी के प्रति रुचि बढाने के उद्देश्य से पखवाड़े के दौरान हिंदी में विभिन्न प्रतियोगिताएँ आयोजित की गई। निबंध-लेखन, टिप्पण-आलेखन, टंकण, तकनीकी शब्दावली, हस्तलिपि, अंताक्षरी, हिंदी वाचन आदि प्रतियोगिताएँ चलाई गई । मंत्रालय से प्राप्त अनुदेशों के अनुसार एंटीएस के लिए हिंदी में श्रुतलेखन प्रतियोगिता 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। इस अवसर पर उन्होंने हिंदी प्रतियोगिताओं के विजेताओं को पुरस्कार वितरण किया।

हिंदी कार्यशाला

कर्मचारियों को हिंदी के प्रयोग में प्रशिक्षण देने के उद्द्श्य से 17-09-2021 को हिंदी कार्यशाला आयोजित किया गया। कोविड-19 महामारी को ध्यान में रखते हुए कार्यशाला ऑनलाइन रूप से चलाया गया, जिसमें यूनियन बैंक ऑफ इंडिया के वरिष्ठ प्रबंधक (राजभाषा), श्री.के राजेश ने टिप्पण-आलेखन में हिंदी के प्रयोग के विषय पर क्लास चलाया और अभ्यास कराया।

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 अनुवादक नियमित रूप से भाग ले रहे हैं। समिति द्वारा आयोजित संयुक्त हिंदी पखवाड़ा के कार्यक्रमों में हिंदी अनुवादक भाग लिया।

हिंदी प्रकाशन

निदेशालय द्वारा प्रकाशित इंडियन जर्नल ऑफ अरीकनट, स्पाइसेस एण्ड मेडिसिलनल प्लान्ट्स नामक त्रैमासिक पत्रिका में विभिन्न मसाला फसलों की उन्नत खेती, रोग-कीट प्रबंधन आदि पर आधारित वैज्ञानिक लेख, कृषि क्रियाएँ, मसालों के बाज़ार मूल्य की समीक्षा आदि नियमित रूप से हिंदी में प्रकाशित किए जाते हैं। इसके अलावा प्रदर्शनियों और कृषि मेलाओं में किसानों को वितरण करने के लिए मसाला फसलों की उन्नत खेती से संबंधित पत्रकें हिंदी में तैयार करके छपवाते हैं।

प्रशिक्षण

कर्मचारियों को हिंदी में काम करने के लिए सक्षम बनाने के उद्देश्य से प्रबोध, प्रवीण, प्राज्ञ और पारंगत कोर्स में प्रशिक्षण दिया जा रहा है। इसके अलावा दो कर्मचारियों को हिंदी शिक्षण योजना के अंतर्गत कंप्यूटर पर हिंदी टंकण का प्रशिक्षण दिया गया।

प्रोत्साहन योजना

कार्यालयीन काम मूल रूप से हिंदी में करने के लिए कर्मचारियों को प्रेरणा देने के लिए राजभाषा विभाग द्वारा 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।

समाचार पत्र, पत्रिकाएँ

निदेशालय में हिंदी के प्रसार के लिए हिंदी दैनिक समाचार पत्र नवभारत टाइम्स और हिंदी पत्रिकाएँ जैसे कृषि समीक्षा, उन्नत कृषि, नारियल पत्रिका, कैरली, रोशनी, मसालों का महक आदि भी उपलब्ध है।

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सत्यमेव जयते

सुपारी और मसाले विकास निदेशालय

कृषि और किसान कल्याण मंत्रालय

कृषि एवं किसान कल्याण विभाग

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